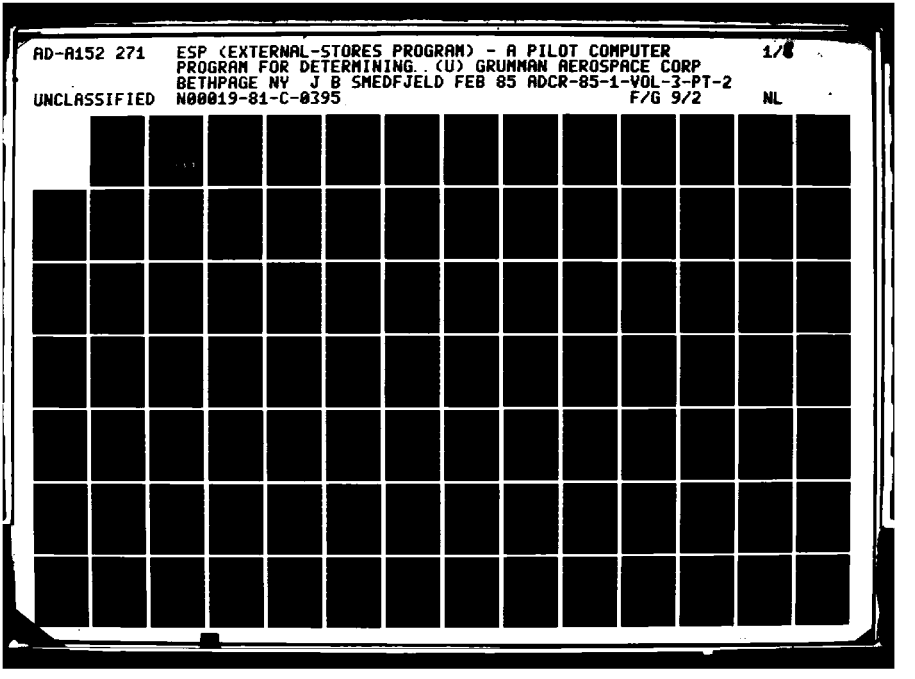
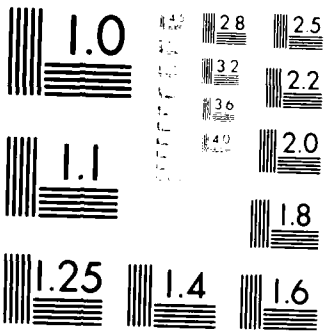

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ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING.. (U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2
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REPORT NO. ADCR-85-1
Volume III, Part 2 of 2

ESP — A PILOT COMPUTER PROGRAM FOR DETERMINING FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS

VOLUME III — PROGRAM COMPILATION PART 2 OF 2

February 1985

Prepared Under Contracts N00019-81-C-0395
and N00019-84-C-0123

JOHN B. SMEDFJELD

GRUMMAN AEROSPACE CORPORATION
BETHPAGE, NEW YORK 11714



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Report No. ADCR-85-1
Volume III, Part 2 of 2

ESP - A PILOT COMPUTER FOR DETERMINING FLUTTER-CRITICAL EXTERNAL-STORE CONFIGURATIONS

Volume III – Program Compilation,
Part 2 of 2, which follows Volume III - Program Compilation, Part 1 of 2.

John B. Smedfjeld

February 1985

Prepared under Contracts N00019-81-C-0395
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by

GRUMMAN AEROSPACE CORPORATION
Bethpage, New York 11714

for

NAVAL AIR SYSTEMS COMMAND
Washington, D.C. 20361



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```
      SUBROUTINE EVOVLE (BETA,ESR,EL,XI,YI,KK,IM,ENDX,KEND,ES)
C
      DIMENSION       CLEX(20) ,     CTEX(20) ,     CLEY(20)
      DIMENSION       CTEY(20) ,      XW(350) ,      YW(350)
      DIMENSION        XD(250) ,      YD(250) ,      AW(350)
      DIMENSION        AD(250) ,      XLE(50) ,      XTE(50)
      DIMENSION       XMS(50) ,    XTEML(50) ,      ISS(50)
      DIMENSION        XAT(5) ,       XAL(5) ,         F(5)
      DIMENSION       NWBT(5) ,       ASR(5) ,      XMAX(5)
      DIMENSION       IND(350) ,      BXW(50) ,    NCLER(5)
      DIMENSION       NCTER(5) ,       ESR(5) ,  CLEXR(20,5)
      DIMENSION    CLEYR(20,5) ,  CTEXR(20,5) ,  CTEYR(20,5)
      DIMENSION          LS(5) ,        XI(5) ,        YI(5)
      DIMENSION       THET(20) ,       CT(20) ,       SN(20)
      DIMENSION        BXE(20) ,       AY(20)
      DIMENSION ITAPES(50)
      COMMON / CTAPES / ITAPES
      COMMON/TOMB/XW,YW,NDB,LS,XMAX,NWB,AD,XD,YD,IND,AW
      COMMON/IDIOT/CLEXR,CLEYR,CTEXR,CTEYR,NCLER,NCTER,NS
      COMMON/OLIVER/CLEX,CLEY,CTEX,CTEY,NWBT,ASR
      COMMON /BXLL  / BEX(5)
      COMMON /BOXS/ BEL , BSR
      INTEGER OVRLAP
      LOGICAL SET,SETT,SAT
C
C
      ITAPER = ITAPES(5)
      ITAPEW = ITAPES(6)
      MTAP3  =  ITAPES(23)
C
C
      BXEL   =  BEX(KK)
      READ (ITAPER,98) NCLER(KK) , NCTER(KK) , NWBT(KK)
      NCLE=NCLER(KK)
      NCTE=NCTER(KK)
      READ (ITAPER,99) (CLEXR(I,KK),CLEYR(I,KK), I=1,NCLE)
      READ (ITAPER,99) (CTEXR(I,KK),CTEYR(I,KK), I=1,NCTE)
      XREF = 0.0
      DO 724 I=1,NCLE
      IF (CLEXR(I,KK).GE.XREF) GO TO 724
      XREF = CLEXR(I,KK)
  724 CONTINUE
   75 SLE    =  0.0
      DO 100 I=2,NCLE
      DELY = CLEYR(I,KK) - CLEYR(I-1,KK)
      XAVE = (CLEXR(I,KK) + CLEXR(I-1,KK))/2.0 - XREF
  100 SLE = SLE + DELY*XAVE
      STE = 0.0
      DO 101 I=2,NCTE
      DELY =  CTEYR(I,KK) - CTEYR(I-1,KK)
      XAVE = (CTEXR(I,KK) + CTEXR(I-1,KK))/2.0 - XREF
  101 STE = STE + DELY*XAVE
      AREA = STE - SLE
      ANWB   =  NWBT(KK)
      ASR(KK) = SQRT(AREA/ANWB)/12.0
      ESR(KK) = ASR(KK)*SQRT(BETA)
      EL=1./BETA
```

```
                  NCLE  =  NCLER(KK)                                          EVOVLE     59
                  ABX   =  CLEYR(NCLE,KK) / (ESR(KK)*12.0*EL)                 EVOVLE     60
60                NBX   =  ABX                                                EVOVLE     61
                  IF ( AMOD(ABX,1.0) .GE. 0.5 )     NBX = NBX + 1             EVOVLE     62
                  ESR(KK)  =  CLEYR(NCLE,KK) / FLOAT(NBX)                     EVOVLE     63
                  ESR(KK)  =  ESR(KK) / (12.0*EL)                             EVOVLE     64
                  ES  =  ESR(KK)                                              EVOVLE     65
65                EL=1./BETA                                                  EVOVLE     66
                  XES = ES*12.0                                               EVOVLE     67
                  XEL = XES*EL                                                EVOVLE     68
                  XIN = ES*6.0                                                EVOVLE     69
                  XAR = XES*XEL                                               EVOVLE     70
70                NCLE=NCLER(KK)                                              EVOVLE     71
                  NCTE=NCTER(KK)                                              EVOVLE     72
                  IF (BXEL.EQ.0.) GOTO 61                                     EVOVLE     73
                  NCLES = NCLE - 1                                            EVOVLE     74
                  DO 62 I = 1,NCLES                                           EVOVLE     75
75                DY = CLEYR(I+1,KK) - CLEYR(I,KK)                            EVOVLE     76
                  DX = CLEXR(I+1,KK) - CLEXR(I,KK)                            EVOVLE     77
                  THET(I) = ATAN2(DY,DX)                                      EVOVLE     78
                  IF (THET(I).LT.0.0) THET(I) = THET(I) + 6.283185307         EVOVLE     79
                  SN(I) = DX / DY                                             EVOVLE     80
80                BXE(I) = BXEL / SIN(THET(I))                                EVOVLE     81
               62 CT(I) = CLEXR(I,KK) - SN(I)*CLEYR(I,KK)                     EVOVLE     82
                  AY(1) = CLEYR(1,KK)                                         EVOVLE     83
                  IF (NCLES.LT.2) GO TO 66                                    EVOVLE     84
                  DO 63 I = 2,NCLES                                           EVOVLE     85
85                IF (SN(I).NE.SN(I-1)) GO TO 64                              EVOVLE     86
                  AY(I) = CLEYR(I,KK)                                         EVOVLE     87
                  GO TO 63                                                    EVOVLE     88
               64 AY(I) = (CT(I) - CT(I-1)) / (SN(I-1) - SN(I))               EVOVLE     89
               63 CONTINUE                                                    EVOVLE     90
90             66 DO 65 I = 1,NCLES                                           EVOVLE     91
                  AY(I) = AY(I) / (ES*EL*12.0)                                EVOVLE     92
               65 BXE(I) = BXE(I) / (ES*12.0)                                 EVOVLE     93
                  BEN = (BXEL + CLEYR(NCLE,KK)) / (ES*EL*12.0)                EVOVLE     94
                                                                              EVOVLE     95
95             61 DO 1  I = 1,NCLE                                            EVOVLE     96
                  CLEX(I)=CLEXR(I,KK)/(ES*12.0) - 0.5                         EVOVLE     97
                1 CLEY(I)=CLEYR(I,KK)/(ES*EL*12.)                             EVOVLE     98
                                                                              EVOVLE     99
                  DO 2 I=1,NCTE                                               EVOVLE    100
100               CTEX(I)=CTEXR(I,KK)/(ES*12.0) - 0.5                         EVOVLE    101
                2 CTEY(I)=CTEYR(I,KK)/(ES*EL*12.)                             EVOVLE    102
                                                                              EVOVLE    103
                  ENDY  =  AINT (CLEY(NCLE) + 0.5)                            EVOVLE    104
                  CLEY(NCLE)  =  ENDY                                         EVOVLE    105
105               CTEY(NCTE)  =  ENDY                                         EVOVLE    106
                                                                              EVOVLE    107
            C FIND LARGEST X ON TRAILING EDGE                                 EVOVLE    108
                                                                              EVOVLE    109
                  ENDX = 0.0                                                  EVOVLE    110
110               DO 3 I=1,NCTE                                               EVOVLE    111
                  XX=CTEX(I)                                                  EVOVLE    112
                3 ENDX=AMAX1(ENDX,XX)                                         EVOVLE    113
                                                                              EVOVLE    114
            C FIND SMALLEST X ON TRAILING EDGE                                EVOVLE    115
```

```
115                                                                     EVOVLE  116
                STEX=ENDX                                               EVOVLE  117
                DO 4 I=1,NCTE                                           EVOVLE  118
                XX=CTEX(I)                                              EVOVLE  119
              4 STEX=AMIN1(STEX,XX)                                     EVOVLE  120
120                                                                     EVOVLE  121
      C FIND LARGEST X ON LEADING EDGE                                  EVOVLE  122
                                                                        EVOVLE  123
                BLEX=0.0                                                EVOVLE  124
                DO 6 I=1,NCLE                                           EVOVLE  125
125             XX=CLEX(I)                                              EVOVLE  126
              6 BLEX=AMAX1(BLEX,XX)                                     EVOVLE  127
                                                                        EVOVLE  128
      C CALCULATE LEADING EDGE LINE                                     EVOVLE  129
                                                                        EVOVLE  130
130             NCLES=NCLE-1                                            EVOVLE  131
                Y=0.                                                    EVOVLE  132
                DO 8 J=1,NCLES                                          EVOVLE  133
                IF(CLEY(J).EQ.CLEY(J+1)) GO TO 8                        EVOVLE  134
                IF(Y+.5.GT.CLEY(J+1)) GO TO 8                           EVOVLE  135
135           7 K=Y+1.                                                  EVOVLE  136
                XLE(K)=CLEX(J)-(CLEX(J)-CLEX(J+1))*(Y+.5-CLEY(J))/      EVOVLE  137
               1       (CLEY(J+1)-CLEY(J))                              EVOVLE  138
                Y=Y+1.                                                  EVOVLE  139
                IF(CLEY(J+1)-(Y+.5)) 8,7,7                              EVOVLE  140
140           8 CONTINUE                                                EVOVLE  141
                                                                        EVOVLE  142
      C CALCULATE TRAILING EDGE LINE                                    EVOVLE  143
                                                                        EVOVLE  144
                NCTES=NCTE-1                                            EVOVLE  145
145             Y=0.                                                    EVOVLE  146
                DO 10 JJ=1,NCTES                                        EVOVLE  147
                IF(CTEY(JJ).EQ.CTEY(JJ+1)) GO TO 10                     EVOVLE  148
                IF(Y+.5.GT.CTEY(JJ+1)) GO TO 10                         EVOVLE  149
              9 K=Y+1.                                                  EVOVLE  150
150             XTE(K)=CTEX(JJ)-(CTEX(JJ)-CTEX(JJ+1))*(Y+.5-CTEY(JJ))/  EVOVLE  151
               1       (CTEY(JJ+1)-CTEY(JJ))                            EVOVLE  152
                Y=Y+1.                                                  EVOVLE  153
                IF(CTEY(JJ+1)-(Y+.5)) 10,9,9                            EVOVLE  154
             10 CONTINUE                                                EVOVLE  155
155                                                                     EVOVLE  156
      C CALCULATE LEADING EDGE MACH LINES THAT HAVE SMALLEST X-VALUES   EVOVLE  157
                                                                        EVOVLE  158
                IRS=1                                                   EVOVLE  159
                Y=0.                                                    EVOVLE  160
160             GO TO 12                                                EVOVLE  161
             11 Y=Y+1.                                                  EVOVLE  162
             12 K=Y+1.                                                  EVOVLE  163
                XMS(K)=ENDX                                             EVOVLE  164
                DO 13 J=1,NCLE                                          EVOVLE  165
165             XMK=ABS(Y-CLEY(J)+.5)+CLEX(J)                           EVOVLE  166
                XMSK=XMS(K)                                             EVOVLE  167
             13 XMS(K)=AMIN1(XMSK,XMK)                                  EVOVLE  168
                IF (BXEL.EQ.0.) GOTO 23                                 EVOVLE  169
      C         ------ BOX ELIMINATION AT LEADING EDGE ----------       EVOVLE  170
170             IF (Y+0.5.LE.CLEY(NCLE)) GO TO 24                       EVOVLE  171
                KAA = NCLE - 1                                          EVOVLE  172
```

```
                  KAB = NCLE                                                    EVOVLE   173
                  XQE = CLEX(KAA) - (CLEX(KAA)-CLEX(KAB)) * (Y+0.5-CLEY(KAA)) /  EVOVLE   174
                 1 (CLEY(KAB) - CLEY(KAA))                                      EVOVLE   175
175               IF (XMS(K).GE.XQE) GO TO 23                                   EVOVLE   176
                  IBNX = XQE - XMS(K)                                           EVOVLE   177
                  IF (IBNX.GT.BXE(NCLE-1)) XMS(K) = XQE - BXE(NCLE-1)           EVOVLE   178
                  GO TO 23                                                      EVOVLE   179
                 24 IF (NCLES.GT.1.AND.Y+0.5.GE.AY(2)) GO TO 25                 EVOVLE   180
180               X22 = XLE(K) - BXE(1)                                         EVOVLE   181
                  IF (XMS(K).LT.X22) XMS(K) = X22                               EVOVLE   182
                  GO TO 23                                                      EVOVLE   183
                 25 DO 26 I = 1,NCLES                                           EVOVLE   184
                  IF (Y+0.5.GE.AY(I).AND.Y+0.5.LT.AY(I+1))  GO TO 27            EVOVLE   185
185               26 CONTINUE                                                   EVOVLE   186
                  X22 = XLE(K) - BXE(NCLES)                                     EVOVLE   187
                  GO TO 35                                                      EVOVLE   188
                 27 X22 = XLE(K) - BXE(I)                                       EVOVLE   189
                 35 IF (XMS(K).LT.X22) XMS(K) = X22                             EVOVLE   190
190                                                                             EVOVLE   191
               C CALCULATE TRAILING EDGE MACH LINES THAT HAVE LARGEST X-VALUES  EVOVLE   192
                                                                                EVOVLE   193
                 23 XTEML(K) = 0.0                                              EVOVLE   194
                  DO 14 JJ=1,NCTE                                               EVOVLE   195
195               XTEMK=CTEX(JJ)-ABS(Y+.5-CTEY(JJ))                             EVOVLE   196
                  XTEMLK=XTEML(K)                                               EVOVLE   197
                 14 XTEML(K)=AMAX1(XTEMLK,XTEMK)                                EVOVLE   198
                                                                                EVOVLE   199
                  IF(Y+.5.LE.ENDY.AND.XTEML(K).GE.XMS(K)) GO TO 11              EVOVLE   200
200               IF(Y+.5.LE.ENDY) GO TO 732                                    EVOVLE   201
                  GO TO 733                                                     EVOVLE   202
                732 IF(IRS.EQ.1) BIGY=Y                                         EVOVLE   203
                  IRS=2                                                         EVOVLE   204
                  GO TO 11                                                      EVOVLE   205
205                                                                             EVOVLE   206
               C FIND THE Y-RANGE OF BOTTOM DIAPHRAGM                           EVOVLE   207
                                                                                EVOVLE   208
                733 IF (BXEL.NE.0.0.AND.Y+0.5.GE.BEN) GOTO 201                  EVOVLE   209
                  IF (XTEML(K).GE.XMS(K)) GO TO 200                             EVOVLE   210
210               GO TO 201                                                     EVOVLE   211
                200 ISS(K)=0                                                    EVOVLE   212
                  IRS=1                                                         EVOVLE   213
                  GO TO 11                                                      EVOVLE   214
                                                                                EVOVLE   215
215            C IF THERE IS A BOTTOM DIAPHRAGM, FIND ITS LARGEST Y-VALUE       EVOVLE   216
                                                                                EVOVLE   217
                201 IF(IRS.EQ.1) BIGY=Y                                         EVOVLE   218
                  BOT=AMAX1(BIGY,ENDY-.5)                                       EVOVLE   219
                                                                                EVOVLE   220
220            C FIND SUBSONIC AND SUPERSONIC LOCATIONS ON LEADING AND TRAILING EDGES  EVOVLE   221
                                                                                EVOVLE   222
                  KEND=ENDY+.5                                                  EVOVLE   223
                  DO 15 K=1,KEND                                                EVOVLE   224
                  IF(XLE(K).GE.XMS(K).AND.XTE(K).LE.XTEML(K)) ISS(K)=-1         EVOVLE   225
225               IF(XLE(K).LE.XMS(K).AND.XTE(K).LE.XTEML(K)) ISS(K)= 1         EVOVLE   226
                  IF(XLE(K).GE.XMS(K).AND.XTE(K).GE.XTEML(K)) ISS(K)=-2         EVOVLE   227
                  IF(XLE(K).LE.XMS(K).AND.XTE(K).GE.XTEML(K)) ISS(K)=2          EVOVLE   228
                 15 CONTINUE                                                    EVOVLE   229
```

```
                                                                                EVOVLE   230
230         C SEE IF MAX-X ON LEADING EDGE IS GREATER THAN MIN-X ON TRAILING EDGE EVOVLE   231
                                                                                EVOVLE   232
                  OVRLAP=0                                                      EVOVLE   233
                  IF(BLEX+1..GE.STEX) OVRLAP=1                                  EVOVLE   234
                                                                                EVOVLE   235
235         C INITIALIZE IW,ID,J,JJ,X,Y                                         EVOVLE   236
                                                                                EVOVLE   237
                  IW=0                                                          EVOVLE   238
                  ID=0                                                          EVOVLE   239
                  X=0.                                                          EVOVLE   240
240              16 Y=0.                                                        EVOVLE   241
                  J=1                                                           EVOVLE   242
                  JJ=1                                                          EVOVLE   243
                  TANLJ=TANL(1)                                                 EVOVLE   244
                  TANTJJ=TANT(1)                                                EVOVLE   245
245                                                                             EVOVLE   246
                 17 K=Y+1.                                                      EVOVLE   247
                  IF(Y+.5.GT.ENDY) XTE(K)=0.                                    EVOVLE   248
                  IF(Y+.5.GT.ENDY) XLE(K)=ENDX+1.                               EVOVLE   249
                                                                                EVOVLE   250
250         C SEE IF BOX IS LOCATED ENTIRELY ON BOTTOM DIAPHRAGM                EVOVLE   251
                                                                                EVOVLE   252
                  IF(ISS(K).EQ.0.AND.Y.GE.ENDY.AND.X.GE.XMS(K).AND.X.LE.XTEML(K)) EVOVLE   253
                 1GO TO 1000                                                    EVOVLE   254
                                                                                EVOVLE   255
255         C SEE IF BOX IS LOCATED ENTIRELY ON WING                            EVOVLE   256
                                                                                EVOVLE   257
                  IF(Y+1..LE.ENDY.AND.X-.5.GT.BLEX.AND.X+.5.LT.STEX             EVOVLE   258
                 1.AND.OVRLAP.EQ.0) GO TO 2000                                  EVOVLE   259
                                                                                EVOVLE   260
260         C IF BOX TOUCHES NEITHER THE WING NOR THE DIAPHRAGM,BYPASS CALCULATIONS EVOVLE   261
                                                                                EVOVLE   262
                  IF((X    .LT.XMS(K).AND.X+1..LT.XLE(K)).OR.(X-1..GT.XTE(K).AND.X EVOVLE   263
                 1.GT.XTEML(K))) GO TO 3000                                     EVOVLE   264
                                                                                EVOVLE   265
265                                                                             EVOVLE   266
            C DETERMINE WHETHER BOX IS CUT OR UNCUT                             EVOVLE   267
                  SET=.FALSE.                                                   EVOVLE   268
                  SETT=.FALSE.                                                  EVOVLE   269
                  DO 55 N=1,5                                                   EVOVLE   270
270               I=6-N                                                         EVOVLE   271
                  S=5-I                                                         EVOVLE   272
                  INT=1                                                         EVOVLE   273
                  GO TO 45                                                      EVOVLE   274
                 40 INT=2                                                       EVOVLE   275
275              45 SSCALE=1.                                                   EVOVLE   276
                  TSCALE=1.                                                     EVOVLE   277
                  XLREF   =XLE(K)                                               EVOVLE   278
                  XTREF   =XTE(K)                                               EVOVLE   279
                  IF(J.LT.NCLES.AND.CLEY(J+1).LT.Y+.5.AND.CLEY(J+1).GT.Y)       EVOVLE   280
280               1XLREF=XLE(K-1)-4.*TANL(J)                                    EVOVLE   281
                  IF(JJ.LT.NCTES.AND.CTEY(JJ+1).LT.Y+.5.AND.CTEY(JJ+1).GT.Y)    EVOVLE   282
                  1XTREF=XTE(K-1)-4.*TANT(JJ)                                   EVOVLE   283
                  IF(Y+.25*S.GE.CLEY(J+1).AND.J.LT.NCLES) GO TO 600             EVOVLE   284
                  IF(SET) GO TO 604                                             EVOVLE   285
285               GO TO 601                                                     EVOVLE   286
```

```
                600 J=J+1                                                          EVOVLE   287
                604 IF(INT.EQ.2) TANLJ=TANL(J)                                     EVOVLE   288
                    IF(INT.EQ.2) XLREF=XLE(K+1)+4.*TANLJ                           EVOVLE   289
                    SET=.TRUE.                                                     EVOVLE   290
290             601 IF(Y+.25*S.GE.CTEY(JJ+1).AND.JJ.LT.NCTES) GO TO 602            EVOVLE   291
                    IF(SETT) GO TO 605                                             EVOVLE   292
                    GO TO 603                                                      EVOVLE   293
                602 JJ=JJ+1                                                        EVOVLE   294
                605 IF(INT.EQ.2) TANTJJ=TANT(JJ)                                   EVOVLE   295
295                 IF(INT.EQ.2) XTREF=XTE(K+1)+4.*TANTJJ                          EVOVLE   296
                    SETT=.TRUE.                                                    EVOVLE   297
                603 CONTINUE                                                       EVOVLE   298
                                                                                   EVOVLE   299
                    IF(CLEY(NCLE).LT.(Y+1.).AND.CLEY(NCLE).GT.(Y    )) GO TO 46    EVOVLE   300
300                 GO TO 48                                                       EVOVLE   301
                 46 SSCALE=CLEY(NCLE)-Y                                            EVOVLE   302
                    XLREF=CLEX(NCLE)+(CLEX(NCLE-1)-CLEX(NCLE))*SSCALE/             EVOVLE   303
                   1(2.*(CLEY(NCLE)-CLEY(NCLE-1)))                                 EVOVLE   304
                 48 IF(CTEY(NCTE).LT.(Y+1.).AND.CTEY(NCTE).GT.(Y    )) GO TO 49    EVOVLE   305
305                 GO TO 50                                                       EVOVLE   306
                 49 TSCALE=CTEY(NCTE)-Y                                            EVOVLE   307
                    XTREF=CTEX(NCTE)+(CTEX(NCTE-1)-CTEX(NCTE))*TSCALE/             EVOVLE   308
                   1(2.*(CTEY(NCTE)-CTEY(NCTE-1)))                                 EVOVLE   309
                                                                                   EVOVLE   310
310              50 IF(INT.EQ.1) GO TO 40                                          EVOVLE   311
                                                                                   EVOVLE   312
                    T=I-3                                                          EVOVLE   313
                    XAL(I)=XLREF+T*SSCALE*TANLJ                                    EVOVLE   314
                    XAT(I)=XTREF+T*TSCALE*TANTJJ                                   EVOVLE   315
315                 F(I)=(SSCALE/12.)*(AMIN1(X+.5,XAT(I))-AMAX1(X-.5,XAL(I)))     EVOVLE   316
                 55 IF(F(I).LE.0.) F(I)=0.                                         EVOVLE   317
                                                                                   EVOVLE   318
                    AREA=F(1)+4.*F(2)+2.*F(3)+4.*F(4)+F(5)                         EVOVLE   319
                    IF(AREA.LT.1..AND.AREA.GT..9999) AREA=1.                       EVOVLE   320
320                 IF(AREA.LT..0001) AREA=0.                                      EVOVLE   321
                                                                                   EVOVLE   322
              C   BOX TURNS OUT TO BE EITHER UNCUT OR ENTIRELY OFF WING            EVOVLE   323
                                                                                   EVOVLE   324
                    IF(AREA.EQ.0.AND.((X.LE.XLE(K).AND.X.GE.XMS(K).AND.ISS(K).LE.0) EVOVLE   325
325                1.OR.(X.GE.XTE(K).AND.X.LE.XTEML(K).AND.(IABS(ISS(K)).EQ.1.OR. EVOVLE   326
                   2ISS(K).EQ.0)))) GO TO 1000                                     EVOVLE   327
                                                                                   EVOVLE   328
              C   BOX TURNS OUT TO BE EITHER CUT OR ENTIRELY ON WING               EVOVLE   329
                                                                                   EVOVLE   330
330                 IF(AREA.GT.0.) GO TO 18                                        EVOVLE   331
                    GO TO 3000                                                     EVOVLE   332
                 18 IW=IW+1                                                        EVOVLE   333
                    IF (IW.GT.350) GOTO 22                                         EVOVLE   334
                    AW(IW)=AREA                                                    EVOVLE   335
335                 XW(IW)=X                                                       EVOVLE   336
                    YW(IW)=Y                                                       EVOVLE   337
                    IND(IW)=1                                                      EVOVLE   338
                    BXW(K)=X                                                       EVOVLE   339
                                                                                   EVOVLE   340
340           C   BOX TURNS OUT TO BE CUT BY BOTTOM EDGE OF WING                    EVOVLE   341
                    IF(AREA.LT.1..AND.AREA.GT.0..AND.CLEY(NCLE).LT.Y+1..AND.CLEY(NCLE) EVOVLE   342
                   1.GT.Y.AND.Y+1..LE.BIGY) GO TO 19                               EVOVLE   343
```

```
      C   BOX TURNS OUT TO BE SHARED BY A DIAPHRAGM                          EVOVLE   344
            DLINE=XLE(K)+.5*(XTE(K)-XLE(K))                                 EVOVLE   345
345         IF(AREA.LT.1.AND.AREA.GT.O..AND.((X.LE.DLINE.AND.X.GE.XMS(K)    EVOVLE   346
           1.AND.ISS(K).LT.O).OR.(X.GT.DLINE.AND.X.LE.XTEML(K).AND.         EVOVLE   347
           2IABS(ISS(K)).EQ.1))) GO TO 19                                   EVOVLE   348
      C   BOX TURNS OUT TO BE SHARED, BUT ISS(K) MAY NOT SO INDICATE        EVOVLE   349
            IF(AREA.LT.1..AND.AREA.GT.O..AND.Y+1..LE.BOT.AND.((CLEY(J  ).LT. EVOVLE   350
350        1Y+1..AND.CLEY(J  ).GT.Y+.5.AND.X.LE.DLINE.AND.X.GE.XMS(K).AND.  EVOVLE   351
           2ISS(K+1).LT.O).OR.(CTEY(JJ  ).LT.Y+1..AND.CTEY(JJ  ).GT.Y+.5.AND. EVOVLE   352
           3X.GT.DLINE.AND.X.LE.XTEML(K).AND.IABS(ISS(K+1)).EQ.1))) GO TO 19 EVOVLE   353
            GO TO 3000                                                      EVOVLE   354
                                                                            EVOVLE   355
355      19 ID=ID+1                                                         EVOVLE   356
            IF (ID.GT.250) GO TO 28                                         EVOVLE   357
            AD(ID)=1.-AREA                                                  EVOVLE   358
            XD(ID)=X                                                        EVOVLE   359
            YD(ID)=Y                                                        EVOVLE   360
360         IND(IW)=O                                                       EVOVLE   361
            GO TO 3000                                                      EVOVLE   362
       1000 ID=ID+1                                                         EVOVLE   363
            IF (ID.GT.250) GO TO 28                                         EVOVLE   364
            AD(ID)=1.                                                       EVOVLE   365
365         XD(ID)=X                                                        EVOVLE   366
            YD(ID)=Y                                                        EVOVLE   367
            GO TO 3000                                                      EVOVLE   368
       2000 IW=IW+1                                                         EVOVLE   369
            IF (IW.GT.350) GOTO 22                                          EVOVLE   370
370         AW(IW)=1.                                                       EVOVLE   371
            XW(IW)=X                                                        EVOVLE   372
            YW(IW)=Y                                                        EVOVLE   373
            IND(IW)=1                                                       EVOVLE   374
            BXW(K)=X                                                        EVOVLE   375
375         GO TO 3000                                                      EVOVLE   376
                                                                            EVOVLE   377
      C SEE IF MAXIMUM Y OF INTEREST HAS BEEN EXCEEDED                      EVOVLE   378
                                                                            EVOVLE   379
       3000 IF(Y+1..LE.BOT) GO TO 3001                                      EVOVLE   380
380                                                                         EVOVLE   381
      C IF MAXIMUM X OF INTEREST HAS BEEN EXCEEDED, STOP                    EVOVLE   382
                                                                            EVOVLE   383
            IF(X-.5.GE.ENDX) GO TO 4000                                     EVOVLE   384
                                                                            EVOVLE   385
385   C   IF MAXIMUM Y OF INTEREST HAS BEEN EXCEEDED, GO TO NEXT X          EVOVLE   386
                                                                            EVOVLE   387
            X=X+1.                                                          EVOVLE   388
            GO TO 16                                                        EVOVLE   389
                                                                            EVOVLE   390
390   C   IF MAXIMUM Y OF INTEREST HAS NOT BEEN EXCEEDED, GO TO NEXT Y      EVOVLE   391
                                                                            EVOVLE   392
       3001 Y=Y+1.                                                          EVOVLE   393
            GO TO 17                                                        EVOVLE   394
                                                                            EVOVLE   395
395   C   GIVE SPECIAL WEIGHTING TO BOXES CUT BY SUPERSONIC TRAILING EDGE   EVOVLE   396
                                                                            EVOVLE   397
       4000 N=IW+1                                                          EVOVLE   398
            SAT=.FALSE.                                                     EVOVLE   399
            DO 304 K=1,KEND                                                 EVOVLE   400
```

```
400                 IW=N-1                                                          EVOVLE   401
                    IF(SAT) IW=N                                                    EVOVLE   402
                    N=1                                                             EVOVLE   403
                    DO 306 IJ=1,IW                                                  EVOVLE   404
                    SAT=.TRUE.                                                      EVOVLE   405
405                 Z=K                                                             EVOVLE   406
                    IF(XW(IJ).EQ.BXW(K)-1..AND.YW(IJ)+1..EQ.Z) IWWS=IJ              EVOVLE   407
                    IF(XW(IJ).EQ.BXW(K)    .AND.YW(IJ)+1..EQ.Z) GO TO 309           EVOVLE   408
                    GO TO 305                                                       EVOVLE   409
                309 IND(IJ)=-IND(IJ)                                                EVOVLE   410
410                 IF(AW(IJ).LT..5) GO TO 316                                      EVOVLE   411
                    GO TO 305                                                       EVOVLE   412
                316 AW(IWWS)=AW(IWWS)+AW(IJ)                                        EVOVLE   413
                    IND(IWWS)=-IND(IWWS)                                            EVOVLE   414
                    IF (IJ .NE. IW) GO TO 306                                       EVOVLE   415
415                 SAT    =   .FALSE.                                              EVOVLE   416
                    GO TO 306                                                       EVOVLE   417
                305 XW(N)=XW(IJ)                                                    EVOVLE   418
                    YW(N)=YW(IJ)                                                    EVOVLE   419
                    AW(N)=AW(IJ)                                                    EVOVLE   420
420                 IND(N)=IND(IJ)                                                  EVOVLE   421
                    N=N+1                                                           EVOVLE   422
                    SAT=.FALSE.                                                     EVOVLE   423
                306 CONTINUE                                                        EVOVLE   424
                304 CONTINUE                                                        EVOVLE   425
425                                                                                 EVOVLE   426
                    IW=N-1                                                          EVOVLE   427
                    IF (IW.LE.350) GOTO 20                                          EVOVLE   428
                 22 NWBT(KK) = NWBT(KK) - 10                                        EVOVLE   429
                    GO TO 75                                                        EVOVLE   430
430              20 IF (ID.LE.250) GOTO 85                                          EVOVLE   431
                 28 IF (BXEL.NE.0.0) GOTO 21                                        EVOVLE   432
                    BXEL =120.0 * ES                                                EVOVLE   433
                    GOTO 75                                                         EVOVLE   434
                 21 BXEL = BXEL - 12.*ES                                            EVOVLE   435
435                 IF (BXEL /(ES*12.).GE.4.0) GOTO 75                              EVOVLE   436
                    BXEL = 0.                                                       EVOVLE   437
                    NWBT(KK) = NWBT(KK) - 10                                        EVOVLE   438
                    GOTO 75                                                         EVOVLE   439
                 85 CONTINUE                                                        EVOVLE   440
440                 BEX(KK) = BXEL                                                  EVOVLE   441
                    WRITE (MTAP3) IW,ENDX,ES,EL,KEND,ID                             EVOVLE   442
                    SW = 0.0                                                        EVOVLE   443
                    WRITE (ITAPEW,114) KK                                           EVOVLE   444
                    WRITE (ITAPEW,116)                                              EVOVLE   445
445                 LINE   =  10                                                    EVOVLE   446
                    DO 4001 IJ=1,IW                                                 EVOVLE   447
                    WRITE(MTAP3) XW(IJ),YW(IJ),AW(IJ),IND(IJ)                       EVOVLE   448
                    LINE = LINE + 1                                                 EVOVLE   449
                    IF ( LINE .GE. 56 )     LINE = 0                                EVOVLE   450
450                 IF (LINE.NE.0) GO TO 30                                         EVOVLE   451
                    LINE   =  11                                                    EVOVLE   452
                    WRITE (ITAPEW,114) KK                                           EVOVLE   453
                    WRITE (ITAPEW,116)                                              EVOVLE   454
                 30 XWIN = XW(IJ)*XES + XIN                                         EVOVLE   455
455                 YWIN = YW(IJ)*XEL + 0.5*XEL                                     EVOVLE   456
                    XAW  = AW(IJ)*XAR                                               EVOVLE   457
```

```
                IXW  =  XW(IJ)                                                  EVOVLE   458
                IYW  =  YW(IJ)                                                  EVOVLE   459
                SW = SW + AW(IJ)                                                EVOVLE   460
460          4001 WRITE (ITAPEW,117) IJ,IND(IJ),IXW,IYW,AW(IJ),XWIN,YWIN,XAW    EVOVLE   461
                SD = 0.0                                                        EVOVLE   462
                IF(ID.EQ.0) GO TO 4006                                          EVOVLE   463
                WRITE (ITAPEW,115) KK                                           EVOVLE   464
                WRITE (ITAPEW,116)                                              EVOVLE   465
465             LINE  =  10                                                     EVOVLE   466
                DO 4002 IJ=1,ID                                                 EVOVLE   467
                WRITE(MTAP3) XD(IJ),YD(IJ),AD(IJ)                               EVOVLE   468
                LINE = LINE + 1                                                 EVOVLE   469
                IF ( LINE  GE. 56 )     LINE = 0                                EVOVLE   470
470             IF (LINE.NE.0) GO TO 60                                         EVOVLE   471
                LINE  =  11                                                     EVOVLE   472
                WRITE (ITAPEW,115) KK                                           EVOVLE   473
                WRITE (ITAPEW,116)                                              EVOVLE   474
             60 XWIN = XD(IJ)*XES + XIN                                         EVOVLE   475
475             YWIN = YD(IJ)*XEL + 0.5*XEL                                     EVOVLE   476
                XAW  = AD(IJ)*XAR                                               EVOVLE   477
                IAC  = 0                                                        EVOVLE   478
                SD = SD + AD(IJ)                                                EVOVLE   479
                IXD  =  XD(IJ)                                                  EVOVLE   480
480             IYD  =  YD(IJ)                                                  EVOVLE   481
             4002 WRITE (ITAPEW,117) IJ,IAC,IXD,IYD,AD(IJ),XWIN,YWIN,XAW       EVOVLE   482
                                                                                EVOVLE   483
             4006 NWB=IW                                                        EVOVLE   484
                NDB=ID                                                          EVOVLE   485
485             NSW = NOXN(SW)                                                  EVOVLE   486
                NSD = NOXN(SD)                                                  EVOVLE   487
                WRITE (MTAP3) XTE                                               EVOVLE   488
                WRITE (ITAPEW,102) NSW , NSD                                    EVOVLE   489
                BSR = ESR(KK)*12.0                                              EVOVLE   490
490             BEL = BSR*EL                                                    EVOVLE   491
                WRITE (ITAPEW,103) BSR , BEL                                    EVOVLE   492
                XMM=0.0                                                         EVOVLE   493
                YMM=0.0                                                         EVOVLE   494
                DO 4031 IJ=1,IW                                                 EVOVLE   495
495             XMM=AMAX1(XMM,XW(IJ))                                           EVOVLE   496
             4031 YMM=AMAX1(YMM,YW(IJ))                                         EVOVLE   497
                XMAX(KK)=XMM+1.0                                                EVOVLE   498
                LS(KK)=YMM+1.0                                                  EVOVLE   499
                IF(NDB.EQ.0) GO TO 4033                                         EVOVLE   500
500             DO 4032 IJ=1,ID                                                 EVOVLE   501
                XMM=AMAX1(XMM,XD(IJ))                                           EVOVLE   502
             4032 YMM=AMAX1(YMM,YD(IJ))                                         EVOVLE   503
             4033 CONTINUE                                                      EVOVLE   504
                XI(KK)=XMM                                                      EVOVLE   505
505             YI(KK)=YMM                                                      EVOVLE   506
             C                                                                  EVOVLE   507
             C                                                                  EVOVLE   508
             C FORMATS                                                          EVOVLE   509
             C                                                                  EVOVLE   510
510             98 FORMAT(10I5)                                                 EVOVLE   511
                99 FORMAT(8E10.2)                                               EVOVLE   512
               102 FORMAT (1H1,//20X38HNUMBER OF BOXES IN TERMS OF UNIT AREAS, //  EVOVLE   513
                  1        20X,I5,3X10HWING BOXES,//20X,I5,3X15HDIAPHRAGM BOXES,//)  EVOVLE   514
```

```
                103 FORMAT (/20X21HDIMENSIONS OF BOX ARE,//20X,F10.3,2X17HINCHES STREA EVOVLE    515
515                1MWISE,//20X,F10.3,2X15HINCHES SPANWISE,//)                        EVOVLE    516
                114 FORMAT (1H1,19X,65HCOORDINATES AND AREAS OF WING BOXES ---------- EVOVLE    517
                   1-- SURFACE NUMBER ,I3//)                                          EVOVLE    518
                115 FORMAT (1H1,19X 70HCOORDINATES AND AREAS OF DIAPHRAGM BOXES ------ EVOVLE    519
                   1------- SURFACE NUMBER ,I3//)                                     EVOVLE    520
520             116 FORMAT (22X,22HNORMALIZED COORDINATES,18X,16HREAL COORDINATES/     EVOVLE    521
                   1          4X,6HBOX NO,2X,5HINDEX,5X,1HX,7X,1HY,8X,4HAREA,7X,    EVOVLE    522
                   2             9HX(INCHES),4X,9HY(INCHES),3X,12HAREA(SQ.IN.)//)    EVOVLE    523
                117 FORMAT (5X,I5,2X,I5,2(3X,I5),4(3X,E10.3))                         EVOVLE    524
                C                                                                     EVOVLE    525
525                  RETURN                                                           EVOVLE    526
                     END                                                              EVOVLE    527
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	EVOVLE	1	525

VARIABLES	SN	TYPE	RELOCATION							
2231	ABX	REAL			REFS	60	61	DEFINED	59	
1310	AD	REAL	ARRAY	TOMB	REFS	6	18	467	476	478	481	
					DEFINED	357	364					
2230	ANWB	REAL			REFS	55	DEFINED	54				
2227	AREA	REAL			REFS	55	2*319	320	324	330	334	2*341
					2*345	2*349	357	DEFINED	53	318	319	320
125	ASR	REAL	ARRAY	OLIVER	REFS	9	20	56	DEFINED	55		
3424	AW	REAL	ARRAY	TOMB	REFS	5	18	410	2*412	419	447	456
					459	460	DEFINED	334	370	412	419	
3143	AY	REAL	ARRAY		REFS	15	91	179	2*184	DEFINED	82	86
					88	91						
0	BEL	REAL		BOXS	REFS	22	491	DEFINED	490			
2242	BEN	REAL			REFS	208	DEFINED	93				
0	BETA	REAL		F.P.	REFS	56	57	65	DEFINED	1		
0	BEX	REAL	ARRAY	BXLL	REFS	21	32	DEFINED	440			
2266	BIGY	REAL			REFS	218	341	DEFINED	202	217		
2246	BLEX	REAL			REFS	126	233	257	DEFINED	123	126	
2267	BOT	REAL			REFS	349	379	DEFINED	218			
1	BSR	REAL		BOXS	REFS	22	490	491	DEFINED	489		
3117	BXE	REAL	ARRAY		REFS	15	92	2*177	180	186	188	
					DEFINED	80	92					
2216	BXEL	REAL			REFS	72	80	93	168	208	431	434
					435	440	DEFINED	32	432	434	436	
2741	BXW	REAL	ARRAY		REFS	10	406	407	DEFINED	338	374	
0	CLEX	REAL	ARRAY	OLIVER	REFS	3	20	125	3*136	165	3*173	3*302
					DEFINED	96						
0	CLEXR	REAL	ARRAY	IDIOT	REFS	11	19	40	41	2*46	2*76	81
					96	DEFINED	36					
24	CLEY	REAL	ARRAY	OLIVER	REFS	3	20	103	2*133	134	3*136	139
					165	170	3*173	2*279	283	2*299	301	2*302
					2*341	2*349	DEFINED	97	104			
144	CLEYR	REAL	ARRAY	IDIOT	REFS	12	19	2*45	59	62	2*75	81
					82	86	93	97	DEFINED	36		

```
      SUBROUTINE HELZ (NF,NQ,NCS,ES,EL,KEND,KHELZ)                      HELZ       2
C                                                                       HELZ       3
      DIMENSION        XC(200) ,        X1(5) ,        X2(5)           HELZ       4
      DIMENSION          Y1(5) ,        Y2(5)                          HELZ       5
      DIMENSION  LC(40)                                                 HELZ       6
      DIMENSION ITAPES(50)                                              HELZ       7
      COMPLEX         XI(350) ,       XA(350)                           HELZ       8
      COMMON /TOMB/ XX(350) , YY(350) , NDB. LS(5) , XMAX(5) , NWB,     HELZ       9
     1              AD(250) , XD(250) , YD(250) , IND(350) , AW(350)    HELZ      10
      COMMON /COMA  / LC, BR                                            HELZ      11
      COMMON /CNTRL/ X1 , X2 , Y1 , Y2 , XC , NCF                       HELZ      12
      COMMON / CTAPES / ITAPES                                          HELZ      13
C                                                                       HELZ      14
C                                                                       HELZ      15
C INITIAL CONDITIONS                                                    HELZ      16
C                                                                       HELZ      17
      ITAPER = ITAPES(5)                                                HELZ      18
      ITAPEW = ITAPES (6)                                               HELZ      19
      MTAP8  =  ITAPES(28)                                              HELZ      20
      MTAP9  =  ITAPES(29)                                              HELZ      21
      MTAP14 =  ITAPES(34)                                              HELZ      22
      KLNN = LC(24)                                                     HELZ      23
      NCF = NCS                                                         HELZ      24
C                                                                       HELZ      25
      IF (KHELZ  EQ  2) GO TO 100                                       HELZ      26
      IF (NMPT NE 0) WRITE (ITAPEW,1)                                   HELZ      27
      DO 20 II=1,NCS                                                    HELZ      28
      READ (ITAPER,30) X1(II) , Y1(II) , X2(II) , Y2(II)                HELZ      29
      IF (NMPT.EQ.0) GO TO 3                                            HELZ      30
      WRITE (ITAPEW,2) II , X1(II) , Y1(II) , X2(II) , Y2(II)           HELZ      31
    3 CONTINUE                                                          HELZ      32
      X1(II) = X1(II) / (ES*12.0) - 0.5                                 HELZ      33
      X2(II) = X2(II) / (ES*12.0) - 0.5                                 HELZ      34
      Y1(II) = Y1(II)/(ES*EL*12.0) - 0.5                                HELZ      35
   20 Y2(II) = Y2(II)/(ES*EL*12.0) - 0.5                                HELZ      36
      Y=0.                                                              HELZ      37
      DO 40 J=1,KEND                                                    HELZ      38
      K=Y+1.                                                            HELZ      39
      DO 25 I=1,NCS                                                     HELZ      40
      IF ( Y .GE. Y1(I) .AND. Y .LT. Y2(I) )      GO TO 26              HELZ      41
   25 CONTINUE                                                          HELZ      42
      I = NCS                                                           HELZ      43
   26 XC(K)  =  X1(I) + (X2(I)-X1(I))*(Y-Y1(I)) / (Y2(I)-Y1(I))         HELZ      44
   40 Y=Y+1.                                                            HELZ      45
      RETURN                                                            HELZ      46
  100 CONTINUE                                                          HELZ      47
      REWIND MTAP8                                                      HELZ      48
C                                                                       HELZ      49
      REWIND MTAP14                                                     HELZ      50
C                                                                       HELZ      51
      DO 60 I = 1,NQ                                                    HELZ      52
      KTEN = 0                                                          HELZ      53
      IF ( KLNN .EQ. 0 )      GO TO 4                                   HELZ      54
      WRITE (ITAPEW,70) NF                                              HELZ      55
      WRITE (ITAPEW,71) I                                               HELZ      56
      WRITE (ITAPEW,72)                                                 HELZ      57
      KTEN  =  10                                                       HELZ      58
```

STATEMENT LABELS			DEF LINE	REFERENCES		
0	210		71	69		
0	220		74	72		
121	250		54	51		
0	260		53	52		
0	270		57	56		
110	275		50	37		
264	500	FMT	85	20		
317	504	FMT	90	48	58	79

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	100	JJ	22 80	217B	EXT REFS NOT INNER
23	110	II	25 29	7B	INSTACK
42	130	II	32 36	7B	INSTACK
65	160	I	42 43	3B	INSTACK
76	170	I	46 47	3B	INSTACK
115	260	I	52 53	3B	INSTACK
126	270	I	56 57	3B	INSTACK
155	190	I	65 66	3B	INSTACK
163	200	I	67 78	40B	NOT INNER
167	210	J	69 71	4B	INSTACK
176	220	J	72 74	5B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
CTAPES	50	0	ITAPES	(50)						
TOMB	2162	0	XW	(350)	350	YW	(350)	700	NDB	(1)
		701	LS	(5)	706	XMAX	(5)	711	NWB	(1)
		712	AD	(250)	962	XD	(250)	1212	YD	(250)
		1462	IND	(350)	1812	AW	(350)			
BOXS	2	0	BEL	(1)	1	BSR	(1)			

STATISTICS

PROGRAM LENGTH	574B	380
CM LABELED COMMON LENGTH	4246B	2214

520008 CM USED

VARIABLES	SN	TYPE		RELOCATION								
					DEFINED	42	46	48	52	56	58	65
					67	79						
333	II	INTEGER			REFS	26	28	33	35	DEFINED	25	32
2666	IND	INTEGER	ARRAY	TOMB	REFS	7						
344	IT	INTEGER			REFS	73	75	76	77	DEFINED	68	70
					73							
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	5	6	17				
326	ITAPEW	INTEGER			DEFINED	17	I/O REFS	20	48	58	79	
512	IYD	INTEGER	ARRAY		REFS	4	50	54	55	61	62	73
					DEFINED	35						
430	IYW	INTEGER	ARRAY		REFS	4	40	44	45	61	62	70
					DEFINED	28						
345	J	INTEGER			REFS	70	73	DEFINED	69	72		
330	JJ	INTEGER			REFS	23	DEFINED	22				
0	KK	INTEGER		F.P	REFS	20	DEFINED	1				
1275	LS	INTEGER	ARRAY	TOMB	REFS	7						
1274	NDB	INTEGER		TOMB	REFS	7	20	30	32			
334	NDZ	INTEGER			REFS	34	35	37	38	55	60	61
					72	DEFINED	31	34				
327	NEX	INTEGER			REFS	22	DEFINED	21				
342	NMIN	INTEGER			REFS	63	67	DEFINED	62			
343	NMN	INTEGER			REFS	64	65	DEFINED	63			
335	NOB	INTEGER			REFS	41	42	51	52	DEFINED	40	50
341	NTOT	INTEGER			REFS	67	79	DEFINED	61			
1307	NWB	INTEGER		TOMB	REFS	7	20	25				
332	NWZ	INTEGER			REFS	27	28	37	39	45	60	61
					69	DEFINED	24	27				
337	N1	INTEGER			REFS	46	56	DEFINED	44	54		
340	N2	INTEGER			REFS	46	48	56	58	DEFINED	45	55
346	PL	REAL	ARRAY		REFS	4	48	58	79	DEFINED	43	47
					53	57	66	75	76	77		
236	SHAR	REAL			REFS	77	DEFINED	14				
234	SURF	REAL			REFS	47	75	DEFINED	12			
1702	XD	REAL	ARRAY	TOMB	REFS	7	33					
0	XEND	REAL		F.P.	REFS	21	DEFINED	1				
1302	XMAX	REAL	ARRAY	TOMB	REFS	7						
0	XW	REAL	ARRAY	TOMB	REFS	7	26					
2274	YD	REAL	ARRAY	TOMB	REFS	7	35					
536	YW	REAL	ARRAY	TOMB	REFS	7	28					

VARIABLES USED AS FILE NAMES, SEE ABOVE

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
MAXO	INTEGER	0	INTRIN		61
MINO	INTEGER	0	INTRIN		62

STATEMENT LABELS		DEF LINE	REFERENCES				
230	100	80	22	39	49	59	60
31	110	29	25	26			
57	120	39	30				
50	130	36	32	33			
140	140	60	38				
71	150	44	41				
0	160	43	42				
0	170	47	46				
161	180	67	64				
0	190	66	65				
0	200	78	67				

```
                      WRITE(ITAPEW,504) (PL(I),I=1,N2)                                  PLAN       59
                      GO TO 100                                                         PLAN       60
      60            140 IF (NWZ.EQ.0.AND.NDZ.EQ.0) GO TO 100                          PLAN       61
                      NTOT = MAXO (IYW(NWZ),IYD(NDZ))                                   PLAN       62
                      NMIN = MINO (IYW(1),IYD(1))                                       PLAN       63
                      NMN = NMIN - 1                                                    PLAN       64
                      IF (NMN.EQ.0) GO TO 180                                           PLAN       65
      65              DO 190 I = 1,NMN                                                  PLAN       66
                    190 PL(I) = BLANK                                                   PLAN       67
                    180 DO 200 I = NMIN,NTOT                                            PLAN       68
                      IT = 0                                                            PLAN       69
                      DO 210 J = 1,NWZ                                                  PLAN       70
      70              IF (IYW(J).EQ.I) IT = 1                                           PLAN       71
                    210 CONTINUE                                                        PLAN       72
                      DO 220 J = 1,NDZ                                                  PLAN       73
                      IF (IYD(J).EQ.I) IT = IT + 2                                      PLAN       74
                    220 CONTINUE                                                        PLAN       75
      75              IF (IT.EQ.1) PL(I) = SURF                                         PLAN       76
                      IF (IT.EQ.2) PL(I) = DPGM                                         PLAN       77
                      IF (IT.EQ.3) PL(I) = SHAR                                         PLAN       78
                    200 CONTINUE                                                        PLAN       79
                      WRITE (ITAPEW,504) (PL(I),I=1,NTOT)                               PLAN       80
      80            100 CONTINUE                                                        PLAN       81
                  C                                                                     PLAN       82
                  C                                                                     PLAN       83
                  C FORMATS                                                             PLAN       84
                  C                                                                     PLAN       85
      85            500 FORMAT (1H1,/30X51HGRAPHIC DISPLAY OF REGIONS ON SEMISPANS OF SURF PLAN      86
                     1ACE ,I3/15X9HMACH NO. ,F7.3,10X10HBOX WIDTH,F7.3,2X6HINCHES,10X,   PLAN       87
                     211HBOX LENGTH ,F7.3,2X6HINCHES,/30X,I5,2X13HSURFACE BOXES,15X,I5,  PLAN       88
                     32X15HDIAPHRAGM BOXES,//30X12HW IS SURFACE,5X14HD IS DIAPHRAGM,     PLAN       89
                     45X11HS IS SHARED,//)                                              PLAN       90
      90            504 FORMAT ((20X,20(1X,A1),20(1X,A1),10(1X,A1))/)                   PLAN       91
                  C                                                                     PLAN       92
                      RETURN                                                            PLAN       93
                      END                                                               PLAN       94
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	PLAN	1	92

VARIABLES	SN	TYPE	RELOCATION										
1310	AD	REAL	ARRAY	TOMB	REFS	7							
331	AK	REAL			REFS	26	33	DEFINED	23				
0	AM	REAL		F.P.	REFS	20	DEFINED	1					
3424	AW	REAL	ARRAY	TOMB	REFS	7							
0	BEL	REAL		BOXS	REFS	9	20						
233	BLANK	REAL			REFS	43	53	66	DEFINED	11			
1	BSR	REAL		BOXS	REFS	9	20						
235	DPGM	REAL			REFS	57	76	DEFINED	13				
336	I	INTEGER			REFS	43	47	48	53	57	58	66	
						70	73	75	76	77	79		

```
      SUBROUTINE PLAN (KK,AM,XEND)                                      PLAN     2
C                                                                       PLAN     3
C                                                                       PLAN     4
      DIMENSION         PL(50) ,      IYW(50) ,      IYD(50)            PLAN     5
      DIMENSION ITAPES(50)                                              PLAN     6
      COMMON / CTAPES / ITAPES                                          PLAN     7
      COMMON /TOMB / XW(350) , YW(350) , NDB, LS(5) , XMAX(5) , NWB ,   PLAN     8
     1               AD(250) , XD(250) , YD(250) , IND(350), AW(350)    PLAN     9
      COMMON /BOXS/ BEL , BSR                                           PLAN    10
C                                                                       PLAN    11
      DATA   BLANK /4H    /                                           PLAN    12
      DATA   SURF  /4HW   /                                           PLAN    13
      DATA   DPGM  /4HD   /                                           PLAN    14
      DATA   SHAR  /4HS   /                                           PLAN    15
C                                                                       PLAN    16
C                                                                       PLAN    17
      ITAPEW = ITAPES(6)                                                PLAN    18
C                                                                       PLAN    19
C                                                                       PLAN    20
      WRITE (ITAPEW,500)  KK , AM , BEL , BSR , NWB , NDB               PLAN    21
      NEX = XEND + 5                                                    PLAN    22
      DO 100 JJ = 1,NEX                                                 PLAN    23
      AK = JJ                                                           PLAN    24
      NWZ = 0                                                           PLAN    25
      DO 110 II = 1,NWB                                                 PLAN    26
      IF (XW(II)+1.0.NE.AK) GO TO 110                                   PLAN    27
      NWZ = NWZ + 1                                                     PLAN    28
      IYW(NWZ) = YW(II) + 1.0                                           PLAN    29
  110 CONTINUE                                                          PLAN    30
      IF (NDB.EQ.0) GO TO 120                                           PLAN    31
      NDZ = 0                                                           PLAN    32
      DO 130 II = 1,NDB                                                 PLAN    33
      IF (XD(II)+1.0.NE.AK) GO TO 130                                   PLAN    34
      NDZ = NDZ + 1                                                     PLAN    35
      IYD(NDZ) = YD(II) + 1.0                                           PLAN    36
  130 CONTINUE                                                          PLAN    37
      IF(NDZ.NE.0.AND.NWZ.EQ.0) GO TO 275                               PLAN    38
      IF (NDZ.NE.0) GO TO 140                                           PLAN    39
  120 IF (NWZ.EQ.0) GO TO 100                                           PLAN    40
      NOB = IYW(1) - 1                                                  PLAN    41
      IF (NOB.EQ.0) GO TO 150                                           PLAN    42
      DO 160 I = 1,NOB                                                  PLAN    43
  160 PL(I) = BLANK                                                     PLAN    44
  150 N1 = IYW(1)                                                       PLAN    45
      N2 = IYW(NWZ)                                                     PLAN    46
      DO 170 I = N1,N2                                                  PLAN    47
  170 PL(I) = SURF                                                      PLAN    48
      WRITE (ITAPEW,504) (PL(I),I=1,N2)                                 PLAN    49
      GO TO 100                                                         PLAN    50
  275 NOB=IYD(1)-1                                                      PLAN    51
      IF(NOB.EQ.0) GO TO 250                                            PLAN    52
      DO 260 I=1,NOB                                                    PLAN    53
  260 PL(I)=BLANK                                                       PLAN    54
  250 N1=IYD(1)                                                         PLAN    55
      N2=IYD(NDZ)                                                       PLAN    56
      DO 270 I=N1,N2                                                    PLAN    57
  270 PL(I)=DPGM                                                        PLAN    58
```

```
      1              FUNCTION NOXN(XX)                                  NOXN      2
                     NXX = XX                                           NOXN      3
                     AXX = NXX                                          NOXN      4
                     DIFX = XX - AXX                                    NOXN      5
      5              IF (DIFX.LE.0.5) NOXN = NXX                        NOXN      6
                     IF (DIFX.GT.0.5) NOXN = NXX + 1                    NOXN      7
                     RETURN                                             NOXN      8
                     END                                                NOXN      9
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
4	NOXN	1	7

VARIABLES	SN	TYPE	RELOCATION							
24	AXX	REAL		REFS	4	DEFINED	3			
25	DIFX	REAL		REFS	5	6	DEFINED	4		
22	NOXN	INTEGER		DEFINED	5	6				
23	NXX	INTEGER		REFS	3	5	6	DEFINED	2	
0	XX	REAL	F.P.	REFS	2	4	DEFINED	1		

STATISTICS

PROGRAM LENGTH 268 22

520008 CM USED

```
      1              FUNCTION TANT(JJ)                                          TANT      2
                     DIMENSION CLEX(20),CTEX(20),CLEY(20),CTEY(20)              TANT      3
                     COMMON/OLIVER/CLEX,CLEY,CTEX,CTEY                          TANT      4
                     TANT=.25*(CTEX(JJ)-CTEX(JJ+1))/(CTEY(JJ+1)-CTEY(JJ))       TANT      5
      5              RETURN                                                     TANT      6
                     END                                                        TANT      7
```

SYMBOLIC REFERENCE MAP (R=3)

```
ENTRY POINTS     DEF LINE     REFERENCES
    4  TANT            1          5

VARIABLES     SN  TYPE          RELOCATION
    0  CLEX       REAL       ARRAY    OLIVER       REFS        2         3
   24  CLEY       REAL       ARRAY    OLIVER       REFS        2         3
   50  CTEX       REAL       ARRAY    OLIVER       REFS        2         3        2*4
   74  CTEY       REAL       ARRAY    OLIVER       REFS        2         3        2*4
    0  JJ         INTEGER               F.P.        REFS      4*4    DEFINED      1
   15  TANT       REAL                            DEFINED      4

COMMON BLOCKS    LENGTH     MEMBERS - BIAS NAME(LENGTH)
       OLIVER       80              0 CLEX   (20)          20 CLEY   (20)          40 CTEX   (20)
                                   60 CTEY   (20)

STATISTICS
  PROGRAM LENGTH                 16B       14
  CM LABELED COMMON LENGTH       120B      80
        52000B CM USED
```

```
      1              FUNCTION TANL(J)                                          TANL      2
                     DIMENSION CLEX(20),CTEX(20),CLEY(20),CTEY(20)             TANL      3
                     COMMON/OLIVER/CLEX,CLEY,CTEX,CTEY                         TANL      4
                     TANL=.25*(CLEX(J)-CLEX(J+1))/(CLEY(J+1)-CLEY(J))          TANL      5
      5              RETURN                                                    TANL      6
                     END                                                       TANL      7
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
4	TANL	1	5

VARIABLES	SN	TYPE	RELOCATION					
0	CLEX	REAL	ARRAY	OLIVER	REFS	2	3	2*4
24	CLEY	REAL	ARRAY	OLIVER	REFS	2	3	2*4
50	CTEX	REAL	ARRAY	OLIVER	REFS	2	3	
74	CTEY	REAL	ARRAY	OLIVER	REFS	2	3	
0	J	INTEGER		F.P.	REFS	4*4	DEFINED	1
15	TANL	REAL			DEFINED	4		

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
OLIVER	80	0 CLEX (20)	20 CLEY (20)	40 CTEX (20)
		60 CTEY (20)		

STATISTICS

PROGRAM LENGTH	168	14
CM LABELED COMMON LENGTH	1208	80

520008 CM USED

STATEMENT LABELS			DEF LINE	REFERENCES		
1673	4033		503	499		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
31		I	36 36	12B		EXT REFS
47		I	37 37	12B		EXT REFS
71	724	I	39 42	4B	INSTACK	
106	100	I	44 47	10B	OPT	
126	101	I	49 52	10B	OPT	
214	62	I	74 81	31B		EXT REFS
260	63	I	84 89	7B	INSTACK	
300	65	I	90 92	4B	INSTACK	
325	1	I	95 97	6B	INSTACK	
345	2	I	99 101	6B	INSTACK	
364	3	I	110 112	5B	INSTACK	
376	4	I	117 119	5B	INSTACK	
407	6	I	124 126	5B	INSTACK	
420	8	J	132 140	24B		
447	10	JJ	146 154	24B		
507	13	J	164 167	11B	OPT	
557	26	I	183 185	7B	INSTACK	EXITS
610	14	JJ	194 197	7B	INSTACK	
670	15	K	223 228	21B	OPT	
773	55	N	269 316	174B		EXT REFS
1352	304	K	399 424	61B		NOT INNER
1370	306	IJ	403 423	37B	OPT	
1474	4001	IJ	446 460	47B		EXT REFS
1552	4002	IJ	466 481	44B		EXT REFS
1644	4031	IJ	494 496	6B	INSTACK	
1664	4032	IJ	500 502	6B	INSTACK	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
CTAPES	50	0	ITAPES	(50)						
TOMB	2162	0	XW	(350)	350	YW	(350)	700	NDB	(1)
		701	LS	(5)	706	XMAX	(5)	711	NWB	(1)
		712	AD	(250)	962	XD	(250)	1212	YD	(250)
		1462	IND	(350)	1812	AW	(350)			
IDIOT	411	0	CLEXR	(100)	100	CLEYR	(100)	200	CTEXR	(100)
		300	CTEYR	(100)	400	NCLER	(5)	405	NCTER	(5)
		410	NS	(1)						
OLIVER	90	0	CLEX	(20)	20	CLEY	(20)	40	CTEX	(20)
		60	CTEY	(20)	80	NWBT	(5)	85	ASR	(5)
BXLL	5	0	BEX	(5)						
BOXS	2	0	BEL	(1)	1	BSR	(1)			

STATISTICS

PROGRAM LENGTH	3176B	1662
CM LABELED COMMON LENGTH	5240B	2720

52000B CM USED

STATEMENT LABELS			DEF LINE	REFERENCES				
0	26		185	183				
572	27		188	184				
1445	28		431	356	363			
1517	30		454	450				
575	35		189	187				
1001	40		274	310				
1002	45		275	273				
1116	46		301	299				
1125	48		304	300				
1132	49		306	304				
1141	50		310	305				
0	55		316	269				
1573	60		474	470				
314	61		95	72				
0	62		81	74				
266	63		89	84	87			
263	64		88	85				
0	65		92	90				
270	66		90	83				
76	75		43	429	433	435	438	
1461	85		439	430				
2072	98	FMT	510	33				
2074	99	FMT	511	36	37			
0	100		47	44				
0	101		52	49				
2076	102	FMT	512	488				
2112	103	FMT	514	491				
2125	114	FMT	516	443	452			
2136	115	FMT	518	463	472			
2150	116	FMT	520	444	453	464	473	
2167	117	FMT	523	460	481			
645	200		211	209				
650	201		217	208	210			
0	304		424	399				
1417	305		417	408	411			
1426	306		423	403	414	416		
1407	309		409	407				
1412	316		412	410				
1045	600		286	283				
1063	601		290	285				
1073	602		293	290				
1111	603		297	292				
1047	604		287	284				
1075	605		294	291				
74	724		42	39	40			
627	732		202	200				
635	733		208	201				
1313	1000		362	252	324			
1323	2000		368	257				
1334	3000		379	262	331	353	361	367	375
1344	3001		392	379				
1347	4000		397	383				
0	4001		460	446				
0	4002		481	466				
1616	4006		483	462				
0	4031		496	494				
0	4032		502	500				

VARIABLES	SN	TYPE		RELOCATION								
						290	2*299	301	2*304	306	336	3*341	5*349
						359	366	372	379	392	DEFINED	131	138
						145	152	159	161	240	392		
2274	YD	REAL	ARRAY	TOMB	REFS		5	18	467	475	480	502	
					DEFINED	359	366						
0	YI	REAL	ARRAY	F.P.	REFS		13	DEFINED	1	505			
2327	YMM	REAL			REFS	496	498	502	505	DEFINED	493	496	
					502								
536	YW	REAL	ARRAY	TOMB	REFS		4	18	406	407	418	447	455
					458	496	DEFINED	336	372	418			
2314	YWIN	REAL			REFS	460	481	DEFINED	455	475			
2307	Z	REAL			REFS	406	407	DEFINED	405				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES		
ATAN2	REAL	2	LIBRARY	77		
NOXN	INTEGER	1		485	486	
SIN	REAL	1	LIBRARY	80		
SQRT	REAL	1	LIBRARY	55	56	
TANL	REAL	1		243	279	287
TANT	REAL	1		244	281	294

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES						
ABS	REAL	1	INTRIN		165	195					
AINT	REAL	1	INTRIN		103						
AMAX1	REAL	0	INTRIN		112	126	197	218	315	495	496	501
					502							
AMIN1	REAL	0	INTRIN		119	167	315					
AMOD	REAL	2	INTRIN		61							
FLOAT	REAL	1	INTRIN		62							
IABS	INTEGER	1	INTRIN		324	345	349					

STATEMENT LABELS		DEF LINE	REFERENCES				
0	1	97	95				
0	2	101	99				
0	3	112	110				
0	4	119	117				
0	6	126	124				
425	7	135	2*139				
441	8	140	132	133	134	139	
454	9	149	2*153				
470	10	154	146	147	148	153	
475	11	161	199	204	213		
477	12	162	160				
0	13	167	164				
0	14	197	194				
0	15	228	223				
721	16	240	388				
730	17	246	393				
1222	18	332	330				
1301	19	355	341	345	349		
1442	20	430	427				
1451	21	434	431				
1437	22	428	333	369			
600	23	193	168	175	178	182	
543	24	179	170				
556	25	183	179				

VARIABLES	SN	TYPE	RELOCATION									
2211	SETT	LOGICAL		REFS	24	291	DEFINED	268	296			
2223	SLE	REAL		REFS	47	53	DEFINED	43	47			
3073	SN	REAL	ARRAY	REFS	14	81	2*85	2*88	DEFINED	79		
2300	SSCALE	REAL		REFS	302	313	315	DEFINED	275	301		
2226	STE	REAL		REFS	52	53	DEFINED	48	52			
2245	STEX	REAL		REFS	119	233	257	DEFINED	116	119		
2311	SW	REAL		REFS	459	485	DEFINED	442	459			
2304	T	REAL		REFS	313	314	DEFINED	312				
2273	TANLJ	REAL		REFS	288	313	DEFINED	243	287			
2274	TANTJJ	REAL		REFS	295	314	DEFINED	244	294			
3023	THET	REAL	ARRAY	REFS	14	2*78	80	DEFINED	77	78		
2301	TSCALE	REAL		REFS	307	314	DEFINED	276	306			
2272	X	REAL		REFS	2*252	2*257	4*262	2*315	4*324	335	338	
				4*345	4*349	358	365	371	374	383	387	
				DEFINED	239	387						
2727	XAL	REAL	ARRAY	REFS	8	315	DEFINED	313				
2236	XAR	REAL		REFS	456	476	DEFINED	69				
2722	XAT	REAL	ARRAY	REFS	8	315	DEFINED	314				
2225	XAVE	REAL		REFS	47	52	DEFINED	46	51			
2315	XAW	REAL		REFS	460	481	DEFINED	456	476			
1702	XD	REAL	ARRAY TOMB	REFS	5	18	467	474	479	501		
				DEFINED	358	365						
2234	XEL	REAL		REFS	69	2*455	2*475	DEFINED	67			
2233	XES	REAL		REFS	67	69	454	474	DEFINED	66		
0	XI	REAL	ARRAY F.P.	REFS	13	DEFINED	1	504				
2235	XIN	REAL		REFS	454	474	DEFINED	68				
2330	XLE	REAL	ARRAY	REFS	6	180	186	188	224	225	226	
				227	262	277	279	288	324	2*344		
				DEFINED	136	248						
2302	XLREF	REAL		REFS	313	DEFINED	277	279	288	302		
1302	XMAX	REAL	ARRAY TOMB	REFS	9	18	DEFINED	497				
2255	XMK	REAL		REFS	167	DEFINED	165					
2326	XMM	REAL		REFS	495	497	501	504	DEFINED	492	495	
				501								
2474	XMS	REAL	ARRAY	REFS	7	166	175	176	181	189	199	
				209	224	225	226	227	252	262	324	
				345	349	DEFINED	163	167	177	181	189	
2256	XMSK	REAL		REFS	167	DEFINED	166					
2261	XQE	REAL		REFS	175	176	177	DEFINED	173			
2222	XREF	REAL		REFS	40	46	51	DEFINED	38	41		
2412	XTE	REAL	ARRAY	REFS	6	224	225	226	227	262	278	
				281	295	324	344	487	DEFINED	150	247	
2264	XTEMK	REAL		REFS	197	DEFINED	195					
2556	XTEML	REAL	ARRAY	REFS	7	196	199	209	224	225	226	
				227	252	262	324	345	349			
				DEFINED	193	197						
2265	XTEMLK	REAL		REFS	197	DEFINED	196					
2303	XTREF	REAL		REFS	314	DEFINED	278	281	295	307		
0	XW	REAL	ARRAY TOMB	REFS	4	18	406	407	417	447	454	
				457	495	DEFINED	335	371	417			
2313	XWIN	REAL		REFS	460	481	DEFINED	454	474			
2244	XX	REAL		REFS	112	119	126	DEFINED	111	118	125	
2263	X22	REAL		REFS	2*181	2*189	DEFINED	180	186	188		
2247	Y	REAL		REFS	134	135	136	138	139	148	149	
				150	152	153	161	162	165	170	173	
				179	2*184	195	199	200	202	208	217	
				246	247	248	252	257	2*279	2*281	283	

VARIABLES	SN	TYPE		RELOCATION								
2310	IWWS	INTEGER			REFS	2*412	2*413	DEFINED	406			
2322	IXD	INTEGER			REFS	481	DEFINED	479				
2316	IXW	INTEGER			REFS	460	DEFINED	457				
2323	IYD	INTEGER			REFS	481	DEFINED	480				
2317	IYW	INTEGER			REFS	460	DEFINED	458				
2250	J	INTEGER			REFS	2*133	134	6*136	139	2*165	4*279	2*283
						286	287	2*349	DEFINED	132	164	241	286
2253	JJ	INTEGER			REFS	2*147	148	6*150	153	2*195	4*281	2*290
						293	294	2*349	DEFINED	146	194	242	293
2251	K	INTEGER			REFS	136	150	163	166	167	175	176
						177	180	2*181	186	188	2*189	193	196
						197	2*199	2*209	211	5*224	5*225	5*226	5*227
						247	248	3*252	4*262	277	278	279	281
						288	295	7*324	338	3*344	4*345	4*349	374
						405	406	407	DEFINED	135	149	162	223
						246	399						
2257	KAA	INTEGER			REFS	4*173	DEFINED	171				
2260	KAB	INTEGER			REFS	2*173	DEFINED	172				
0	KEND	INTEGER		F.P.	REFS	223	399	441	DEFINED	1	222	
0	KK	INTEGER		F.P.	REFS	32	3*33	34	35	2*36	2*37	40
						41	2*45	2*46	2*50	2*51	54	55	2*56
						58	2*59	2*62	2*63	64	70	71	2*75
						2*76	2*81	82	86	93	96	97	100
						101	2*428	2*437	440	443	452	463	472
						489	497	498	504	505	DEFINED	1	
2312	LINE	INTEGER			REFS	448	449	450	468	469	470	
					DEFINED	445	448	449	451	465	468	469	
						471							
1275	LS	INTEGER	ARRAY	TOMB	REFS	13	18	DEFINED	498			
2215	MTAP3	INTEGER			DEFINED	29	I/O REFS	441	447	467	487	
2275	N	INTEGER			REFS	270	400	401	417	418	419	4
						421	426	DEFINED	269	397	402	421	
2232	NBX	INTEGER			REFS	61	62	DEFINED	60	61		
2217	NCLE	INTEGER			REFS	36	39	44	59	62	73	93
						95	103	104	124	130	164	170	171
						172	2*177	2*299	301	5*302	2*341		
					DEFINED	34	58	70					
620	NCLER	INTEGER	ARRAY	IDIOT	REFS	10	19	34	58	70			
					DEFINED	33							
2237	NCLES	INTEGER			REFS	74	83	84	90	132	179	183
						186	279	283	DEFINED	73	130		
2220	NCTE	INTEGER			REFS	37	49	99	105	110	117	144
						194	2*304	306	5*307	DEFINED	35	71	
625	NCTER	INTEGER	ARRAY	IDIOT	REFS	11	19	35	71	DEFINED	33		
2252	NCTES	INTEGER			REFS	146	281	290	DEFINED	144			
1274	NDB	INTEGER		TOMB	REFS	18	499	DEFINED	484				
632	NS	INTEGER		IDIOT	REFS	19							
2325	NSD	INTEGER			REFS	488	DEFINED	486					
2324	NSW	INTEGER			REFS	488	DEFINED	485					
1307	NWB	INTEGER		TOMB	REFS	18	DEFINED	483					
120	NWBT	INTEGER	ARRAY	OLIVER	REFS	9	20	54	428	437			
					DEFINED	33	428	437					
2207	OVRLAP	INTEGER			REFS	23	257	DEFINED	232	233			
2276	S	REAL			REFS	283	290	DEFINED	271				
2212	SAT	LOGICAL			REFS	24	401	DEFINED	398	404	415	422	
2320	SD	REAL			REFS	478	486	DEFINED	461	478			
2210	SET	LOGICAL			REFS	24	284	DEFINED	267	289			

VARIABLES	SN	TYPE		RELOCATION								
3047	CT	REAL	ARRAY		REFS	14	2*88	DEFINED	81			
50	CTEX	REAL	ARRAY	OLIVER	REFS	3	20	111	118	3*150	195	3*307
					DEFINED	100						
310	CTEXR	REAL	ARRAY	IDIOT	REFS	12	19	2*51	100	DEFINED	37	
74	CTEY	REAL	ARRAY	OLIVER	REFS	4	20	2*147	148	3*150	153	195
					2*281	290	2*304	306	2*307	2*349		
					DEFINED	101	105					
454	CTEYR	REAL	ARRAY	IDIOT	REFS	12	19	2*50	101	DEFINED	37	
2224	DELY	REAL			REFS	47	52	DEFINED	45	50		
2305	DLINE	REAL			REFS	2*345	2*349	DEFINED	344			
2241	DX	REAL			REFS	77	79	DEFINED	76			
2240	DY	REAL			REFS	77	79	DEFINED	75			
0	EL	REAL		F.P.	REFS	59	63	67	91	93	97	101
					441	490	DEFINED	1	57	65		
0	ENDX	REAL		F.P.	REFS	112	116	163	248	383	411	
					DEFINED	1	109	112				
2243	ENDY	REAL			REFS	104	105	199	200	218	222	247
					248	252	257	DEFINED	103			
0	ES	REAL		F.P.	REFS	66	68	91	92	93	96	97
					100	101	432	434	435	441		
					DEFINED	1	64					
0	ESR	REAL	ARRAY	F.P.	REFS	11	59	63	64	489		
					DEFINED	1	56	62	63			
2734	F	REAL	ARRAY		REFS	8	316	5*318	DEFINED	315	316	
2221	I	INTEGER			REFS	2*36	2*37	40	41	2*45	2*46	2*50
					2*51	2*75	2*76	77	3*78	79	2*80	4*81
					2*85	2*86	5*88	2*91	2*92	2*96	2*97	2*100
					2*101	111	118	125	2*184	188	271	312
					313	314	3*315	2*316	DEFINED	36	37	39
					44	49	74	84	90	95	99	110
					117	124	183	270				
2321	IAC	INTEGER			REFS	481	DEFINED	477				
2262	IBNX	INTEGER			REFS	177	DEFINED	176				
2271	ID	INTEGER			REFS	355	356	357	358	359	362	363
					364	365	366	430	441	462	466	484
					500	DEFINED	238	355	362			
2306	IJ	INTEGER			REFS	3*406	2*407	2*409	410	412	414	417
					418	419	420	4*447	454	455	456	457
					458	459	3*460	3*467	474	475	476	478
					479	480	2*481	495	496	501	502	
					DEFINED	403	446	466	494	500		
0	IM	INTEGER	*UNUSED	F.P.	DEFINED	1						
2666	IND	INTEGER	ARRAY	TOMB	REFS	10	18	409	413	420	447	460
					DEFINED	337	360	373	409	413	420	
2277	INT	INTEGER			REFS	287	288	294	295	310		
					DEFINED	272	274					
2254	IRS	INTEGER			REFS	202	217	DEFINED	158	203	212	
2640	ISS	INTEGER	ARRAY		REFS	7	252	3*324	2*345	2*349		
					DEFINED	211	224	225	226	227		
2213	ITAPER	INTEGER			DEFINED	27	I/O REFS	33	36	37		
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	16	17	27	28	29		
2214	ITAPEW	INTEGER			DEFINED	28	I/O REFS	443	444	452	453	460
					463	464	472	473	481	488	491	
2270	IW	INTEGER			REFS	332	333	334	335	336	337	360
					368	369	370	371	372	373	397	403
					414	427	441	446	483	494		
					DEFINED	237	332	368	400	401	426	

```
      4 CONTINUE                                                        HELZ      59
        CALL CNRW (-MTAP14,XA,NWB)                                      HELZ      60
60      CALL CNRW (-MTAP8,XI,NWB)                                       HELZ      61
        DO 50 JJ = 1,NWB                                                HELZ      62
        XW = XX(JJ)                                                     HELZ      63
        YW = YY(JJ)                                                     HELZ      64
        K=YW+1.                                                         HELZ      65
65      DO 27 II=1,NCS                                                  HELZ      66
        IF (YW.GE.Y1(II).AND.YW.LT.Y2(II)) GO TO 28                     HELZ      67
     27 CONTINUE                                                        HELZ      68
        II = NCS                                                        HELZ      69
     28 IF ((XW.LT.XC(K)).OR.(YW.LT.Y1(II)).OR.(YW.GT.Y2(II))) GO TO 50  HELZ      70
70   C                                                                  HELZ      71
        M1 = 1                                                          HELZ      72
        M2 = NQ                                                         HELZ      73
        XI(JJ) = XA(JJ)                                                 HELZ      74
     C                                                                  HELZ      75
75      50 CONTINUE                                                     HELZ      76
        CALL CNRW (MTAP9,XI,NWB)                                        HELZ      77
        IF ( KLNN .EQ. 0 )      GO TO 60                                HELZ      78
        DO 55 IA = 1,NWB                                                HELZ      79
        KTEN = KTEN + 1                                                 HELZ      80
80      IF (KTEN .LT. 56) GO TO 81                                      HELZ      81
        KTEN  =  11                                                     HELZ      82
        WRITE (ITAPEW,70) NF                                            HELZ      83
        WRITE (ITAPEW,71) I                                             HELZ      84
        WRITE (ITAPEW,72)                                               HELZ      85
85      81 XES = 12.0*ES                                                HELZ      86
        XEL = XES*EL                                                    HELZ      87
        YEW = YY(IA)                                                    HELZ      88
        XWIN = (XX(IA) + 0.5) * XES                                     HELZ      89
        YWIN = (YEW + 0.5) * XEL                                        HELZ      90
90      IXW  =  XX(IA)                                                  HELZ      91
        IYW  =  YEW                                                     HELZ      92
     55 WRITE (ITAPEW,73) IA , IXW , IYW , XI(IA) , XWIN , YWIN         HELZ      93
     60 CONTINUE                                                        HELZ      94
        REWIND MTAP8                                                    HELZ      95
95      REWIND MTAP14                                                   HELZ      96
        WRITE (MTAP9)  XC                                               HELZ      97
        END FILE MTAP9                                                  HELZ      98
     C                                                                  HELZ      99
     C                                                                  HELZ     100
100  C FORMATS                                                          HELZ     101
     C                                                                  HELZ     102
      1 FORMAT (1H1,/20X35HCOORDINATES OF HINGE LINE IN INCHES,//13X     HELZ     103
       1         7HSURFACE,26X7HINBOARD,27X8HOUTBOARD,//14X5HINDEX,     HELZ     104
       2         22X1HX,14X1HY,19X1HX,14X1HY, //)                       HELZ     105
105   2 FORMAT ((15X,I3,2(10X,E10.2,5X,E10.2))/)                         HELZ     106
     10 FORMAT (I5)                                                     HELZ     107
     30 FORMAT(4E10.2)                                                  HELZ     108
     70 FORMAT (1H1,20X15HSURFACE NUMBER ,I3,//3X67HINTERPOLATED MODAL DAT HELZ     109
       1A FOR SURFACE AND CONTROL SURFACE COMBINATION, //)              HELZ     110
110  71 FORMAT (20X8HMODE NO ,I3 //)                                    HELZ     111
     72 FORMAT (9X,22HNORMALIZED COORDINATES,8X,17HMODAL DEFLECTIONS,   HELZ     112
       1        19X,16HREAL COORDINATES/                               HELZ     113
       2         5X,6HBOX NO,4X,1HX,7X,1HY,12X,1HH,15X,5HALPHA,11X,    HELZ     114
       3            9HX(INCHES),9X,9HY(INCHES)//)                      HELZ     115
```

```
115              73 FORMAT (5X,I5,2(3X,I5),4(3X,E15.6))                    HELZ      116
                C                                                          HELZ      117
                      RETURN                                               HELZ      118
                      END                                                  HELZ      119
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
3 HELZ 1 45 117

VARIABLES		SN	TYPE		RELOCATION							
1310	AD		REAL	ARRAY	TOMB	REFS	8					
3424	AW		REAL	ARRAY	TOMB	REFS	8					
50	BR		REAL		COMA	REFS	10					
0	EL		REAL		F.P.	REFS	34	35	86	DEFINED	1	
0	ES		REAL		F.P.	REFS	32	33	34	35	85	
						DEFINED	1					
466	I		INTEGER			REFS	2*40	6*43	55	83	DEFINED	39	42
						51							
475	IA		INTEGER			REFS	87	88	90	2*92	DEFINED	78	
462	II		INTEGER			REFS	4*28	5*30	2*32	2*33	2*34	2*35	2*66
						2*69	DEFINED	27	65	68			
2666	IND		INTEGER	ARRAY	TOMB	REFS	8						
453	ITAPER		INTEGER			DEFINED	17	I/O REFS	28				
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	6	12	17	18	19	20	21
454	ITAPEW		INTEGER			DEFINED	18	I/O REFS	26	30	54	55	56
						82	83	84	92				
503	IXW		INTEGER			REFS	92	DEFINED	90				
504	IYW		INTEGER			REFS	92	DEFINED	91				
464	J	*	INTEGER			DEFINED	37						
470	JJ		INTEGER			REFS	62	63	2*73	DEFINED	61		
465	K		INTEGER			REFS	43	69	DEFINED	38	64		
0	KEND		INTEGER		F.P.	REFS	37	DEFINED	1				
0	KHELZ		INTEGER		F.P.	REFS	25	DEFINED	1				
460	KLNN		INTEGER			REFS	53	77	DEFINED	22			
467	KTEN		INTEGER			REFS	79	80	DEFINED	52	57	79	81
0	LC		INTEGER	ARRAY	COMA	REFS	5	10	22				
1275	LS		INTEGER	ARRAY	TOMB	REFS	8						
457	MTAP14		INTEGER			REFS	59	DEFINED	21	I/O REFS	49	95	
455	MTAP8		INTEGER			REFS	60	DEFINED	19	I/O REFS	47	94	
456	MTAP9		INTEGER			REFS	76	DEFINED	20	I/O REFS	96	97	
473	M1	*	INTEGER			DEFINED	71						
474	M2	*	INTEGER			DEFINED	72						
334	NCF		INTEGER		CNTRL	REFS	11	DEFINED	23				
0	NCS		INTEGER		F.P.	REFS	23	27	39	42	65	68	
						DEFINED	1						
1274	NDB		INTEGER		TOMB	REFS	8						
0	NF		INTEGER		F.P.	REFS	54	82	DEFINED	1			
461	NMPT		INTEGER	*UNDEF		REFS	26	29					
0	NQ		INTEGER		F.P.	REFS	51	72	DEFINED	1			
1307	NWB		INTEGER		TOMB	REFS	8	59	60	61	76	78	
2001	XA		COMPLEX	ARRAY		REFS	7	59	73				
24	XC		REAL	ARRAY	CNTRL	REFS	3	11	69	96	DEFINED	43	

VARIABLES	SN	TYPE		RELOCATION								
1702	XD	REAL	ARRAY	TOMB	REFS	8						
477	XEL	REAL			REFS	89	DEFINED	86				
476	XES	REAL			REFS	86	88	DEFINED	85			
505	XI	COMPLEX	ARRAY		REFS	7	60	76	92	DEFINED	73	
1302	XMAX	REAL	ARRAY	TOMB	REFS	8						
471	XW	REAL			REFS	69	DEFINED	62				
501	XWIN	REAL			REFS	92	DEFINED	88				
0	XX	REAL	ARRAY	TOMB	REFS	8	62	88	90			
0	X1	REAL	ARRAY	CNTRL	REFS	3	11	30	32	2*43		
					DEFINED	28	32					
5	X2	REAL	ARRAY	CNTRL	REFS	3	11	30	33	43		
					DEFINED	28	33					
463	Y	REAL			REFS	38	2*40	43	44	DEFINED	36	44
2274	YD	REAL	ARRAY	TOMB	REFS	8						
500	YEW	REAL			REFS	89	91	DEFINED	87			
472	YW	REAL			REFS	64	2*66	2*69	DEFINED	63		
502	YWIN	REAL			REFS	92	DEFINED	89				
536	YY	REAL	ARRAY	TOMB	REFS	8	63	87				
12	Y1	REAL	ARRAY	CNTRL	REFS	4	11	30	34	40	2*43	66
					69	DEFINED	28	34				
17	Y2	REAL	ARRAY	CNTRL	REFS	4	11	30	35	40	43	66
					69	DEFINED	28	35				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES		
CNRW		3	59	60	76

STATEMENT LABELS				DEF LINE	REFERENCES	
360	1	FMT		102	26	
376	2	FMT		105	30	
47	3			31	29	
133	4			58	53	
402	10	FMT	NO REFS	106		
0	20			35	27	
0	25			41	39	
101	26			43	40	
0	27			67	65	
160	28			69	66	
404	30	FMT		107	28	
0	40			44	37	
174	50			75	61	69
0	55			92	78	
236	60			93	51	77
406	70	FMT		108	54	82
422	71	FMT		110	55	83
425	72	FMT		111	56	84
444	73	FMT		115	92	
214	81			85	80	
115	100			46	25	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
26	20	II	27 35	35B		EXT REFS
65	40	J	37 44	27B		NOT INNER
71	25	I	39 41	7B	INSTACK	EXITS
122	60	I	51 93	117B		EXT REFS NOT INNER
142	50	JJ	61 75	35B		NOT INNER
150	27	II	65 67	7B	INSTACK	EXITS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS
202	55	IA	78 92	348		

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)						
TOMB	2162	0	XX	(350)	350	YY	(350)	700	NDB	(1)
		701	LS	(5)	706	XMAX	(5)	711	NWB	(1)
		712	AD	(250)	962	XD	(250)	1212	YD	(250)
		1462	IND	(350)	1812	AW	(350)			
COMA	41	0	LC	(40)	40	BR	(1)			
CNTRL	221	0	X1	(5)	5	X2	(5)	10	Y1	(5)
		15	Y2	(5)	20	XC	(200)	220	NCF	(1)
CTAPES	50	0	ITAPES	(50)						

STATISTICS

PROGRAM LENGTH	3312B	1738
CM LABELED COMMON LENGTH	4652B	2474

52000B CM USED

```
      SUBROUTINE MODAZ (NF,NMODES,ITAPE,WILK,QZ,NPOINT,ENDX,ES,EL,KEND)
C
      DIMENSION        NGP(20) ,   XTERM1(20) ,   XTERM2(20)
      DIMENSION     XGP(12,20) ,   YTERM1(20) ,   YTERM2(20)
      DIMENSION     YGP(12,20) ,      A(350) ,      LL(50)
      DIMENSION        QY(220) ,     ZEL(20) ,      YY(50)
      DIMENSION ITAPES(50)
      DIMENSION     DEF(12,20) ,      XAT(50) ,   DEFL(50,2)
      DIMENSION       AN(50,2) ,      YX(350) ,      XX(350)
      DIMENSION         LC(40) ,     NAME(2)
C
      COMPLEX         DWSH(350)
C
      COMMON /MODD/ XJUNK(8040), NC
      COMMON /COMA  / LC, BR
      COMMON /TOMB / XW(350) , YW(350) , NDB, LS(5) , XMAX(5) , NWB ,
     1               AD(250) , XD(250) , YD(250) , IND(350), AW(350)
      COMMON/JUNK/XTERM1,XTERM2,YTERM1,YTERM2,DIST
      COMMON /CNTRL/ X1(5) , X2(5) , Y1(5) , Y2(5) , XC(200) , NCF
      COMMON /CHSP/ KDEG
      COMMON / CTAPES / ITAPES
C
      LOGICAL WILK
C
C
C
      ITAPER = ITAPES(5)
      ITAPEW = ITAPES(6)
      MTAP2  =  ITAPES(22)
      MTAP49 =  ITAPES(49)
      MTAP9 = ITAPES(29)
C
C
      NMPT = LC(23)
      KLNN  = LC(24)
      NN=KEND+3

      K=1
      IF ( WILK )              GO TO 11
      NCF      =  1
      Y1(1)    =  100.0
      Y2(1)    =  100.0
   11 CONTINUE
      DO 1999  JJ=1,NWB
C     ESTABLISH CHORDWISE LIMITS OF BOXES
      IF (YW(JJ)+1.0.GT.KEND) KEND = KEND + 1
 1999 CONTINUE

      NENDX=ENDX
      NGPTOT=0
      READ (ITAPER,83) NLINES, NELAXS, NICH, NISP
C
      DO 1082 I=1,NLINES
      READ (ITAPER,62) NGP(I),XTERM1(I),YTERM1(I),XTERM2(I),YTERM2(I)
      NGPTOT=NGPTOT + NGP(I)
      NGPI=NGP(I)
      XTERM1(I) = XTERM1(I) - 6.0*ES
      XTERM2(I) = XTERM2(I) - 6.0*ES
```

```
                DEL=(XTERM2(I)-XTERM1(I))/(YTERM2(I)-YTERM1(I))                    MODAZ      59
                YTM1 = YTERM1(I)                                                   MODAZ      60
60              XTM1 = XTERM1(I)                                                   MODAZ      61
                READ (ITAPER,63)(YGP(J,I),J=1,NGPI)                                MODAZ      62
                YTM2 = YTERM2(I)                                                   MODAZ      63
                XTM2 = XTERM2(I)                                                   MODAZ      64
                DO 1083 JK =1,NGPI                                                 MODAZ      65
65              XGP(JK,I) = (YGP(JK,I) - YTM1)*DEL + XTM1                          MODAZ      66
                XGP1 = YGP(JK,I)                                                   MODAZ      67
                IF (XGP1.EQ.YTM2) XGP(JK,I) = XTM2                                 MODAZ      68
                XGP(JK,I) = XGP(JK,I)/12.0                                         MODAZ      69
                YGP(JK,I) = YGP(JK,I)/12.0                                         MODAZ      70
70          1083 CONTINUE                                                          MODAZ      71
            1082 CONTINUE                                                          MODAZ      72
                KEL=0                                                              MODAZ      73
                IF (NELAXS.EQ.1) CALL FORM (NLINES,KEL,NGPTOT,NGPI,XGP,YGP,NGP)    MODAZ      74
                NLIN=NLINES-1                                                      MODAZ      75
75              NGPO=NGPTOT                                                        MODAZ      76
                DO 77 K=1,NLIN                                                     MODAZ      77
                NGPL=NGP(K)                                                        MODAZ      78
                IF(XGP(NGPL,K).EQ.XGP(1,K+1).AND.YGP(NGPL,K).EQ.YGP(1,K+1))        MODAZ      79
               1 NGPO=NGPO-1                                                       MODAZ      80
80           77 CONTINUE                                                          MODAZ      81
                REWIND MTAP2                                                       MODAZ      82
                IF ( NMPT .EQ. 0 )       GO TO 2                                   MODAZ      83
                IF ( .NOT. WILK )  WRITE (ITAPEW,400) NF                           MODAZ      84
                IF ( WILK )        WRITE (ITAPEW,601)                              MODAZ      85
85              WRITE (ITAPEW,70)  NGPTOT, NLINES, NMODES                          MODAZ      86
                LINE    =  13 + NGP(1)                                             MODAZ      87
                IF ( WILK ) LINE = LINE + 14                                       MODAZ      88
             2  CONTINUE                                                           MODAZ      89
                DO 1 I=1,NLINES                                                    MODAZ      90
90              YTERM1(I)=YTERM1(I)/(ES*EL*12.)-.5                                 MODAZ      91
                CALL ORDS (YTERM1(I))                                              MODAZ      92
                YTERM2(I)=YTERM2(I)/(ES*EL*12.)-.5                                 MODAZ      93
                CALL ORDS (YTERM2(I))                                              MODAZ      94
                NGPI=NGP(I)                                                        MODAZ      95
95              XTERM1(I)=XTERM1(I)/(ES*12.)                                       MODAZ      96
                XTERM2(I)=XTERM2(I)/(ES*12.)                                       MODAZ      97
                ZEL(I) = (XTERM2(I) - XTERM1(I)) / (YTERM2(I) - YTERM1(I))         MODAZ      98
                IF (NMPT.EQ.0) GO TO 4                                             MODAZ      99
                IF ( I .EQ. 1 )     GO TO 40                                       MODAZ     100
100             LINE  =  LINE + 9 + NGP(I)                                         MODAZ     101
                IF ( LINE .LT. 55 )      GO TO 40                                  MODAZ     102
                WRITE (ITAPEW,400) NF                                              MODAZ     103
                IF ( WILK )   WRITE (ITAPEW,601)                                   MODAZ     104
                LINE      =  9 + NGP(I)                                            MODAZ     105
105          40 CONX   =  12.0 * ES                                                MODAZ     106
                CONY   =  CONX * EL                                                MODAZ     107
                XT1    =  CONX * (XTERM1(I) + 0.5)                                 MODAZ     108
                YT1    =  CONY * (YTERM1(I) + 0.5)                                 MODAZ     109
                XT2    =  CONX * (XTERM2(I) + 0.5)                                 MODAZ     110
110             YT2    =  CONY * (YTERM2(I) + 0.5)                                 MODAZ     111
                WRITE (ITAPEW,198) I , XT1 , YT1 , XT2 , YT2                       MODAZ     112
                WRITE (ITAPEW,602)  NGP(I)                                         MODAZ     113
                                                                                   MODAZ     114
             4  DO 10 J = 1,NGPI                                                   MODAZ     115
```

```
                XGP(J,I)=XGP(J,I)/ES                                              MODAZ     116
                YGP(J,I) = YGP(J,I) / (ES*EL) - 0.5                               MODAZ     117
                CALL ORDS (YGP(J,I))                                              MODAZ     118
                IF (NMPT.EQ.0) GO TO 10                                           MODAZ     119
                XT  =  CONX * (XGP(J,I) + 0.5)                                    MODAZ     120
                YT  =  CONY * (YGP(J,I) + 0.5)                                    MODAZ     121
                WRITE (ITAPEW,718) J , XT , YT                                    MODAZ     122
             10 CONTINUE                                                          MODAZ     123
                                                                                  MODAZ     124
                                                                                  MODAZ     125
              1 CONTINUE                                                          MODAZ     126
                                                                                  MODAZ     127
           C  INTERPOLATE AND EXTRAPOLATE TO GET INTERMEDIATE DISPLACEMENTS ON GIVE MODAZ     128
                KDEG   =  NISP                                                    MODAZ     129
                REWIND MTAP49                                                     MODAZ     130
                DO 150 M=1,NMODES                                                 MODAZ     131
                CALL RNRW (-MTAP49,QY,NC)                                         MODAZ     132
                LINE = 0                                                          MODAZ     133
                IF (NMPT.EQ.0) GO TO 862                                          MODAZ     134
                WRITE (ITAPEW,400) NF                                             MODAZ     135
                WRITE (ITAPEW,450) M                                              MODAZ     136
            862 JB = NPOINT                                                       MODAZ     137
                IF (NELAXS.NE.0) GO TO 12                                         MODAZ     138
                DO 15 K = 1,NLINES                                                MODAZ     139
                JB = JB + 1                                                       MODAZ     140
                NGPI = NGP(K)                                                     MODAZ     141
                IF (K.EQ.1) GO TO 16                                              MODAZ     142
                NGPX = NGP(K-1)                                                   MODAZ     143
                IF (XGP(1,K).EQ.XGP(NGPX,K-1).AND.YGP(1,K).EQ.YGP(NGPX,K-1))     MODAZ     144
               1  JB = JB - 1                                                     MODAZ     145
             16 DEF (1,K) = QY(JB)                                                MODAZ     146
                DO 15 L = 2,NGPI                                                  MODAZ     147
                JB = JB + 1                                                       MODAZ     148
                DEF (L,K) = QY(JB)                                                MODAZ     149
             15 CONTINUE                                                          MODAZ     150
                GO TO 24                                                          MODAZ     151
             12 NZLIN = NLINES / 2                                                MODAZ     152
                DO 17 K = 1,NZLIN                                                 MODAZ     153
                JB = JB + 1                                                       MODAZ     154
                NGPI = NGP(K)                                                     MODAZ     155
                IF (K.EQ.1) GO TO 19                                              MODAZ     156
                NGPX = NGP(K-1)                                                   MODAZ     157
                IF (XGP(1,K).EQ.XGP(NGPX,K-1).AND.YGP(1,K).EQ.YGP(NGPX,K-1))     MODAZ     158
               1   JB = JB - 2                                                    MODAZ     159
             19 DEF (1,K) = QY(JB)                                                MODAZ     160
                JB = JB + 1                                                       MODAZ     161
                DEF (1,K+NZLIN) = DEF (1,K) + QY(JB) * DIST                       MODAZ     162
                DO 17 L = 2,NGPI                                                  MODAZ     163
                JB = JB + 1                                                       MODAZ     164
                DEF (L,K) = QY(JB)                                                MODAZ     165
                JB = JB + 1                                                       MODAZ     166
                DEF (L,K+NZLIN) = DEF(L,K) + QY(JB) * DIST                        MODAZ     167
             17 CONTINUE                                                          MODAZ     168
             24 IF  (M.NE.NMODES) JB = JB - NGPO                                  MODAZ     169
                NPOINT = JB                                                       MODAZ     170
                IF (NMPT.EQ.0) GO TO 20                                           MODAZ     171
                DO 60 J = 1,NLINES                                                MODAZ     172
```

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                NGPI = NGP(J)                                                    MODAZ     173
                DO 60 K = 1,NGPI                                                 MODAZ     174
                LINE = LINE + 1                                                  MODAZ     175
175             IF (LINE.GT.50) LINE = 0                                         MODAZ     176
                IF (LINE.NE.0) GO TO 60                                          MODAZ     177
                WRITE (ITAPEW,400) NF                                            MODAZ     178
                WRITE (ITAPEW,450) M                                             MODAZ     179
               60 WRITE (ITAPEW,82) J , K , DEF(K,J)                             MODAZ     180
180            20 NPT = 0                                                        MODAZ     181
                DO 875 KL=1,NLINES                                               MODAZ     182
                NGPI=NGP(KL)                                                     MODAZ     183
                DO 22 I = 1,NGPI                                                 MODAZ     184
                XAT(I) = YGP(I,KL)                                               MODAZ     185
185             22 DEFL(I,1) = DEF(I,KL)                                         MODAZ     186
                NGPL = MINO (4,NGPI)                                             MODAZ     187
                NFP = 0                                                          MODAZ     188
            C                                                                    MODAZ     189
                  R      =   -1.0                                                MODAZ     190
190             DO 876   MM  =  1,KEND                                           MODAZ     191
                R      =   R  +  1.0                                             MODAZ     192
                IF ( R .GT. YTERM2(KL) .OR. R .LT. YTERM1(KL) )       GO TO 876  MODAZ     193
                IF  ( .NOT. WILK )       GO TO 31                                MODAZ     194
                DO 30 II = 1,NCF                                                 MODAZ     195
195             IF (R.GE.Y1(II).AND.R.LT.Y2(II).OR.R.EQ.Y2(NCF)) GO TO 31        MODAZ     196
               30 CONTINUE                                                       MODAZ     197
                GO TO 876                                                        MODAZ     198
               31 NFP     =  NFP  +  1                                           MODAZ     199
                YY(NFP) = R                                                      MODAZ     200
200            876 CONTINUE                                                      MODAZ     201
                IF ( NFP .EQ. 0 )  GO TO 875                                     MODAZ     202
                CALL HELGA (YY,AN,NFP,50,XAT,DEFL,NGPI,NGPL,50,0,0)              MODAZ     203
                DO 6 LM = 1,NFP                                                  MODAZ     204
                NPT = NPT + 1                                                    MODAZ     205
205             IF (M.GT.1) GO TO 7                                              MODAZ     206
                YX(NPT) = YY(LM)                                                 MODAZ     207
                 R      =    YX (NPT)                                           MODAZ     208
                XX(NPT) = XTERM1(KL) + (R-YTERM1(KL))*ZEL(KL)                    MODAZ     209
                7 A(NPT) = AN(LM,1)                                              MODAZ     210
210             IF (ABS(A(NPT)) .LE. 1.0E-07)  A(NPT)  =  0.0                    MODAZ     211
                6 CONTINUE                                                       MODAZ     212
               875 CONTINUE                                                      MODAZ     213
                LPT    =    NPT                                                 MODAZ     214
                CALL RNRW (MTAP2,A,LPT)                                          MODAZ     215
215            150 CONTINUE                                                      MODAZ     216
                REWIND MTAP49                                                    MODAZ     217
                REWIND MTAP2                                                     MODAZ     218
                KDEG   =  NICH                                                   MODAZ     219
                DO 570 M=1,NMODES                                                MODAZ     220
220             CALL RNRW (-MTAP2,A,LPT)                                         MODAZ     221
                DO 34 II = 1,NWB                                                 MODAZ     222
               34 DWSH(II)   =  CMPLX (0.0,0.0)                                  MODAZ     223
            C                                                                    MODAZ     224
                DO 120 I = 1,KEND                                                MODAZ     225
225             R  =  I  -  1                                                    MODAZ     226
                IF ( .NOT. WILK )       GO TO 36                                 MODAZ     227
                DO 32 II = 1,NCF                                                 MODAZ     228
                IF (R.GE.Y1(II).AND.R.LT.Y2(II).OR.R.EQ.Y2(NCF))  GO TO 36       MODAZ     229
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                32 CONTINUE                                                    MODAZ     230
230                GO TO 120                                                   MODAZ     231
              C       COLLECT   LINE   DATA                                    MODAZ     232
                36 NPT      =  0                                               MODAZ     233
                   DO 5 J = 1,LPT                                              MODAZ     234
                   IF (YX(J) .NE. R) GO TO 5                                   MODAZ     235
235                NPT = NPT + 1                                               MODAZ     236
                   XAT(NPT) = XX(J)                                            MODAZ     237
                   DEFL (NPT,1)  =  A (J)                                      MODAZ     238
                 5 CONTINUE                                                    MODAZ     239
                   NGPI = NPT                                                  MODAZ     240
240                NPL = MINO (4,NPT)                                          MODAZ     241
                   NFB = 0                                                     MODAZ     242
                   DO 8 J = 1,NWB                                              MODAZ     243
                   KK  =  YW(J) + 1.0                                          MODAZ     244
                   IF (YW(J) .NE  R) GO TO 8                                   MODAZ     245
245                 IF  (.NOT.WILK)   GO TO 35                                 MODAZ     246
                   IF (XW(J).LT.XC(KK))  GO TO 8                               MODAZ     247
                35 NFB = NFB + 1                                               MODAZ     248
                   LL(NFB) = J                                                 MODAZ     249
                   YY(NFB) = XW(J)                                             MODAZ     250
250                8 CONTINUE                                                  MODAZ     251
                   IF (NFB.EQ.0)  GO TO 120                                    MODAZ     252
                   CALL HELGA (YY,AN,NFB,50,XAT,DEFL,NPT,NPL,50,0,1)           MODAZ     253
                   DO 9 J = 1,NFB                                              MODAZ     254
                   LLL = LL(J)                                                 MODAZ     255
255                IF (ABS(AN(J,1)) .LE. 1.0E-05) AN(J,1) = 0.0                MODAZ     256
                   IF (ABS(AN(J,2)) .LE. 1.0E-07) AN(J,2) = 0.0                MODAZ     257
                   AN(J,2)  =  AN(J,2) / ES                                    MODAZ     258
                 9 DWSH(LLL) =  CMPLX (AN(J,1),AN(J,2))                        MODAZ     259
               120 CONTINUE                                                    MODAZ     260
260            570 CALL CNRW (ITAPE,DWSH,NWB)                                  MODAZ     261
                   WRITE (ITAPE)  YY                                           MODAZ     262
                   END FILE ITAPE                                              MODAZ     263
                   IF (ITAPE .NE. MTAP9) GO TO 1100                            MODAZ     264
                   IF ( KLNN .EQ. 0 )       GO TO 1100                         MODAZ     265
265                CALL GEDLAB(8HMODAZ 01,ITAPE,NAME,NF,IRD,JCD)               MODAZ     266
                   DO 1080 J = 1,NMODES                                        MODAZ     267
                   MAX=2*NWB                                                   MODAZ     268
                   CALL GETROW(ITAPE,1,DWSH,MAX)                               MODAZ     269
                   WRITE (ITAPEW,666) J                                        MODAZ     270
270                IF (.NOT.WILK) WRITE (ITAPEW,667) NF                        MODAZ     271
                   IF (WILK) WRITE (ITAPEW,668) NF                             MODAZ     272
                   WRITE (ITAPEW,669)                                          MODAZ     273
                   KTEN  =  10                                                 MODAZ     274
                   DO 1090 II = 1,NWB                                          MODAZ     275
275                KTEN  =  KTEN + 1                                           MODAZ     276
                   IF ( KTEN .LT. 56 )      GO TO 600                          MODAZ     277
                   KTEN  =  11                                                 MODAZ     278
                   WRITE (ITAPEW,666) J                                        MODAZ     279
                   IF (.NOT.WILK) WRITE (ITAPEW,667) NF                        MODAZ     280
280                IF (WILK) WRITE (ITAPEW,668) NF                             MODAZ     281
                   WRITE (ITAPEW,669)                                          MODAZ     282
               600 XES = 12.0*ES                                               MODAZ     283
                   XEL = XES*EL                                                MODAZ     284
                   YEW = YW(II)                                                MODAZ     285
285                XWIN = (XW(II) + 0.5) * XES                                 MODAZ     286
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                      YWIN = (YEW + 0.5) * XEL                                  MODAZ     287
                      IXW  =  XW(II)                                            MODAZ     288
                      IYW  =  YW(II)                                            MODAZ     289
                    1090 WRITE (ITAPEW,670) II , IXW , IYW , DWSH(II) , XWIN , YWIN  MODAZ     290
290                 1080 CONTINUE                                               MODAZ     291
                    C                                                           MODAZ     292
                    C                                                           MODAZ     293
                    C FORMATS                                                   MODAZ     294
                    C                                                           MODAZ     295
295                                                                             MODAZ     296
                       62 FORMAT(I5,4E10.2)                                     MODAZ     297
                       63 FORMAT(8E10.2)                                        MODAZ     298
                       70 FORMAT (2X19HMODAL DATA GIVEN AT,I4,1X9HPOINTS ON,I3,1X9HLINES FOR MODAZ     299
                         1        ,I3,1X5HMODES)                               MODAZ     300
300                    71 FORMAT(4E17.6,2I5)                                    MODAZ     301
                       82 FORMAT (15X,I4,10X,I4,10X,E18.7)                      MODAZ     302
                       83 FORMAT(4I5)                                           MODAZ     303
                      198 FORMAT (//3X,24HTERMINAL POINTS ON LINE ,I5,2X,13HIN INCHES ARE/ MODAZ     304
                         1          6X,4HX(1),9X,4HY(1),9X,4HX(2),9X,4HY(2)/    MODAZ     305
305                      2          4(2X,E12.5)/)                               MODAZ     306
                      400 FORMAT (1H1,19X15HSURFACE NUMBER ,I3,/)               MODAZ     307
                      450 FORMAT (15X26HINPUT MODAL DATA FOR MODE ,I3 //        MODAZ     308
                         1        15X4HLINE,10X5HPOINT,15X10HDEFLECTION, //)   MODAZ     309
                      601 FORMAT (15X,21HCONTROL SURFACE MODES/)                MODAZ     310
310                   602 FORMAT ( 3X,23HNO. OF POINTS ON LINE =,I5/            MODAZ     311
                         1         3X,37HCOORDINATES OF POINTS (IN INCHES) ARE/ MODAZ     312
                         2         3X,5HINDEX,9X,1HX,15X,1HY/)                  MODAZ     313
                      666 FORMAT (1H1,9X30HINTERPOLATED DATA FOR MODE NO ,I3 //) MODAZ     314
                      667 FORMAT (10X15HPRIMARY SURFACE,15X11HSURFACE NO ,I3 //) MODAZ     315
315                   668 FORMAT (10X16HCONTROL SURFACES,15X11HSURFACE NO ,I3 //) MODAZ     316
                      669 FORMAT (9X,22HNORMALIZED COORDINATES,8X,17HMODAL DEFLECTIONS, MODAZ     317
                         1       19X,16HREAL COORDINATES/                       MODAZ     318
                         2        5X,6HBOX NO,4X,1HX,7X,1HY,12X,1HH,15X,5HALPHA,11X, MODAZ     319
                         3           9HX(INCHES),9X,9HY(INCHES)//)               MODAZ     320
320                   670 FORMAT (5X,I5,2(3X,I5),4(3X,E15.6))                   MODAZ     321
                      718 FORMAT (4X,I3,3X,E14.7,3X,E14.7)                      MODAZ     322
                      778 FORMAT (1H1)                                          MODAZ     323
                                                                                MODAZ     324
                                                                                MODAZ     325
325                  1100 RETURN                                                MODAZ     326
                          END                                                   MODAZ     327
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SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	MODAZ	1	325

VARIABLES	SN	TYPE		RELOCATION							
2632	A	REAL	ARRAY		REFS	5	210	214	220	237	
					DEFINED	209	210				
1310	AD	REAL	ARRAY	TOMB	REFS	16					
4722	AN	REAL	ARRAY		REFS	9	202	209	252	255	256	257
					2*258	DEFINED	255	256	257			

VARIABLES		SN	TYPE		RELOCATION							
3424	AW		REAL	ARRAY	TOMB	REFS	16					
50	BR		REAL		COMA	REFS	15					
1602	CONX		REAL			REFS	106	107	109	119	DEFINED	105
1603	CONY		REAL			REFS	108	110	120	DEFINED	106	
4114	DEF		REAL	ARRAY		REFS	8	161	166	179	185	
						DEFINED	145	148	159	161	164	166
4556	DEFL		REAL	ARRAY		REFS	8	202	252	DEFINED	185	237
1565	DEL		REAL			REFS	65	DEFINED	58			
120	DIST		REAL		JUNK	REFS	18	161	166			
6364	DWSH		COMPLEX	ARRAY		REFS	12	260	268	289	DEFINED	222	258
0	EL		REAL		F.P.	REFS	90	92	106	116	283	
						DEFINED	1					
0	ENDX		REAL		F.P.	REFS	48	DEFINED	1			
0	ES		REAL		F.P.	REFS	56	57	90	92	95	96	105
						115	116	257	282	DEFINED	1	
1563	I		INTEGER			REFS	5*53	54	55	2*56	2*57	4*58	59
						60	61	62	63	2*65	66	67	2*68
						2*69	2*90	91	2*92	93	94	2*95	2*96
						5*97	99	100	104	107	108	109	110
						111	112	2*115	2*116	117	119	120	2*184
						2*185	225	DEFINED	52	89	183	224	
1624	II		INTEGER			REFS	2*195	222	2*228	284	285	287	288
						2*289	DEFINED	194	221	227	274		
2666	IND		INTEGER	ARRAY	TOMB	REFS	16					
1633	IRD	*	INTEGER			REFS	265					
0	ITAPE		INTEGER		F.P.	REFS	260	263	265	268	DEFINED	1	
						I/O REFS	261	262				
1543	ITAPER		INTEGER			DEFINED	26	I/O REFS	50	53	61	
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	7	21	26	27	28	29	30
1544	ITAPEW		INTEGER			DEFINED	27	I/O REFS	83	84	85	102	103
						111	112	121	134	135	177	178	179
						269	270	271	272	278	279	280	281
						289							
1644	IXW		INTEGER			REFS	289	DEFINED	287				
1645	IYW		INTEGER			REFS	289	DEFINED	288				
1570	J		INTEGER			REFS	61	2*115	2*116	117	119	120	121
						172	2*179	234	236	237	243	244	246
						248	249	254	2*255	2*256	2*257	2*258	269
						278	DEFINED	61	114	171	233	242	253
						266							
1613	JB		INTEGER			REFS	139	143	145	147	148	153	157
						159	160	161	163	164	165	166	168
						169	DEFINED	136	139	143	147	153	157
						160	163	165	168				
1634	JCD	*	INTEGER			REFS	265						
1554	JJ		INTEGER			REFS	45	DEFINED	43				
1573	JK		INTEGER			REFS	2*65	66	67	2*68	2*69		
						DEFINED	64						
1553	K		INTEGER			REFS	77	4*78	140	141	142	4*143	145
						148	154	155	156	4*157	159	2*161	164
						2*166	2*179	DEFINED	37	76	138	152	173
0	KDEG		INTEGER		CHSP	REFS	20	DEFINED	128	218			
1575	KEL		INTEGER			REFS	73	DEFINED	72				
0	KEND		INTEGER		F.P.	REFS	35	2*45	190	224	DEFINED	1	45
1631	KK		INTEGER			REFS	246	DEFINED	243				
1620	KL		INTEGER			REFS	182	184	185	2*192	3*208		
						DEFINED	181						

VARIABLES		SN	TYPE		RELOCATION
1551	KLNN		INTEGER		
1636	KTEN		INTEGER		
1615	L		INTEGER		
0	LC		INTEGER	ARRAY	COMA
1601	LINE		INTEGER		
3370	LL		INTEGER	ARRAY	
1632	LLL		INTEGER		
1625	LM		INTEGER		
1626	LPT		INTEGER		
1275	LS		INTEGER	ARRAY	TOMB
1612	M		INTEGER		
1635	MAX		INTEGER		
1623	MM	*	INTEGER		
1545	MTAP2		INTEGER		
1546	MTAP49		INTEGER		
1547	MTAP9		INTEGER		
6362	NAME		INTEGER	ARRAY	
17550	NC		INTEGER		MODD
334	NCF		INTEGER		CNTRL
1274	NDB		INTEGER		TOMB
1560	NELAXS		INTEGER		
1555	NENDX	*	INTEGER		
0	NF		INTEGER		F.P.
1630	NFB		INTEGER		
1621	NFP		INTEGER		
1646	NGP		INTEGER	ARRAY	
1564	NGPI		INTEGER		
1600	NGPL		INTEGER		
1577	NGPO		INTEGER		
1556	NGPTOT		INTEGER		
1614	NGPX		INTEGER		
1561	NICH		INTEGER		
1562	NISP		INTEGER		
1576	NLIN		INTEGER		
1557	NLINES		INTEGER		
0	NMODES		INTEGER		F.P.
1550	NMPT		INTEGER		
1552	NN	*	INTEGER		
1627	NPL		INTEGER		
0	NPOINT		INTEGER		F.P.
1617	NPT		INTEGER		
1307	NWB		INTEGER		TOMB
1616	NZLIN		INTEGER		

REFS	264	DEFINED	34			
REFS	275	276	DEFINED	273	275	277
REFS	148	164	2*166	DEFINED	146	162
REFS	10	15	33	34		
REFS	87	100	101	174	175	176
DEFINED	86	87	100	104	132	174	175
REFS	5	254	DEFINED	248		
REFS	258	DEFINED	254			
REFS	206	209	DEFINED	203		
REFS	214	220	233	DEFINED	213	
REFS	16					
REFS	135	168	178	205	DEFINED	130	219
REFS	268	DEFINED	267			
DEFINED	190					
REFS	214	220	DEFINED	28	I/O REFS	81	217
REFS	131	DEFINED	29	I/O REFS	129	216
REFS	263	DEFINED	30			
REFS	10	265				
REFS	14	131				
REFS	19	194	195	227	228	
DEFINED	39					
REFS	16					
REFS	73	137	DEFINED	50		
DEFINED	48					
REFS	83	102	134	177	265	270	271
279	280	DEFINED	1			
REFS	247	248	249	251	252	253	
DEFINED	241	247				
REFS	198	199	201	202	203	
DEFINED	187	198				
REFS	3	54	55	73	77	86	94
100	104	112	140	142	154	156	172
182	DEFINED	53				
REFS	61	64	73	114	146	162	173
183	186	202	DEFINED	55	94	140	154
172	182	239				
REFS	2*78	202	DEFINED	77	186	
REFS	78	168	DEFINED	75	78	
REFS	54	73	75	85	DEFINED	49	54
REFS	2*143	2*157	DEFINED	142	156	
REFS	218	DEFINED	50			
REFS	128	DEFINED	50			
REFS	76	DEFINED	74			
REFS	52	73	74	85	89	138	151
171	181	DEFINED	50			
REFS	85	130	168	219	266	
DEFINED	1					
REFS	82	98	118	133	170	
DEFINED	33					
DEFINED	35					
REFS	252	DEFINED	240			
REFS	136	DEFINED	1	169		
REFS	204	206	207	208	209	2*210	213
235	236	237	239	240	252	
DEFINED	180	204	232	235		
REFS	16	43	221	242	260	267	274
REFS	152	161	166	DEFINED	151	

VARIABLES	SN	TYPE	RELOCATION							
3452	QY	REAL	ARRAY	REFS	6	131	145	148	159	161	164
				166							
0	QZ	REAL	*UNUSED F.P.	DEFINED	1						
1622	R	REAL		REFS	191	2*192	3*195	199	208	3*228	234
				244	DEFINED	189	191	207	225		
0	WILK	LOGICAL	F.P.	REFS	23	38	83	84	87	103	193
				226	245	270	271	279	280		
				DEFINED	1						
4474	XAT	REAL	ARRAY	REFS	8	202	252	DEFINED	184	236	
24	XC	REAL	ARRAY CNTRL	REFS	19	246					
1702	XD	REAL	ARRAY TOMB	REFS	16						
1640	XEL	REAL		REFS	286	DEFINED	283				
1637	XES	REAL		REFS	283	285	DEFINED	282			
1672	XGP	REAL	ARRAY	REFS	4	68	73	2*78	115	119	2*143
				2*157	DEFINED	65	67	68	115		
1574	XGP1	REAL		REFS	67	DEFINED	66				
0	XJUNK	REAL	ARRAY MODD	REFS	14						
1302	XMAX	REAL	ARRAY TOMB	REFS	16						
1610	XT	REAL		REFS	121	DEFINED	119				
0	XTERM1	REAL	ARRAY JUNK	REFS	3	18	56	58	60	95	97
				107	208	DEFINED	53	56	95		
24	XTERM2	REAL	ARRAY JUNK	REFS	3	18	57	58	63	96	97
				109	DEFINED	53	57	96			
1567	XTM1	REAL		REFS	65	DEFINED	60				
1572	XTM2	REAL		REFS	67	DEFINED	63				
1604	XT1	REAL		REFS	111	DEFINED	107				
1606	XT2	REAL		REFS	111	DEFINED	109				
0	XW	REAL	ARRAY TOMB	REFS	16	246	243	285	287		
1642	XWIN	REAL		REFS	289	DEFINED	285				
5624	XX	REAL	ARRAY	REFS	9	236	DEFINED	208			
0	X1	REAL	ARRAY CNTRL	REFS	19						
5	X2	REAL	ARRAY CNTRL	REFS	19						
2274	YD	REAL	ARRAY TOMB	REFS	16						
1641	YEW	REAL		REFS	286	DEFINED	284				
2252	YGP	REAL	ARRAY	REFS	5	65	66	69	73	2*78	116
				117	120	2*143	2*157	184	DEFINED	61	69
				116							
1611	YT	REAL		REFS	121	DEFINED	120				
50	YTERM1	REAL	ARRAY JUNK	REFS	4	18	58	59	90	91	97
				108	192	208	DEFINED	53	90		
74	YTERM2	REAL	ARRAY JUNK	REFS	4	18	58	62	92	93	97
				110	192	DEFINED	53	92			
1566	YTM1	REAL		REFS	65	DEFINED	59				
1571	YTM2	REAL		REFS	67	DEFINED	62				
1605	YT1	REAL		REFS	111	DEFINED	108				
1607	YT2	REAL		REFS	111	DEFINED	110				
536	YW	REAL	ARRAY TOMB	REFS	16	45	243	244	284	288	
1643	YWIN	REAL		REFS	289	DEFINED	286				
5066	YX	REAL	ARRAY	REFS	9	207	234	DEFINED	206		
4032	YY	REAL	ARRAY	REFS	6	202	206	252	261		
				DEFINED	199	249					
12	Y1	REAL	ARRAY CNTRL	REFS	19	195	228	DEFINED	40		
17	Y2	REAL	ARRAY CNTRL	REFS	19	2*195	2*228	DEFINED	41		
4006	ZEL	REAL	ARRAY	REFS	6	208	DEFINED	97			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES			
CNRW		3	260			
FORM		7	73			
GEDLAB		6	265			
GETROW		4	268			
HELGA		11	202	252		
ORDS		1	91	93	117	
RNRW		3	131	214	220	

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES			
ABS	REAL	1	INTRIN	210	255	256	
CMPLX	COMPLEX	2	INTRIN	222	258		
MINO	INTEGER	0	INTRIN	186	240		

STATEMENT LABELS				DEF LINE	REFERENCES			
0	1			125	89			
176	2			88	82			
265	4			114	98			
670	5			238	233	234		
0	6			211	203			
600	7			209	205			
716	8			250	242	244	246	
0	9			258	253			
311	10			122	114	118		
27	11			42	38			
375	12			151	137			
0	15			149	138	146		
354	16			145	141			
0	17			167	152	162		
415	19			159	155			
505	20			180	170			
0	22			185	183			
446	24			168	150			
0	30			196	194			
551	31			198	193	195		
0	32			229	227			
0	34			222	221			
714	35			247	245			
656	36			232	226	228		
243	40			105	99	101		
472	60			179	171	173	176	
1360	62	FMT		296	53			
1363	63	FMT		297	61			
1365	70	FMT		298	85			
1375	71	FMT	NO REFS	300				
0	77			80	76			
1400	82	FMT		301	179			
1404	83	FMT		302	50			
745	120			259	224	230	251	
0	150			215	130			
1406	198	FMT		303	111			
1421	400	FMT		306	83	102	134	177
1425	450	FMT		307	135	178		
0	570			260	219			
1026	600			282	276			
1436	601	FMT		309	84	103		
1442	602	FMT		310	11			

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
CMPLX	COMPLEX	2	INTRIN	18

STATEMENT LABELS			DEF LINE	REFERENCES				
1011	1		205	81	114			
517	2		149	117	144			
141	3		81	78				
751	4		192	187				
324	5		115	83				
323	6		114	109				
0	12		167	160				
522	13		150	115				
0	15		181	174	177			
0	35		140	135				
0	42		166	163				
0	50		95	86	90			
0	60		103	99				
0	66		127	121	124			
1115	100	FMT	210	113	148	191	203	
146	200		85	194				
761	300		196	105				
1011	400		204	195	199			
1122	500	FMT	211	79	112	147	190	202
753	600		193	157	158			
37	700		33	19				
102	710		58	32				

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
142	1	I	81 205	652B	EXT REFS	NOT INNER
151	50	IO	86 95	57B	EXT REFS	NOT INNER
172	50	JO	90 95	34B	EXT REFS	
246	60	IO1	99 103	25B	EXT REFS	
331	2	J	117 149	171B	EXT REFS	NOT INNER
335	66	K1	121 127	40B	EXT REFS	NOT INNER
347	66	K2	124 127	24B	EXT REFS	
420	35	JJ	135 140	44B	EXT REFS	
536	600	IL	157 193	220B	EXT REFS	NOT INNER
544	12	IX	160 167	53B	EXT REFS	NOT INNER
556	42	JX	163 166	37B	EXT REFS	
636	15	MX	174 181	54B	EXT REFS	NOT INNER
651	15	KX	177 181	37B	EXT REFS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTAPES	50	0 ITAPES (50)
CORPSE	4000	0 R1 (4000)

STATISTICS

PROGRAM LENGTH	1441B	801
CM LABELED COMMON LENGTH	7722B	4050

52000B CM USED

VARIABLES	SN	TYPE		RELOCATION							
1345	MX	INTEGER			REFS	175	176	4*178	DEFINED	174	
0	N	INTEGER		F.P.	REFS	81	DEFINED	1			
1323	NBOX	INTEGER			REFS	108	2*113	143	2*148	185	3*186	2*191
					198	2*203	DEFINED	107	142	184	197	
0	NPIF	LOGICAL		F.P.	REFS	12	78	109	144	187	199	
					DEFINED	1						
1340	NUP	INTEGER			REFS	163	177	DEFINED	155	156		
0	P	REAL		F.P.	REFS	19	73	75	89	93	98	123
					131	132	156	162	168	176		
					DEFINED	1						
1302	Q	REAL			REFS	73	89	98	123	131	132	162
					176	DEFINED	72					
0	R1	COMPLEX	ARRAY	CORPSE	REFS	5	8	11	113	148	2*186	191
					2*198	203	DEFINED	108	143	185	186	198
1337	S	REAL			REFS	3*164	175	2*178	DEFINED	154	192	
0	VBO	REAL		F.P.	REFS	79	112	147	190	202		
					DEFINED	1						
1364	WB1	REAL	ARRAY		REFS	3	164	178	DEFINED	26	27	28
					29	30	31	46	47	48	49	50
					51	52	53	54	55	56	57	
1412	WX1	REAL	ARRAY		REFS	4	66	68	70	93	2*126	138
					139	164	DEFINED	65	66	67	68	69
					70							
1350	XB1	REAL	ARRAY		REFS	3	4*164	4*178	DEFINED	20	21	22
					23	24	25	34	35	36	37	38
					39	40	41	42	43	44	45	
1270	XJT	* COMPLEX	*UNDEF		REFS	10						
1254	XJ1	COMPLEX			REFS	9	126	128	143	DEFINED	120	126
					128							
1262	XJ1J2	COMPLEX			REFS	10	108	198	DEFINED	104		
1264	XJ1T	COMPLEX			REFS	10	93	96	104	164	168	185
					DEFINED	85	93	96	159	164	168	
1276	XJ2	COMPLEX			REFS	10	143	DEFINED	141			
1266	XJ2T	COMPLEX			REFS	10	102	104	178	182	185	
					DEFINED	97	102	169	178	182		
1256	XJ21	COMPLEX			REFS	9	138	141	DEFINED	133	138	
1260	XJ22	COMPLEX			REFS	9	139	141	DEFINED	134	139	
1312	XN	REAL			REFS	87	88	98	102	122	129	130
					161	170	171	DEFINED	82			
1406	XN1	REAL	ARRAY		REFS	3	175	176	3*178	DEFINED	170	171
1274	XTRA	* COMPLEX	*UNDEF		REFS	10						
1400	XX1	REAL	ARRAY		REFS	3	60	62	64	87	88	122
					125	136	137	161	DEFINED	59	60	61
					62	63	64					
1332	X1	REAL			REFS	131	137	DEFINED	129			
1333	X2	REAL			REFS	132	136	DEFINED	130			
1325	YL	REAL			REFS	125	136	137	154	192		
					DEFINED	118	151					
1410	Z	REAL	ARRAY		REFS	4	178	DEFINED	172	173		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES							
CEXP	COMPLEX	1	LIBRARY	93	102	126	138	139	164	178	
COS	REAL	1	LIBRARY	92	93	101	102	126	138	139	164	178
NORDER	INTEGER	2		107	142	184	197					
SQRT	REAL	1	LIBRARY	71	93	102	125	136	137	3*164	175	2*178

VARIABLES	SN	TYPE	RELOCATION								
1327	A	REAL		REFS	123	125	DEFINED	122			
1316	ARG	REAL		REFS	178	DEFINED	175				
1316	AX	REAL		REFS	92	101	DEFINED	91	100		
1335	A5	REAL		REFS	2*138	DEFINED	136				
1336	A6	REAL		REFS	2*139	DEFINED	137				
1331	B	REAL		REFS	2*126	DEFINED	125				
1306	BANG	REAL		REFS	77	182	DEFINED	76			
1301	BETA	REAL		REFS	74	76	93	DEFINED	71		
1305	BIG	REAL		REFS	128	DEFINED	75				
1307	BING	REAL		REFS	168	DEFINED	77				
1236	CMI	COMPLEX		REFS	9	89	93	98	123	128	131
				132	162	168	176	DEFINED	18		
1304	CON	REAL		REFS	102	DEFINED	74				
1303	E	REAL		REFS	93	102	126	138	139	164	178
				DEFINED	73						
0	EL	REAL	F.P.	REFS	75	141	DEFINED	1			
0	EM	REAL	F.P.	REFS	19	71	2*72	73	79	112	147
				156	190	202	DEFINED	1			
1343	EX	REAL		REFS	162	4*164	DEFINED	161			
1240	E1	COMPLEX		REFS	9	126	DEFINED	123			
1321	E10	REAL		REFS	102	DEFINED	101				
1252	E12	COMPLEX		REFS	9	102	DEFINED	98			
1242	E3	COMPLEX		REFS	9	139	DEFINED	131			
1244	E4	COMPLEX		REFS	9	138	DEFINED	132			
1272	E5	COMPLEX		REFS	10	164	DEFINED	162			
1246	E6	COMPLEX		REFS	9	178	DEFINED	176			
1250	E8	COMPLEX		REFS	9	93	DEFINED	89			
1314	E9	REAL		REFS	89	93	DEFINED	87	88		
1317	F	REAL		REFS	93	DEFINED	92				
1311	I	INTEGER		REFS	82	83	88	96	105	107	113
				115	116	142	148	150	158	183	184
				191	194	195	196	197	203		
				DEFINED	81						
1341	IL	INTEGER		REFS	158	183	186	DEFINED	157		
1313	IO	INTEGER		REFS	87	88	93	DEFINED	86		
1320	IO1	INTEGER		REFS	100	DEFINED	99				
0	ITAPES	INTEGER	ARRAY CTAPES	REFS	6	7	15				
1300	ITAPEW	INTEGER		DEFINED	15	I/O REFS	79	112	113	147	148
				190	191	202	203				
1342	IX	INTEGER		REFS	161	164	DEFINED	160			
1322	J	INTEGER		REFS	107	113	118	142	148	151	184
				191	197	203	DEFINED	106	117	150	183
				196							
1334	JJ	INTEGER		REFS	136	137	138	139	DEFINED	135	
1315	JO	INTEGER		REFS	91	DEFINED	90				
1344	JX	INTEGER		REFS	5*164	DEFINED	163				
1324	K	INTEGER		REFS	117	DEFINED	116				
0	KK	INTEGER	F.P.	REFS	79	112	147	190	202		
				DEFINED	1						
1347	KX	INTEGER		REFS	5*178	DEFINED	177				
1326	K1	INTEGER		REFS	122	126	DEFINED	121			
1330	K2	INTEGER		REFS	125	126	DEFINED	124			
0	L	INTEGER	*UNUSED F.P.	DEFINED	1						
1310	LINE	INTEGER		REFS	110	111	112	145	146	147	188
				189	190	200	201	202	DEFINED	80	110
				111	145	146	188	189	200	201	

```
                      Z(1)= 1.0                                                  COFFIN    173
                      Z(2)=-1.0                                                  COFFIN    174
                      DO 15 MX=1,2                                               COFFIN    175
     175              ARG=SQRT(XN1(MX)-S)                                        COFFIN    176
                      E6= -CMI*P*Q*XN1(MX)                                       COFFIN    177
                      DO 15 KX=1,NUP                                             COFFIN    178
                      XJ2T=XJ2T-Z(MX)*ARG*CEXP(E6)*WB1(KX)*COS(E*SQRT(XN1(MX)**2-(S*(1.- COFFIN    179
                     1XB1(KX))+XN1(MX)*XB1(KX))**2))/SQRT(XN1(MX)*(1.+XB1(KX))+S*(1.-XB1 COFFIN    180
     180             2(KX)))                                                    COFFIN    181
                   15 CONTINUE                                                  COFFIN    182
                      XJ2T=XJ2T*BANG                                             COFFIN    183
                      IF(IL.EQ.2) J=I-1                                          COFFIN    184
                      NBOX=NORDER(I,J)                                           COFFIN    185
     185              R1(NBOX)=XJ1T-XJ2T                                         COFFIN    186
                      IF(IL.EQ.2) R1(NBOX)=R1(NBOX)-R1(NBOX+1)                   COFFIN    187
                      IF (.NOT.NPIF) GO TO 4                                     COFFIN    188
                      LINE = LINE + 1                                            COFFIN    189
                      IF (LINE.GE.45) LINE=0                                     COFFIN    190
     190              IF (LINE.EQ.0) WRITE (ITAPEW,500) KK , EM , VBO            COFFIN    191
                      WRITE (ITAPEW,100) I,J,NBOX,R1(NBOX)                       COFFIN    192
                    4 S = YL - 1.5                                               COFFIN    193
                  600 CONTINUE                                                   COFFIN    194
                      IF(I.EQ.2) GO TO 200                                       COFFIN    195
     195              IF(I.GT.2) GO TO 400                                       COFFIN    196
                  300 J=I-1                                                      COFFIN    197
                      NBOX=NORDER(I,J)                                           COFFIN    198
                      R1(NBOX)=XJ1J2-(R1(1)+2.*R1(3))                            COFFIN    199
                      IF (.NOT.NPIF) GOTO 400                                    COFFIN    200
     200              LINE = LINE + 1                                            COFFIN    201
                      IF (LINE.GE.45) LINE = 0                                   COFFIN    202
                      IF (LINE.EQ.0) WRITE (ITAPEW,500) KK , EM , VBO            COFFIN    203
                      WRITE (ITAPEW,100) I,J,NBOX,R1(NBOX)                       COFFIN    204
                  400 CONTINUE                                                   COFFIN    205
     205            1 CONTINUE                                                   COFFIN    206
                C                                                                COFFIN    207
                C                                                                COFFIN    208
                C FORMATS                                                        COFFIN    209
                C                                                                COFFIN    210
     210          100 FORMAT (5X,I5,2(3X,I5),3X2H( ,E12.4,2H, ,E12.4,2H) )      COFFIN    211
                  500 FORMAT(1H1,5X52HTABLE OF PRESSURE INFLUENCE COEFFICIENTS FOR SURFA COFFIN    212
                     1CE ,I2,//10X,10HMACH NO = ,F6.3,15X19HREDUCED VELOCITY = ,    COFFIN    213
                     2   F7.3,/32X22HINFLUENCE COEFFICIENTS,/9X1HI,7X1HJ,          COFFIN    214
                     3   4X6HBOX NO,5X20H( REAL , IMAGINARY ),//)                  COFFIN    215
     215          C                                                               COFFIN    216
                      RETURN                                                     COFFIN    217
                      END                                                        COFFIN    218
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 COFFIN	1	216

```
115               5 IF(I.LT.3) GO TO 13                                          COFFIN   116
                    K=I-2                                                        COFFIN   117
                    DO 2 J=1,K                                                   COFFIN   118
                    YL=J-1                                                       COFFIN   119
                  C RECTANGULAR BOXES                                            COFFIN   120
120                 XJ1=0.0                                                      COFFIN   121
                    DO 66 K1=1,6                                                 COFFIN   122
                    A=XN+.5*XX1(K1)                                              COFFIN   123
                    E1= -CMI*P*Q*A                                               COFFIN   124
                    DO 66 K2=1,6                                                 COFFIN   125
125                 B=SQRT(A**2-(YL+.5*XX1(K2))**2)                              COFFIN   126
                    XJ1=XJ1-CEXP(E1)*COS(E*B)*WX1(K1)*WX1(K2)/B                  COFFIN   127
                   66 CONTINUE                                                   COFFIN   128
                    XJ1=XJ1*CMI*BIG                                              COFFIN   129
                    X1=XN- 5                                                     COFFIN   130
130                 X2=XN+.5                                                     COFFIN   131
                    E3=-CMI*P*Q*X1                                               COFFIN   132
                    E4=-CMI*P*Q*X2                                               COFFIN   133
                    XJ21=0.0                                                     COFFIN   134
                    XJ22=0.0                                                     COFFIN   135
135                 DO 35 JJ=1,6                                                 COFFIN   136
                    A5=SQRT(X2**2-(YL-XX1(JJ)/2.)**2)                            COFFIN   137
                    A6=SQRT(X1**2-(YL-XX1(JJ)/2.)**2)                            COFFIN   138
                    XJ21=XJ21+CEXP(E4)*(COS(E*A5)/A5)*WX1(JJ)                    COFFIN   139
                    XJ22=XJ22-CEXP(E3)*(COS(E*A6)/A6)*WX1(JJ)                    COFFIN   140
140                35 CONTINUE                                                   COFFIN   141
                    XJ2 =-(XJ21+XJ22)*(EL*.3183098862)*.5                        COFFIN   142
                    NBOX=NORDER(I,J)                                             COFFIN   143
                    R1(NBOX)=XJ1+XJ2                                             COFFIN   144
                    IF (.NOT.NPIF)  GO TO 2                                      COFFIN   145
145                 LINE = LINE + 1                                              COFFIN   146
                    IF (LINE.GE.45)LINE = 0                                      COFFIN   147
                    IF (LINE.EQ.0) WRITE (ITAPEW,500) KK, EM, VBO                COFFIN   148
                    WRITE (ITAPEW,100) I,J,NBOX,R1(NBOX)                         COFFIN   149
                    2 CONTINUE                                                   COFFIN   150
150                13 J=I                                                        COFFIN   151
                    YL=J-1                                                       COFFIN   152
                  C     TRIANGLE SOLUTION                                      COFFIN   153
                  C     TRAPEZOID SOLUTION                                     COFFIN   154
                    S=YL-.5                                                      COFFIN   155
155                 NUP=6                                                        COFFIN   156
                    IF(P.GE.1.0.AND.EM.LT.2.0) NUP=12                            COFFIN   157
                    DO 600 IL=1,2                                                COFFIN   158
                    IF(I.EQ.2.AND.IL.EQ.2) GO TO 600                             COFFIN   159
                    XJ1T=0.                                                      COFFIN   160
160                 DO 12 IX=1,6                                                 COFFIN   161
                    EX= XN-.5*XX1(IX)                                            COFFIN   162
                    E5=-CMI*P*Q*EX                                               COFFIN   163
                    DO 42 JX=1,NUP                                               COFFIN   164
                    XJ1T=XJ1T-SQRT(EX-S)*CEXP(E5)*WB1(JX)*COS(E*SQRT(EX**2-(S*(1.-XB1(  COFFIN   165
165                1JX))+EX*XB1(JX))**2))*WX1(IX)/SQRT(EX*(1.+XB1(JX))+S*(1.-XB1(JX)))  COFFIN   166
                   42 CONTINUE                                                   COFFIN   167
                   12 CONTINUE                                                   COFFIN   168
                    XJ1T=XJ1T*CMI*P*BING                                         COFFIN   169
                    XJ2T=0.                                                      COFFIN   170
170                 XN1(1)=XN-.5                                                 COFFIN   171
                    XN1(2)=XN+.5                                                 COFFIN   172
```

```
                710 CONTINUE                                                        COFFIN     59
                    XX1(1)=.23861918                                                COFFIN     60
60                  XX1(2)= -XX1(1)                                                 COFFIN     61
                    XX1(3)=.66120938                                                COFFIN     62
                    XX1(4)=-XX1(3)                                                  COFFIN     63
                    XX1(5)=.93246951                                                COFFIN     64
                    XX1(6)=-XX1(5)                                                  COFFIN     65
65                  WX1(1)=.46791393                                                COFFIN     66
                    WX1(2)=WX1(1)                                                   COFFIN     67
                    WX1(3)=.36076157                                                COFFIN     68
                    WX1(4)=WX1(3)                                                   COFFIN     69
                    WX1(5)=.17132449                                                COFFIN     70
70                  WX1(6)=WX1(5)                                                   COFFIN     71
                    BETA=SQRT(EM**2-1.)                                             COFFIN     72
                    Q=EM**2/(EM**2-1.)                                              COFFIN     73
                    E=P*Q/EM                                                        COFFIN     74
                    CON= 1./(BETA*12.)                                              COFFIN     75
75                  BIG= EL*.0795774715*P                                           COFFIN     76
                    BANG=1./(3.141592*BETA)                                         COFFIN     77
                    BING=BANG/2.                                                    COFFIN     78
                    IF (.NOT.NPIF)  GO TO 3                                         COFFIN     79
                    WRITE (ITAPEW,500) KK , EM , VBO                                COFFIN     80
80                  LINE = 0                                                        COFFIN     81
                  3 DO 1 I=1,N                                                      COFFIN     82
                    XN=I-1                                                          COFFIN     83
                    IF(I.GT.1) GO TO 5                                              COFFIN     84
                C   MACH CONE APEX TRIANGLE                                         COFFIN     85
85                200 XJ1T=0.0                                                      COFFIN     86
                    DO 50 IO=1,6                                                    COFFIN     87
                    E9= (4.*XN+(1.+XX1(IO)))/2.0                                    COFFIN     88
                    IF(I.EQ.2) E9=(2.*XN+1.)*(1.+XX1(IO))/2.                        COFFIN     89
                    E8=-CMI*P*Q*E9/2.0                                              COFFIN     90
90                  DO 50 JO=1,12                                                   COFFIN     91
                    AX=JO                                                           COFFIN     92
                    F=COS((2.*AX-1.0)*3.141592/24.)                                 COFFIN     93
                    XJ1T=XJ1T-(CMI/(4.*BETA*12.))*CEXP(E8)*COS(E*(E9/2.)*SQRT(1.-F**2) COFFIN     94
                   1)*WX1(IO)*P                                                     COFFIN     95
95                 50 CONTINUE                                                      COFFIN     96
                    IF(I.EQ.2) XJ1T=3.*XJ1T                                         COFFIN     97
                    XJ2T=0.0                                                        COFFIN     98
                    E12=-CMI*P*Q*(XN+.5)                                            COFFIN     99
                    DO 60 IO1=1,12                                                  COFFIN    100
100                 AX=IO1                                                          COFFIN    101
                    E10=COS((2.*AX-1.0)*3.141592/24.)                               COFFIN    102
                    XJ2T=XJ2T-CON*CEXP(E12)*COS(E*(XN+.5)*SQRT(1.-E10**2))          COFFIN    103
                 60 CONTINUE                                                        COFFIN    104
                    XJ1J2=XJ1T+XJ2T                                                 COFFIN    105
105                 IF(I.EQ.2) GO TO 300                                            COFFIN    106
                    J=1                                                             COFFIN    107
                    NBOX=NORDER(I,J)                                                COFFIN    108
                    R1(NBOX)=XJ1J2                                                  COFFIN    109
                    IF (.NOT.NPIF)  GO TO 6                                         COFFIN    110
110                 LINE = LINE + 1                                                 COFFIN    111
                    IF (LINE.GE.45) LINE = 0                                        COFFIN    112
                    IF (LINE.EQ.0) WRITE (ITAPEW,500) KK , EM , VBO                 COFFIN    113
                    WRITE (ITAPEW,100) I,J,NBOX,R1(NBOX)                            COFFIN    114
                  6 GO TO 1                                                         COFFIN    115
```

```
      SUBROUTINE COFFIN (N,P,EM,L,EL,KK,VBO,NPIF)                       COFFIN     2
C                                                                       COFFIN     3
      DIMENSION XB1(12),WB1(12),XX1(6),XN1(2)                           COFFIN     4
      DIMENSION Z(2),WX1(6)                                             COFFIN     5
      DIMENSION       R1(2000)                                          COFFIN     6
      DIMENSION ITAPES(50)                                              COFFIN     7
      COMMON / CTAPES / ITAPES                                          COFFIN     8
      COMMON/CORPSE/R1                                                  COFFIN     9
      COMPLEX CMI,E1,E3,E4,E6,E8,E12,XJ1,XJ21,XJ22                      COFFIN    10
      COMPLEX XJ1J2,XJ1T,XJ2T,XJT,E5,XTRA,XJ2                           COFFIN    11
      COMPLEX R1                                                        COFFIN    12
      LOGICAL  NPIF                                                     COFFIN    13
C                                                                       COFFIN    14
C                                                                       COFFIN    15
      ITAPEW = ITAPES(6)                                                COFFIN    16
C                                                                       COFFIN    17
C                                                                       COFFIN    18
      CMI=CMPLX(0.0,1.0)                                                COFFIN    19
      IF(P.GE.1.0.AND.EM.LT.2.0) GO TO 700                              COFFIN    20
      XB1(1)=.98431659                                                  COFFIN    21
      XB1(2)=.86469999                                                  COFFIN    22
      XB1(3)=.65505762                                                  COFFIN    23
      XB1(4)=.40724987                                                  COFFIN    24
      XB1(5)=.18257199                                                  COFFIN    25
      XB1(6)=.03653872                                                  COFFIN    26
      WB1(1)=.49829408                                                  COFFIN    27
      WB1(2)=.46698506                                                  COFFIN    28
      WB1(3)=.40623484                                                  COFFIN    29
      WB1(4)=.32015664                                                  COFFIN    30
      WB1(5)=.21387864                                                  COFFIN    31
      WB1(6)=.09435066                                                  COFFIN    32
      GO TO 710                                                         COFFIN    33
  700 CONTINUE                                                          COFFIN    34
      XB1(1)=.99589671                                                  COFFIN    35
      XB1(2)=.96347358                                                  COFFIN    36
      XB1(3)=.90074812                                                  COFFIN    37
      XB1(4)=.81182320                                                  COFFIN    38
      XB1(5)=.70251542                                                  COFFIN    39
      XB1(6)=.57997462                                                  COFFIN    40
      XB1(7)=.45221618                                                  COFFIN    41
      XB1(8)=.32759675                                                  COFFIN    42
      XB1(9)=.21426753                                                  COFFIN    43
      XB1(10)=.11964087                                                 COFFIN    44
      XB1(11)=.04990425                                                 COFFIN    45
      XB1(12)=.00960242                                                 COFFIN    46
      WB1(1)=.25587638                                                  COFFIN    47
      WB1(2)=.25167490                                                  COFFIN    48
      WB1(3)=.24334094                                                  COFFIN    49
      WB1(4)=.23101132                                                  COFFIN    50
      WB1(5)=.21488854                                                  COFFIN    51
      WB1(6)=.19523730                                                  COFFIN    52
      WB1(7)=.17238032                                                  COFFIN    53
      WB1(8)=.14669296                                                  COFFIN    54
      WB1(9)=.11859716                                                  COFFIN    55
      WB1(10)=.08855486                                                 COFFIN    56
      WB1(11)=.05706276                                                 COFFIN    57
      WB1(12)=.02468244                                                 COFFIN    58
```

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)						
TOMB	2162	0	XW	(350)	350	YW	(350)	700	NDB	(1)
		701	LS	(5)	706	XMX	(5)	711	NWB	(1)
		712	AD	(250)	962	XD	(250)	1212	YD	(250)
		1462	IND	(350)	1812	AW	(350)			
CTAPES	50	0	ITAPES	(50)						

STATISTICS

PROGRAM LENGTH	1723B	979
CM LABELED COMMON LENGTH	4244B	2212
52000B CM USED		

VARIABLES	SN	TYPE	RELOCATION								
306	IY2	INTEGER			REFS	62	DEFINED	61			
266	JCD *	INTEGER			REFS	23					
0	KK	INTEGER		F.P.	REFS	23	42	43	DEFINED	1	
301	KOUNT	INTEGER			REFS	46	54	DEFINED	45	63	
1275	LS	INTEGER	ARRAY	TOMB	REFS	11					
273	MAX	INTEGER			REFS	30	DEFINED	29			
264	MTAP9	INTEGER			REFS	23	30	DEFINED	21		
421	NAME	INTEGER	ARRAY		REFS	7	23				
1274	NDB	INTEGER		TOMB	REFS	11					
0	NS	INTEGER		F.P.	REFS	27	DEFINED	1			
1307	NWB	INTEGER		TOMB	REFS	11	25	29	32	46	54
377	QHOL	REAL	ARRAY		REFS	5	59	DEFINED	16		
300	X	REAL			REFS	47	55	64	65	DEFINED	44	64
1702	XD	REAL	ARRAY	TOMB	REFS	11					
267	XMAX	REAL			REFS	26	65	DEFINED	24	26	
1302	XMX	REAL	ARRAY	TOMB	REFS	11					
0	XW	REAL	ARRAY	TOMB	REFS	11	26	47	55		
2274	YD	REAL	ARRAY	TOMB	REFS	11					
536	YW	REAL	ARRAY	TOMB	REFS	11	48	58			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
ALOG10	REAL	1	LIBRARY	39
GEDLAB		6		23
GETROW		4		30

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
ABS	REAL	1	INTRIN	35	52	
AIMAG	REAL	1	INTRIN	34	51	
AMAX1	REAL	0	INTRIN	26	35	
MINO	INTEGER	0	INTRIN	61		
REAL	REAL	1	INTRIN	33	50	
SIGN	REAL	2	INTRIN	40		

STATEMENT LABELS			DEF LINE	REFERENCES	
0	1		68	27	
0	2		35	32	
65	3		42	37	38
130	4		53	46	47
0	5		56	54	
142	6		58	55	
0	10		26	25	
232	100	FMT	73	42	
244	110	FMT	75	43	
31	200		31	67	
77	300		46	65	
162	400		64	57	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
17	10	I	25 26	4B	INSTACK		
25	1	IM	27 68	146B		EXT REFS	NOT INNER
42	2	I	32 35	11B	OPT		
101	4	I	46 53	32B		EXT REFS	
134	5	I	54 56	5B	INSTACK	EXITS	

```
                    6 IYY   =  YW(I)                                          DSPMD      59
                      FMT(2)  =  QHOL (IYY+1)                                 DSPMD      60
      60              IY1   =  IYY + 1                                        DSPMD      61
                      IY2   =  MINO (18, IY)                                  DSPMD      62
                      WRITE (ITAPEW,FMT)   (H(I) , I=IY1,IY2)                 DSPMD      63
                      KOUNT   =  IK + 1                                       DSPMD      64
                    400 X   =  X + 1.0                                        DSPMD      65
      65              IF ( X .LE. XMAX )      GO TO 300                       DSPMD      66
                      ICAP   =  ICAP + 1                                      DSPMD      67
                      IF ( ICAP .EQ. 2 )      GO TO 200                       DSPMD      68
                    1 CONTINUE                                                DSPMD      69
                  C                                                           DSPMD      70
      70          C                                                           DSPMD      71
                  C FORMATS                                                   DSPMD      72
                  C                                                           DSPMD      73
                    100 FORMAT (1H1,10X35HMODAL DEFLECTION MULTIPLIED BY 1.0E, I3,  DSPMD  74
                       1     2X,9HFOR MODE ,I3,5X12HFOR SURFACE ,I3, ///)     DSPMD      75
      75            110 FORMAT (1H1,10X31HMODAL SLOPES MULTIPLIED BY 1.0E, I3,  DSPMD      76
                       1     2X,9HFOR MODE ,I3,5X12HFOR SURFACE ,I3 ///)      DSPMD      77
                  C                                                           DSPMD      78
                      RETURN                                                  DSPMD      79
                      END                                                     DSPMD      80
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	DSPMD	1	78

VARIABLES	SN	TYPE	RELOCATION									
277		AA	REAL			REFS	2*40	DEFINED	39			
1310		AD	REAL	ARRAY	TOMB	REFS	11					
3424		AW	REAL	ARRAY	TOMB	REFS	11					
423		DWSH	COMPLEX	ARRAY		REFS	9	30	33	34	50	51
371		FMT	REAL	ARRAY		REFS	5	62	DEFINED	15	59	
307		H	REAL	ARRAY		REFS	5	52	62	DEFINED	50	51
275		HH	REAL			REFS	35	DEFINED	33	34		
274		HMAX	REAL			REFS	35	2*37	38	39	DEFINED	31
270		I	INTEGER			REFS	26	33	34	47	48	49
						51	55	58	62	DEFINED	25	32
						54	62					
272		ICAP	INTEGER			REFS	33	34	42	43	50	51
						67	DEFINED	28	66			
303		IK	INTEGER			REFS	63	DEFINED	49			
271		IM	INTEGER			REFS	42	43	DEFINED	27		
2666		IND	INTEGER	ARRAY	TOMB	REFS	11					
265	*	IRD	INTEGER			REFS	23					
276		ISCL	INTEGER			REFS	41	42	43	50	51	
						DEFINED	36	40	41			
0		ITAPES	INTEGER	ARRAY	CTAPES	REFS	6	13	20	21		
263		ITAPEW	INTEGER			DEFINED	20	I/O REFS	42	43	62	
302		IY	INTEGER			REFS	50	51	2*52	61	DEFINED	48
304		IYY	INTEGER			REFS	59	60	DEFINED	58		
305		IY1	INTEGER			REFS	62	DEFINED	60			

```
      SUBROUTINE DSPMD ( KK , NS )                                      DSPMD      2
C                                                                       DSPMD      3
C     PROVIDES DISPLAY OF MODAL DEFLECTIONS                             DSPMD      4
C                                                                       DSPMD      5
      DIMENSION          H(50) ,       FMT(6) ,     QHOL(18)           DSPMD      6
      DIMENSION ITAPES(50)                                              DSPMD      7
      DIMENSION         NAME(2)                                         DSPMD      8
C                                                                       DSPMD      9
      COMPLEX        DWSH(350)                                          DSPMD     10
C                                                                       DSPMD     11
      COMMON /TOMB/ XW(350) , YW(350) , NDB , LS(5) , XMX(5) , NWB ,    DSPMD     12
     1              AD(250) , XD(250) , YD(250) ,IND(350) , AW(350)     DSPMD     13
      COMMON / CTAPES / ITAPES                                          DSPMD     14
C                                                                       DSPMD     15
      DATA FMT /4H(    ,4H     ,4HX,  ,4H18(1,4HX,F6,4H.3))/            DSPMD     16
      DATA QHOL /1H2,1H9,2H16,2H23,2H30,2H37,2H44,2H51,2H58,2H65,2H72,  DSPMD     17
     1          2H79,2H86,2H93,3H100,3H107,3H114,3H121/                 DSPMD     18
C                                                                       DSPMD     19
C                                                                       DSPMD     20
      ITAPEW = ITAPES(6)                                                DSPMD     21
      MTAP9  =  ITAPES(29)                                              DSPMD     22
C                                                                       DSPMD     23
      CALL GEDLAB(8HDSPMD 01,MTAP9,NAME,KK,IRD,JCD)                     DSPMD     24
      XMAX  =  0.0                                                      DSPMD     25
      DO 10  I =1,NWB                                                   DSPMD     26
   10 XMAX  =  AMAX1 (XMAX,XW(I))                                       DSPMD     27
      DO 1  IM = 1,NS                                                   DSPMD     28
      ICAP  =  1                                                        DSPMD     29
      MAX=2*NWB                                                         DSPMD     30
      CALL GETROW(MTAP9,1,DWSH,MAX)                                     DSPMD     31
  200 HMAX  =  0.0                                                      DSPMD     32
      DO 2  I = 1,NWB                                                   DSPMD     33
      IF ( ICAP .EQ. 1 )      HH = REAL (DWSH(I))                       DSPMD     34
      IF ( ICAP .EQ. 2 )      HH = AIMAG(DWSH(I))                       DSPMD     35
    2 HMAX  =  AMAX1 ( HMAX , ABS(HH) )                                 DSPMD     36
      ISCL  =  0                                                        DSPMD     37
      IF ( HMAX .GE. 1.0 .AND. HMAX .LT. 10.0 )   GO TO 3               DSPMD     38
      IF ( HMAX .EQ. 0.0 )                        GO TO 3               DSPMD     39
      AA  =  ALOG10 (HMAX)                                              DSPMD     40
      ISCL  =  AA - 0.5 + SIGN (0.5,AA)                                 DSPMD     41
      ISCL  =  - ISCL                                                  DSPMD     42
    3 IF ( ICAP .EQ. 1 )      WRITE (ITAPEW,100)  ISCL , IM , KK        DSPMD     43
      IF ( ICAP .EQ. 2 )      WRITE (ITAPEW,110)  ISCL , IM , KK        DSPMD     44
      X   =  0.0                                                        DSPMD     45
      KOUNT  =  1                                                       DSPMD     46
  300 DO 4  I = KOUNT,NWB                                               DSPMD     47
      IF ( XW(I) .NE. X )     GO TO 4                                   DSPMD     48
      IY  =  YW(I) + 1                                                  DSPMD     49
      IK  =  I                                                          DSPMD     50
      IF ( ICAP .EQ. 1 )      H(IY)  =  REAL (DWSH(I)) * 10.0**ISCL     DSPMD     51
      IF ( ICAP .EQ. 2 )      H(IY)  = AIMAG (DWSH(I)) * 10.0**ISCL     DSPMD     52
      IF ( ABS(H(IY)) .LT. 0.001 )     H(IY)  =  0.0                    DSPMD     53
    4 CONTINUE                                                          DSPMD     54
      DO 5  I = KOUNT,NWB                                               DSPMD     55
      IF (XW(I) .EQ. X)  GOTO  6                                        DSPMD     56
    5 CONTINUE                                                          DSPMD     57
      GO TO 400                                                         DSPMD     58
```

```
1                SUBROUTINE ORDS (X)                                    ORDS      2
                 IF (X.NE.0.0) GO TO 10                                 ORDS      3
                 X = X - 0.001                                          ORDS      4
                 GO TO 20                                               ORDS      5
5             10 IX = X                                                 ORDS      6
                 AX = IX                                                ORDS      7
                 IF (AX.EQ.X) X = X + 0.001                             ORDS      8
              20 RETURN                                                 ORDS      9
                 END                                                    ORDS     10
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	ORDS	1	8

VARIABLES		SN	TYPE	RELOCATION										
20	AX		REAL		REFS	7	DEFINED	6						
17	IX		INTEGER		REFS	6	DEFINED	5						
0	X		REAL	F.P.	REFS	2	3	5	2*7	DEFINED	1	3		
					7									

STATEMENT LABELS		DEF LINE	REFERENCES
10	10	5	2
15	20	8	4

STATISTICS

PROGRAM LENGTH	218	17
52000B CM USED		

```
COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       CHSP           1               0 KDEG   (1)
       CTAPES        50               0 ITAPES (50)

STATISTICS
  PROGRAM LENGTH                 7723B     4051
  CM LABELED COMMON LENGTH      245458    10597
          52C00B CM USED
```

STATEMENT LABELS			DEF LINE	REFERENCES		
1455	666	FMT	313	269	278	
1463	667	FMT	314	270	279	
1471	668	FMT	315	271	280	
1477	669	FMT	316	272	281	
1516	670	FMT	320	289		
1522	718	FMT	321	121		
1526	778	FMT NO REFS	322			
333	862		136	133		
607	875		212	181	201	
554	876		200	190	192	197
0	1080		290	266		
0	1082		71	52		
0	1083		70	64		
0	1090		289	274		
1052	1100		325	263	264	
0	1999		46	43		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
32	1999	JJ	43 46	6B	INSTACK
46	1082	I	52 71	63B	EXT REFS NOT INNER
113	1083	JK	64 70	12B	OPT
145	77	K	76 80	12B	OPT
177	1	I	89 125	117B	EXT REFS NOT INNER
266	10	J	114 122	26B	EXT REFS
322	150	M	130 215	276B	EXT REFS NOT INNER
337	15	K	138 149	36B	NOT INNER
366	15	L	146 149	3B	INSTACK
400	17	K	152 167	46B	NOT INNER
435	17	L	162 167	6B	INSTACK
456	60	J	171 179	27B	EXT REFS NOT INNER
461	60	K	173 179	22B	EXT REFS
507	875	KL	181 212	103B	EXT REFS NOT INNER
516	22	I	183 185	4B	INSTACK
531	876	MM	190 200	26B	NOT INNER
540	30	II	194 196	10B	OPT EXITS
571	6	LM	203 211	14B	OPT
626	570	M	219 260	127B	EXT REFS NOT INNER
635	34	II	221 222	2B	INSTACK
641	120	I	224 259	107B	EXT REFS NOT INNER
645	32	II	227 229	10B	OPT EXITS
663	5	J	233 238	6B	INSTACK
704	8	J	242 250	13B	OPT
727	9	J	253 258	15B	OPT
770	1080	J	266 290	62B	EXT REFS NOT INNER
1010	1090	II	274 289	40B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
MODD	8041	0	XJUNK	(8040)	8040	NC	(1)			
COMA	41	0	LC	(40)	40	BR	(1)			
TOMB	2162	0	XW	(350)	350	YW	(350)	700	NDB	(1)
		701	LS	(5)	706	XMAX	(5)	711	NWB	(1)
		712	AD	(250)	962	XD	(250)	1212	YD	(250)
		1462	IND	(350)	1812	AW	(350)			
JUNK	81	0	XTERM1	(20)	20	XTERM2	(20)	40	YTERM1	(20)
		60	YTERM2	(20)	80	DIST	(1)			
CNTRL	221	0	X1	(5)	5	X2	(5)	10	Y1	(5)
		15	Y2	(5)	20	XC	(200)	220	NCF	(1)

```
      1              FUNCTION NORDER(I,J)                                  NORDER      2
                     NORDER = (I*(I-1))/2+J                                NORDER      3
                     RETURN                                                NORDER      4
                     END                                                   NORDER      5
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
4	NORDER	1	3

VARIABLES	SN	TYPE	RELOCATION				
0	I	INTEGER	F.P.	REFS	2*2	DEFINED	1
0	J	INTEGER	F.P.	REFS	2	DEFINED	1
12	NORDER	INTEGER		DEFINED	2		

STATISTICS

PROGRAM LENGTH	138	11
52000B CM USED		

```
      SUBROUTINE RIP (NQ,OSA,P,ES,KDWSH)
C
      DIMENSION       XW(350) ,     YW(350) ,     XD(250)
      DIMENSION       YD(250) ,     AW(350) ,     AD(250)
      DIMENSION        X(350) ,    R1(2000) ,      H(350)
      DIMENSION      IND(350) ,       LS(5) ,     XMAX(5)
      DIMENSION       PP(350)
      DIMENSION ITAPES(50)
      COMMON / CTAPES / ITAPES
      COMMON/CORPSE/R1
      COMMON/TOMB/XW,YW,NDB,LS,XMAX,NWB,AD,XD,YD,IND,AW
      COMPLEX               W ,          PP ,        TEMP
      COMPLEX              R1 ,           X ,         ACC
      COMPLEX           TEMP1 ,          XX ,           H
C
C
C
C INITIAL CONDITIONS
C
      MTAP2  =  ITAPES(22)
      MTAP9  =  ITAPES(29)
      MTAP11 =  ITAPES(31)
      MTAP12 =  ITAPES(32)
C
C
      IF ( KDWSH .NE. 0 .AND. NDB .NE. 0 )   REWIND MTAP2
      REWIND MTAP11
      DO 1 L = 1,NQ
      CALL CNRW (-MTAP9,H,NWB)
1
C
      DO 70 II=1,NWB
      PP(II)   =  0.0
      DO 15 J=1,II
C     WING DUE WING
      ENJ = XW(II)-XW(J)
      ELJ = ABS(YW(II)-YW(J))
      IF (ELJ.GT.ENJ) GO TO 15
      NJ = ENJ + 1.0
      LJ = ELJ + 1.0
      TEMP1=R1(NORDER(NJ,LJ))
      ELJ = YW(II)+YW(J)+1.0
      IF(ELJ.GT.ENJ) GO TO 90
      LJ = ELJ+1.0
      TEMP=R1(NORDER(NJ,LJ))
      GO TO 91
   90 TEMP = TEMP1
      GO TO 94
   91 TEMP = TEMP1+(TEMP*OSA)
   94 XI       =  REAL (H(J)) * P / ES
      ALP      =  AIMAG (H(J))
      W = CMPLX (ALP,XI)
      IF (AW(J) .NE. 1.0) GO TO 16
      PP(II)   =  PP(II) + TEMP * W
      GO TO 15
   16 PP(II)   =  PP(II) + TEMP * W * AW(J)
```

```
                15 CONTINUE                                                          RIP      59
                   IF(NDB.EQ.0) GO TO 65                                             RIP      60
60                 IF(II.GT.1) GO TO 50                                              RIP      61
                   DO 45 I=1,NDB                                                     RIP      62
                   X(I)      =  0.0                                                  RIP      63
                C     DIAPHRAGM DUE WING                                           RIP      64
                   DO 25 JJ=1,NWB                                                    RIP      65
65                 ENJ = XD(I)-XW(JJ)                                                RIP      66
                   IF (ENJ.LT.0.0) GO TO 26                                          RIP      67
                   ELJ = ABS(YD(I)-YW(JJ))                                           RIP      68
                   IF (ELJ.GT.ENJ) GO TO 25                                          RIP      69
                   NJ = ENJ + 1.0                                                    RIP      70
70                 LJ = ELJ + 1.0                                                    RIP      71
                   TEMP1=R1(NORDER(NJ,LJ))                                           RIP      72
                   ELJ = YD(I) + YW(JJ) + 1.0                                        RIP      73
                   IF(ELJ.GT.ENJ) GO TO 84                                           RIP      74
                   LJ = ELJ + 1.0                                                    RIP      75
75                 TEMP=R1(NORDER(NJ,LJ))                                            RIP      76
                   GO TO 81                                                          RIP      77
                84 TEMP = TEMP1                                                      RIP      78
                   GO TO 80                                                          RIP      79
                81 TEMP = TEMP1 + (TEMP*OSA)                                         RIP      80
80              80 XI        =  REAL (H(JJ)) * P / ES                                RIP      81
                   ALP       =  AIMAG (H(JJ))                                        RIP      82
                   W = CMPLX (ALP,XI)                                                RIP      83
                   IF ( AW(JJ) .NE. 1.0 )  TEMP = TEMP * AW(JJ)                      RIP      84
                   X(I)  =  X(I) + TEMP * W                                          RIP      85
85              25 CONTINUE                                                          RIP      86
                26 XX        =  0.0                                                  RIP      87
                   IF(I.EQ.1) GO TO 40                                               RIP      88
                   N=I-1                                                             RIP      89
                   DO 35 J=1,N                                                       RIP      90
90              C     DIAPHRAGM DUE DIAPHRAGM                                      RIP      91
                   ENJ = XD(I)-XD(J)                                                 RIP      92
                   ELJ = ABS(YD(J)-YD(I))                                            RIP      93
                   IF (ELJ.GT.ENJ) GO TO 35                                          RIP      94
                   NJ = ENJ + 1.0                                                    RIP      95
95                 LJ = ELJ + 1.0                                                    RIP      96
                   TEMP1=R1(NORDER(NJ,LJ))                                           RIP      97
                   ELJ = YD(J)+YD(I)+1.0                                             RIP      98
                   IF(ELJ.GT.ENJ) GO TO 95                                           RIP      99
                   LJ = ELJ + 1.0                                                    RIP     100
100                TEMP=R1(NORDER(NJ,LJ))                                            RIP     101
                   GO TO 93                                                          RIP     102
                95 TEMP = TEMP1                                                      RIP     103
                   GO TO 2                                                           RIP     104
                93 TEMP = TEMP1 + (TEMP*OSA)                                         RIP     105
105              2 IF ( AD(J) .NE. 1.0 )   TEMP = TEMP * AD(J)                       RIP     106
                   XX  =  XX + TEMP * X(J)                                           RIP     107
                35 CONTINUE                                                          RIP     108
                40 X(I)      =  (X(I) - XX) / R1(1)                                  RIP     109
                   IF ( AD(I) .NE. 1.0 )   X(I) = X(I) / AD(I)                       RIP     110
110             45 CONTINUE                                                          RIP     111
                   IF ( KDWSH .EQ. 0 )     GO TO 50                                  RIP     112
                   CALL CNRW (MTAP2,X,NDB)                                           RIP     113
                50 DO 60 IJ=1,NDB                                                    RIP     114
                C     WING DUE DIAPHRAGM                                           RIP     115
```

```
                      ENJ=XW(II)-XD(IJ)                                  RIP       116
                      IF (ENJ.LT.0.0) GO TO 65                           RIP       117
                      ELJ = ABS(YW(II)-YD(IJ))                           RIP       118
                      IF (ELJ.GT.ENJ) GO TO 60                           RIP       119
                      NJ = ENJ + 1.0                                     RIP       120
  120                 LJ = ELJ + 1.0                                     RIP       121
                      TEMP1=R1(NORDER(NJ,LJ))                            RIP       122
                      ELJ = ABS(YW(II)+YD(IJ)+1.0)                       RIP       123
                      IF(ELJ.GT.ENJ) GO TO 85                            RIP       124
                      LJ = ELJ + 1.0                                     RIP       125
  125                 TEMP=R1(NORDER(NJ,LJ))                             RIP       126
                      GO TO 83                                           RIP       127
                   85 TEMP = TEMP1                                       RIP       128
                      GO TO 3                                            RIP       129
                   83 TEMP = TEMP1 + (TEMP*OSA)                          RIP       130
  130              3 IF ( AD(IJ) .NE. 1.0 )  TEMP = TEMP * AD(IJ)       RIP       131
                      PP(II)  =  PP(II) - TEMP * X(IJ)                   RIP       132
                   60 CONTINUE                                           RIP       133
                   65 PP(II)   =  4.0 * PP(II)                           RIP       134
                   70 CONTINUE                                           RIP       135
  135                 CALL CNRW (MTAP12,PP,NWB)                          RIP       136
                    1 CONTINUE                                           RIP       137
                      IF ( KDWSH .NE.0 .AND. NDB .NE. 0 )    REWIND MTAP2  RIP       138
                      RETURN                                             RIP       139
                      END                                                RIP       140
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	RIP	1	138

VARIABLES

		SN	TYPE		RELOCATION								
507	ACC	*	COMPLEX	*UNDEF		REFS	13						
1310	AD		REAL	ARRAY	TOMB	REFS	4	11	2*105	2*109	2*130		
531	ALP		REAL			REFS	53	82	DEFINED	52	81		
3424	AW		REAL	ARRAY	TOMB	REFS	4	11	54	57	2*83		
525	ELJ		REAL			REFS	39	41	44	45	68	70	73
							74	93	95	98	99	118	120	123
							124	DEFINED	38	43	67	72	92	97
							117	122						
524	ENJ		REAL			REFS	39	40	44	66	68	69	73	
							93	94	98	116	118	119	123	
						DEFINED	37	65	91	115				
0	ES		REAL		F.P.	REFS	51	80	DEFINED	1				
2032	H		COMPLEX	ARRAY		REFS	5	14	29	51	52	80	81	
532	I		INTEGER			REFS	62	65	67	72	2*84	87	88	
							91	92	97	2*108	4*109	DEFINED	61	
522	II		INTEGER			REFS	34	35	37	38	43	2*55	2*57	
							60	115	117	122	2*131	2*133		
						DEFINED	33							
535	IJ		INTEGER			REFS	115	117	122	2*130	131			
						DEFINED	113							
2666	IND		INTEGER	ARRAY	TOMB	REFS	6	11						

VARIABLES	SN	TYPE		RELOCATION								
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	8	9	20	21	22	23	
523	J	INTEGER			REFS	37	38	43	51	52	54	57
					91	92	97	2*105	106	DEFINED	35	89
533	JJ	INTEGER			REFS	65	67	72	80	81	2*83	
					DEFINED	64						
0	KDWSH	INTEGER		F.P.	REFS	26	111	137	DEFINED	1		
521	L	* INTEGER			DEFINED	28						
527	LJ	INTEGER			REFS	42	46	71	75	96	100	121
					125	DEFINED	41	45	70	74	95	99
					120	124						
1275	LS	INTEGER	ARRAY	TOMB	REFS	6	11					
517	MTAP11	INTEGER			DEFINED	22	I/O REFS	27				
520	MTAP12	INTEGER			REFS	135	DEFINED	23				
515	MTAP2	INTEGER			REFS	112	DEFINED	20	I/O REFS	26	137	
516	MTAP9	INTEGER			REFS	29	DEFINED	21				
534	N	INTEGER			REFS	89	DEFINED	88				
1274	NDB	INTEGER		TOMB	REFS	11	26	59	61	112	113	137
526	NJ	INTEGER			REFS	42	46	71	75	96	100	121
					125	DEFINED	40	69	94	119		
0	NQ	INTEGER		F.P.	REFS	28	DEFINED	1				
1307	NWB	INTEGER		TOMB	REFS	11	29	33	64	135		
0	OSA	REAL		F.P.	REFS	50	79	104	129	DEFINED	1	
0	P	REAL		F.P.	REFS	51	80	DEFINED	1			
3326	PP	COMPLEX	ARRAY		REFS	7	12	55	57	131	133	135
					DEFINED	34	55	57	131	133		
0	R1	COMPLEX	ARRAY	CORPSE	REFS	5	10	13	42	46	71	75
					96	100	108	121	125			
505	TEMP	COMPLEX			REFS	12	50	55	57	79	83	84
					104	105	106	129	130	131		
					DEFINED	46	48	50	75	77	79	83
					100	102	104	105	125	127	129	130
511	TEMP1	COMPLEX			REFS	14	48	50	77	79	102	104
					127	129	DEFINED	42	71	96	121	
503	W	COMPLEX			REFS	12	55	57	84	DEFINED	53	82
536	X	COMPLEX	ARRAY		REFS	5	13	84	106	108	109	112
					131	DEFINED	62	84	108	109		
1702	XD	REAL	ARRAY	TOMB	REFS	3	11	65	2*91	115		
530	XI	REAL			REFS	53	82	DEFINED	51	80		
1302	XMAX	REAL	ARRAY	TOMB	REFS	6	11					
0	XW	REAL	ARRAY	TOMB	REFS	3	11	2*37	65	115		
513	XX	COMPLEX			REFS	14	106	108	DEFINED	86	106	
2274	YD	REAL	ARRAY	TOMB	REFS	4	11	67	72	2*92	2*97	117
					122							
536	YW	REAL	ARRAY	TOMB	REFS	3	11	2*38	2*43	67	72	117
					122							

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES							
CNRW		3	29	112	135					
NORDER	INTEGER	2	42	46	71	75	96	100	121	125

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES				
ABS	REAL	1	INTRIN		38	67	92	117	122
AIMAG	REAL	1	INTRIN		52	81			
CMPLX	COMPLEX	2	INTRIN		53	82			
REAL	REAL	1	INTRIN		51	80			

STATEMENT LABELS		DEF LINE	REFERENCES		
0	1	136	28		
304	2	105	103		
415	3	130	128		
127	15	58	35	39	56
116	16	57	54		
230	25	85	64	68	
233	26	86	66		
321	35	107	89	93	
324	40	108	87		
0	45	110	61		
346	50	113	60	111	
432	60	132	113	118	
435	65	133	59	116	
0	70	134	33		
206	80	80	78		
201	81	79	76		
410	83	129	126		
176	84	77	73		
405	85	127	123		
67	90	48	44		
72	91	50	47		
277	93	104	101		
77	94	51	49		
274	95	102	98		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
24	1	L	28 136	424B	EXT REFS NOT INNER
30	70	II	33 134	413B	EXT REFS NOT INNER
33	15	J	35 58	77B	EXT REFS
136	45	I	61 110	206B	EXT REFS NOT INNER
141	25	JJ	64 85	72B	EXT REFS EXITS
240	35	J	89 107	64B	EXT REFS
347	60	IJ	113 132	66B	EXT REFS EXITS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)							
CTAPES	50	0	ITAPES	(50)					
CORPSE	4000	0	R1	(4000)					
TOMB	2162	0	XW	(350)	350	YW	(350)	700	NDB (1)
		701	LS	(5)	706	XMAX	(5)	711	NWB (1)
		712	AD	(250)	962	XD	(250)	1212	YD (250)
		1462	IND	(350)	1812	AW	(350)		

STATISTICS

PROGRAM LENGTH	4635B	2461
CM LABELED COMMON LENGTH	14104B	6212

52000B CM USED

```
      SUBROUTINE TRIP (OSA,NQ,LINC,LSVT,NKF,P,ES,VBO,KDWSH)                TRIP       2
C     ARRAYS WRITTEN ON UNITS 11 AND 14                                    TRIP       3
C                                                                          TRIP       4
C     INFLUENCE COEFFICIENT ARRAY FORMULATION                              TRIP       5
C                                                                          TRIP       6
      COMPLEX  CDWD (350) , CWD (350) , CINF (350) , COBB , COMSCA         TRIP       7
      COMPLEX  R1(2000), CDD(350), CDW(350), PP(350), DWSH(350)            TRIP       8
      COMPLEX  TEMP , TEMP1                                                TRIP       9
CIBM  BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   TRIP      10
C     COMPLEX*16    COB   ,DCMPLF                                          TRIP      11
C     DOUBLE PRECISION ARG1,ARG2                                           TRIP      12
CIBM  ENDING OF TYPE STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      TRIP      13
CCDC  BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS   TRIP      14
      COMPLEX       COB   ,DCMPLF                                          TRIP      15
CCDC  ENDING OF TYPE STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      TRIP      16
      COMMON /CTAPES/  ITAPES                                              TRIP      17
      COMMON /CORPSE/ R1                                                   TRIP      18
      COMMON /TOMB/ XW (350) , YW (350) , NDB , LS(5) , XMAX(5) , NWB ,    TRIP      19
     1 AD (250) , XD (250) , YD(250) , IND (350) , AW (350)                TRIP      20
      DIMENSION ITAPES(50)                                                 TRIP      21
      EQUIVALENCE   (PP(1) , CDWD(1))  ,  (DWSH(1) , CDW(1))               TRIP      22
      MTAP2  =  ITAPES(22)                                                 TRIP      23
      MTAP8  =  ITAPES(28)                                                 TRIP      24
      MTAP9  =  ITAPES(29)                                                 TRIP      25
      MTAP11 =  ITAPES(31)                                                 TRIP      26
      MTAP12 =  ITAPES(32)                                                 TRIP      27
      MTAP14 =  ITAPES(34)                                                 TRIP      28
      ITAPEW =  ITAPES(6)                                                  TRIP      29
      REWIND MTAP14                                                        TRIP      30
      ARG1 = 0.0                                                           TRIP      31
      ARG2 = 0.0                                                           TRIP      32
      IF ( LSVT .NE. 0 )      GO TO 200                                    TRIP      33
      IF (  NDB .NE. 0 )   REWIND MTAP2                                    TRIP      34
C                                                                          TRIP      35
      LINE = 0                                                             TRIP      36
      IF (LINC.NE.0) WRITE (ITAPEW,101)                                    TRIP      37
      IF (NDB.EQ.0) GO TO 100                                              TRIP      38
      IACC  =  0                                                           TRIP      39
C                                                                          TRIP      40
C     MATRIX PRODUCT OF INVERSE OF DIAPHRAGM ON DIAPHRAGM                  TRIP      41
C     AND DIAPHRAGM ON WING                                                TRIP      42
C                                                                          TRIP      43
      DO 4 I = 1,NWB                                                       TRIP      44
C                                                                          TRIP      45
C     INFLUENCE COEFFICIENTS FOR DIAPHRAGM DUE WING                        TRIP      46
C                                                                          TRIP      47
      DO 9 JJ = 1,NDB                                                      TRIP      48
      CDW(JJ) = CMPLX(0.0,0.0)                                             TRIP      49
      ENJ = XD(JJ) - XW(I)                                                 TRIP      50
      IF ( ENJ .LT. 0.0 )      GO TO 9                                     TRIP      51
      ELJ = ABS (YD(JJ) - YW(I))                                           TRIP      52
      IF ( ELJ .GT. ENJ )      GO TO 9                                     TRIP      53
      NJ = ENJ + 1.0                                                       TRIP      54
      LJ = ELJ + 1.0                                                       TRIP      55
      TEMP1  =  R1 (NORDER(NJ,LJ))                                         TRIP      56
      ELJ = YD(JJ) + YW(I) + 1.0                                           TRIP      57
      IF ( ELJ .GT. ENJ )      TEMP = TEMP1                                TRIP      58
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                  IF ( ELJ .GT. ENJ )      GO TO 30                          TRIP      59
                  LJ = ELJ + 1.0                                             TRIP      60
   60             TEMP    =  R1 (NORDER(NJ,LJ)) * OSA + TEMP1                TRIP      61
                30 IF ( AW(I) .NE. 1 )      TEMP = TEMP * AW(I)               TRIP      62
                  CDW(JJ)  =  TEMP                                           TRIP      63
                 9 CONTINUE                                                  TRIP      64
                  DO 6  K = 1,NDB                                            TRIP      65
   65         C                                                              TRIP      66
              C     INFLUENCE COEFFICIENTS FOR DIAPHRAGM DUE DIAPHRAGM       TRIP      67
              C                                                              TRIP      68
                  DO 2  J = 1,K                                              TRIP      69
                  CDD(J) = CMPLX(0.0,0.0)                                    TRIP      70
   70             ENJ  =  XD(K) - XD(J)                                      TRIP      71
                  IF ( ENJ .LT. 0.0 )      GO TO 2                           TRIP      72
                  ELJ  =   ABS (YD(J) - YD(K))                               TRIP      73
                  IF ( ELJ .GT. ENJ )      GO TO 2                           TRIP      74
                  NJ  =  ENJ + 1.0                                           TRIP      75
   75             LJ  =  ELJ + 1.0                                           TRIP      76
                  TEMP1  =  R1 (NORDER(NJ,LJ))                               TRIP      77
                  ELJ  =  YD(J) + YD(K) +1.0                                 TRIP      78
                  IF ( ELJ .GT. ENJ )      TEMP = TEMP1                      TRIP      79
                  IF ( ELJ .GT. ENJ )      GO TO 1                           TRIP      80
   80             LJ  =  ELJ + 1.0                                           TRIP      81
                  TEMP    =  R1 (NORDER(NJ,LJ)) * OSA + TEMP1                TRIP      82
                1 IF ( AD(J) .NE. 1 )      TEMP = TEMP * AD(J)               TRIP      83
                  CDD(J)  =  TEMP                                            TRIP      84
                2 CONTINUE                                                   TRIP      85
   85             IF (K.NE.1) GO TO 7                                        TRIP      86
                  CDWD(IACC+K)  =  CDW(K) / CDD(K)                           TRIP      87
                  GO TO 6                                                    TRIP      88
                7 NDBB = K - 1                                               TRIP      89
                  COB = DCMPLF(ARG1,ARG2)                                    TRIP      90
   90             COBB  =  COMSCA ( CDD,CDWD(IACC+1),COB,NDBB,1,1)           TRIP      91
                  CDWD(IACC+K)  =  (CDW(K) - COBB) / CDD(K)                  TRIP      92
                6 CONTINUE                                                   TRIP      93
                  IACC  =  IACC + NDB                                        TRIP      94
                  IF ( IACC .EQ. 350 .OR. IACC+NDB .GT. 350 )      IACC = 0  TRIP      95
   95             IF ( IACC .EQ. 0 )       CALL CNRW (MTAP2,CDWD,350)        TRIP      96
                4 CONTINUE                                                   TRIP      97
                  IF ( IACC .NE. 0 )       CALL CNRW (MTAP2,CDWD,350)        TRIP      98
                  REWIND MTAP2                                               TRIP      99
              100 IAC  =  0                                                  TRIP     100
  100             DO 11 I = 1,NWB                                            TRIP     101
                  DO 12  J = 1,I                                             TRIP     102
               12 CINF(IAC+J)  =  0.0                                        TRIP     103
              C                                                              TRIP     104
              C     INFLUENCE COEFFICIENTS FOR WING ON WING                  TRIP     105
  105         C                                                              TRIP     106
                  DO 13 J = 1,I                                              TRIP     107
                  ENJ = XW(I) - XW(J)                                        TRIP     108
                  IF ( ENJ .LT. 0.0 )      GO TO 13                          TRIP     109
                  ELJ = ABS (YW(I) - YW(J))                                  TRIP     110
  110             IF (ELJ.GT.ENJ) GO TO 13                                   TRIP     111
                  NJ = ENJ + 1.0                                             TRIP     112
                  LJ = ELJ + 1.0                                             TRIP     113
                  TEMP1  =  R1 (NORDER(NJ,LJ))                               TRIP     114
                  ELJ = YW(I) + YW(J) + 1.0                                  TRIP     115
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115                IF ( ELJ .GT. ENJ )     TEMP = TEMP1                                  TRIP      116
                   IF (ELJ.GT.ENJ) GO TO 14                                              TRIP      117
                   LJ = ELJ + 1.0                                                        TRIP      118
                   TEMP   =  R1 (NORDER(NJ,LJ)) * OSA + TEMP1                            TRIP      119
                14 IF ( AW(J) .NE. 1.0 )        TEMP = TEMP * AW(J)                    TRIP      120
120                CINF(IAC+J)  =  TEMP                                                  TRIP      121
                13 CONTINUE                                                           TRIP      122
                   IF ( NDB .EQ. 0 )       GO TO 24                                   TRIP      123
             C                                                                        TRIP      124
             C     INFLUENCE COEFFICIENTS FOR WING DUE DIAPHRAGM                      TRIP      125
125          C                                                                        TRIP      126
                   DO 16 II = 1,NDB                                                   TRIP      127
                   CWD(II) = CMPLX(0.0,0.0)                                           TRIP      128
                   ENJ = XW(I) - XD(II)                                               TRIP      129
                   IF ( ENJ .LT. 0.0 )     GO TO 16                                   TRIP      130
130                ELJ = ABS (YW(I) - YD(II))                                         TRIP      131
                   IF (ELJ.GT.ENJ) GO TO 16                                           TRIP      132
                   NJ = ENJ + 1.0                                                     TRIP      133
                   LJ = ELJ + 1.0                                                     TRIP      134
                   TEMP1  =  R1 (NORDER(NJ,LJ))                                       TRIP      135
135                ELJ = ABS (YW(I) + YD(II) + 1.0)                                   TRIP      136
                   IF ( ELJ .GT. ENJ )     TEMP = TEMP1                               TRIP      137
                   IF ( ELJ .GT. ENJ )     GO TO 28                                   TRIP      138
                   LJ = ELJ + 1.0                                                     TRIP      139
                   TEMP=R1(NORDER(NJ,LJ))*OSA + TEMP1                                 TRIP      140
140             28 IF ( AD(II) .NE. 1.0 )       TEMP = TEMP * AD(II)                  TRIP      141
                   CWD(II)  =  TEMP                                                   TRIP      142
                16 CONTINUE                                                           TRIP      143
                   REWIND MTAP2                                                       TRIP      144
                   IACC  =  0                                                         TRIP      145
145                DO 22  K = 1,I                                                     TRIP      146
                   IF ( IACC .EQ. 0 )      CALL CNRW (-MTAP2,CDWD,350)                TRIP      147
                   COB = DCMPLF(ARG1,ARG2)                                            TRIP      148
                   COBB  =  COMSCA (CWD,CDWD(IACC+1),COB,NDB,1,1)                     TRIP      149
                   CINF(IAC+K)  =  CINF(IAC+K) - COBB                                 TRIP      150
150                IACC  =  IACC + NDB                                                TRIP      151
                   IF ( IACC .EQ. 350 .OR. IACC+NDB .GT. 350 )      IACC = 0          TRIP      152
                22 CONTINUE                                                           TRIP      153
                24 IF ( LINC .EQ. 0 )      GO TO 25                                   TRIP      154
                   LINE  =  LINE + 10 + I/10                                          TRIP      155
155                IF (LINE.LE.45) GO TO 17                                           TRIP      156
                   LINE  =  10 + I/10                                                 TRIP      157
                   WRITE (ITAPEW,101)                                                 TRIP      158
                17 WRITE (ITAPEW,102) I                                               TRIP      159
                   I1  =  IAC + 1                                                     TRIP      160
160                I2  =  IAC + I                                                     TRIP      161
                   WRITE (ITAPEW,103)   (CINF(II) , II=I1,I2)                         TRIP      162
             C     -------  WRITE AIF ON UNITS 11 AND 14  ----------------            TRIP      163
                25 IAC  =  IAC + I                                                    TRIP      164
                   IF ( IAC .EQ. 350 .OR. IAC+I+1 .GT. 350 )       IAC = 0           TRIP      165
165                IF ( IAC .NE. 0 )       GO TO 11                                   TRIP      166
                   CALL CNRW ( MTAP11, CINF, 350)                                     TRIP      167
                   CALL CNRW ( MTAP14,CINF,350)                                       TRIP      168
                11 CONTINUE                                                           TRIP      169
                   IF ( IAC .EQ. 0 )       GO TO 400                                  TRIP      170
170                CALL CNRW ( MTAP11, CINF, 350)                                     TRIP      171
                   CALL CNRW ( MTAP14, CINF, 350)                                     TRIP      172
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                400 IF ( KDWSH .EQ. 0 .OR. NDB .EQ. 0 )    GO TO 300                  TRIP      173
                    REWIND MTAP8                                                  TRIP      174
                    DO 31  J = 1,NDB                                              TRIP      175
175                 REWIND MTAP2                                                  TRIP      176
                    IACC  =  0                                                    TRIP      177
                    DO 32  I = 1,NWB                                              TRIP      178
                    IF ( IACC .EQ. 0 )       CALL CNRW (-MTAP2,CDD,350)           TRIP      179
                    CDWD(I)  =  CDD(J+IACC)                                       TRIP      180
180                 IACC  =  IACC + NDB                                           TRIP      181
                    IF ( IACC .EQ. 350 .OR. IACC+NDB .GT. 350 )       IACC = 0    TRIP      182
                 32 CONTINUE                                                      TRIP      183
                 31 CALL CNRW (MTAP8,CDWD,NWB)                                    TRIP      184
                    REWIND MTAP2                                                  TRIP      185
185                 REWIND MTAP8                                                  TRIP      186
                    GO TO 300                                                     TRIP      187
                200 KOUNT  =  0                                                   TRIP      188
                    KTOL  =  0                                                    TRIP      189
                    DO 26  I = 1,NWB                                              TRIP      190
190                 KTOL  =  KTOL + I                                             TRIP      191
                    IF ( KTOL .EQ. 350 .OR. KTOL+I+1 .GT. 350 )       KTOL = 0    TRIP      192
                    IF ( KTOL .EQ. 0 )           KOUNT = KOUNT + 1                TRIP      193
                 26 CONTINUE                                                      TRIP      194
                    IF ( KTOL .NE. 0 )           KOUNT = KOUNT + 1                TRIP      195
195                 REWIND MTAP14                                                 TRIP      196
                    DO 27  I = 1,KOUNT                                            TRIP      197
                    CALL CNRW (-MTAP11, CINF, 350)                                TRIP      198
                 27 CALL CNRW ( MTAP14, CINF, 350)                                TRIP      199
                300 REWIND MTAP12                                                 TRIP      200
200                 DO 18 I = 1,NQ                                                TRIP      201
                    REWIND MTAP14                                                 TRIP      202
                    CALL CNRW (-MTAP9, DWSH, NWB)                                 TRIP      203
                    DO 19 J = 1,NWB                                               TRIP      204
                    XI = (REAL(DWSH(J))*P) / ES                                   TRIP      205
205                 ZI = AIMAG(DWSH(J))                                           TRIP      206
                 19 DWSH(J) = CMPLX (ZI,XI) * 4.0                                 TRIP      207
                    IAC  =  0                                                     TRIP      208
                    DO 20 K = 1,NWB                                               TRIP      209
                    IF ( IAC .EQ. 0 )       CALL CNRW (-MTAP14, CINF, 350)        TRIP      210
210                 COB = DCMPLF(ARG1,ARG2)                                       TRIP      211
                    PP(K)  =  COMSCA (CINF(IAC+1),DWSH,COB,K,1,1)                 TRIP      212
                    IAC  =  IAC + K                                               TRIP      213
                    IF ( IAC .EQ. 350 .OR. IAC+K+1 .GT. 350 )       IAC = 0       TRIP      214
                 20 CONTINUE                                                      TRIP      215
215                 IF ( KDWSH .EQ. 0 .OR. LSVT .NE. 0 .OR. NDB .EQ. 0 )  GO TO 18 TRIP      216
                    REWIND MTAP8                                                  TRIP      217
                    DO 33  J = 1,NDB                                              TRIP      218
                    CALL CNRW (-MTAP8,CDD,NWB)                                    TRIP      219
                    COB=DCMPLF(ARG1,ARG2)                                         TRIP      220
220                 CWD(J)  =  COMSCA (CDD,DWSH,COB,NWB,1,1)                      TRIP      221
                 33 CWD(J)  =  CWD(J) * 0.25                                      TRIP      222
                    CALL CNRW (MTAP2,CWD,NDB)                                     TRIP      223
                 18 CALL CNRW (MTAP12, PP, NWB)                                   TRIP      224
                    REWIND MTAP14                                                 TRIP      225
225                 IF ( KDWSH .EQ. 0 .OR. LSVT .NE. 0 .OR. NDB .EQ. 0 )  GO TO 50 TRIP      226
                    REWIND MTAP2                                                  TRIP      227
                    REWIND MTAP8                                                  TRIP      228
                C                                                                 TRIP      229
```

```
                C     FORMATS                                                    TRIP      230
     230        C                                                                TRIP      231
                  101 FORMAT (1H1, /15X34HAERODYNAMIC INFLUENCE COEFFICIENTS, 20X TRIP      232
                     1        12H(BY COLUMNS),  //)                            TRIP      233
                  102 FORMAT (// 20X 7HROW NO , I5  //)                         TRIP      234
                  103 FORMAT (5X,10E12.4)                                       TRIP      235
     235        C                                                                TRIP      236
                C                                                                TRIP      237
                   50 RETURN                                                    TRIP      238
                      END                                                       TRIP      239
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	TRIP	1	237

VARIABLES

		SN	TYPE		RELOCATION								
1310	AD		REAL	ARRAY	TOMB	REFS	18	2*82	2*140				
1203	ARG1		REAL			REFS	89	147	210	219	DEFINED	30	
1204	ARG2		REAL			REFS	89	147	210	219	DEFINED	31	
3424	AW		REAL	ARRAY	TOMB	REFS	18	2*61	2*119				
6610	CDD		COMPLEX	ARRAY		REFS	7	86	90	91	178	179	218
						220	DEFINED	69	83				
2524	CDW		COMPLEX	ARRAY		REFS	7	21	86	91	DEFINED	48	62
1230	CDWD		COMPLEX	ARRAY		REFS	6	21	90	95	97	146	148
						183	DEFINED	86	91	179			
5314	CINF		COMPLEX	ARRAY		REFS	6	149	161	166	167	170	171
						197	198	209	211	DEFINED	102	120	149
1172	COB		COMPLEX			REFS	14	90	148	211	220		
						DEFINED	89	147	210	219			
1164	COBB		COMPLEX			REFS	6	91	149	DEFINED	90	148	
4020	CWD		COMPLEX	ARRAY		REFS	6	148	221	222	DEFINED	127	141
						220	221						
2524	DWSH		COMPLEX	ARRAY		REFS	7	21	202	204	205	211	220
						DEFINED	206						
1212	ELJ		REAL			REFS	52	54	57	58	59	73	75
						78	79	80	110	112	115	116	117
						131	133	136	137	138	DEFINED	51	56
						72	77	109	114	130	135		
1211	ENJ		REAL			REFS	50	52	53	57	58	71	73
						74	78	79	108	110	111	115	116
						129	131	132	136	137	DEFINED	49	70
						107	128						
0	ES		REAL		F.P.	REFS	204	DEFINED	1				
1207	I		INTEGER			REFS	49	51	56	2*61	101	106	107
						109	114	128	130	135	145	154	156
						158	160	163	164	179	190	191	
						DEFINED	43	100	177	189	196	200	
1220	IAC		INTEGER			REFS	102	120	2*149	159	160	163	2*164
						165	169	209	211	212	2*213		
						DEFINED	99	163	164	207	212	213	
1206	IACC		INTEGER			REFS	86	90	91	93	2*94	95	97
						146	148	150	2*151	178	179	180	2*181

VARIABLES	SN	TYPE		RELOCATION							
					DEFINED	38	93	94	144	150	151	176
					180	181						
1221	II	INTEGER			REFS	127	128	130	135	2*140	141	161
					DEFINED	126	161					
2666	IND	INTEGER	ARRAY	TOMB	REFS	18						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	16	20	22	23	24	25	26
					27	28						
1202	ITAPEW	INTEGER			DEFINED	28	I/O REFS	36	157	158	161	
1222	I1	INTEGER			REFS	161	DEFINED	159				
1223	I2	INTEGER			REFS	161	DEFINED	160				
1216	J	INTEGER			REFS	69	70	72	77	2*82	83	102
					107	109	114	2*119	120	179	204	205
					206	220	2*221	DEFINED	68	101	106	174
					203	217						
1210	JJ	INTEGER			REFS	48	49	51	56	62		
					DEFINED	47						
1215	K	INTEGER			REFS	68	70	72	77	85	3*86	88
					3*91	2*149	2*211	212	213	DEFINED	64	145
					208							
0	KDWSH	INTEGER		F.P.	REFS	172	215	225	DEFINED	1		
1224	KOUNT	INTEGER			REFS	192	194	196	DEFINED	187	192	194
1225	KTOL	INTEGER			REFS	190	2*191	192	194	DEFINED	188	190
					191							
0	LINC	INTEGER		F.P.	REFS	36	153	DEFINED	1			
1205	LINE	INTEGER			REFS	154	155	DEFINED	35	154	156	
1214	LJ	INTEGER			REFS	55	60	76	81	113	118	134
					139	DEFINED	54	59	75	80	112	117
					133	138						
1275	LS	INTEGER	ARRAY	TOMB	REFS	18						
0	LSVT	INTEGER		F.P.	REFS	32	215	225	DEFINED	1		
1177	MTAP11	INTEGER			REFS	166	170	197	DEFINED	25		
1200	MTAP12	INTEGER			REFS	223	DEFINED	26	I/O REFS	199		
1201	MTAP14	INTEGER			REFS	167	171	198	209	DEFINED	27	
					I/O REFS	29	195	201	224			
1174	MTAP2	INTEGER			REFS	95	97	146	178	222		
					DEFINED	22	I/O REFS	33	98	143	175	184
					226							
1175	MTAP8	INTEGER			REFS	183	218	DEFINED	23	I/O REFS	173	185
					216	227						
1176	MTAP9	INTEGER			REFS	202	DEFINED	24				
1274	NDB	INTEGER		TOMB	REFS	18	33	37	47	64	93	94
					122	126	148	150	151	172	174	180
					181	215	217	222	225			
1217	NDBB	INTEGER			REFS	90	DEFINED	88				
1213	NJ	INTEGER			REFS	55	60	76	81	113	118	134
					139	DEFINED	53	74	111	132		
0	NKF	INTEGER	*UNUSED	F.P.	DEFINED	1						
0	NQ	INTEGER		F.P.	REFS	200	DEFINED	1				
1307	NWB	INTEGER		TOMB	REFS	18	43	100	177	183	189	202
					203	208	218	220	223			
0	OSA	REAL		F.P.	REFS	60	81	118	139	DEFINED	1	
0	P	REAL		F.P.	REFS	204	DEFINED	1				
1230	PP	COMPLEX	ARRAY		REFS	7	21	223	DEFINED	211		
0	R1	COMPLEX	ARRAY	CORPSE	REFS	7	17	55	60	76	81	113
					118	134	139					
1166	TEMP	COMPLEX			REFS	8	61	62	82	83	119	120
					140	141	DEFINED	57	60	61	78	81

VARIABLES	SN	TYPE		RELOCATION								
					82	115	118	119	136	139	140	
1170	TEMP1	COMPLEX			REFS	8	57	60	78	81	115	118
					136	139	DEFINED	55	76	113	134	
0	VBO	REAL	*UNUSED	F.P.	DEFINED	1						
1702	XD	REAL	ARRAY	TOMB	REFS	18	49	2*70	128			
1226	XI	REAL			REFS	206	DEFINED	204				
1302	XMAX	REAL	ARRAY	TOMB	REFS	18						
0	XW	REAL	ARRAY	TOMB	REFS	18	49	2*107	128			
2274	YD	REAL	ARRAY	TOMB	REFS	18	51	56	2*72	2*77	130	135
536	YW	REAL	ARRAY	TOMB	REFS	18	51	56	2*109	2*114	130	135
1227	ZI	REAL			REFS	206	DEFINED	205				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES							
CNRW		3	95	97	146	166	167	170	171	178	183
			197	198	202	209	218	222	223		
COMSCA	COMPLEX	6	6	90	148	211	220				
DCMPLF	COMPLEX	2	14	89	147	210	219				
NORDER	INTEGER	2	55	60	76	81	113	118	134	139	

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES				
ABS	REAL	1	INTRIN	51	72	109	130	135
AIMAG	REAL	1	INTRIN	205				
CMPLX	COMPLEX	2	INTRIN	48	69	127	206	
REAL	REAL	1	INTRIN	204				

STATEMENT LABELS			DEF LINE	REFERENCES		
167	1		82	79		
200	2		84	68	71	73
0	4		96	43		
241	6		92	64	87	
215	7		88	85		
115	9		63	47	50	52
536	11		168	100	165	
0	12		102	101		
353	13		121	106	108	110
341	14		119	116		
440	16		142	126	129	131
510	17		158	155		
745	18		223	200	215	
0	19		206	203		
0	20		214	208		
0	22		152	145		
477	24		153	122		
523	25		163	153		
0	26		193	189		
0	27		198	196		
427	28		140	137		
104	30		61	58		
0	31		183	174		
0	32		182	177		
0	33		221	217		
764	50		237	225		
263	100		99	37		
1141	101	FMT	231	36	157	
1151	102	FMT	233	158		
1154	103	FMT	234	161		

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STATEMENT LABELS              DEF LINE   REFERENCES
  611  200                       187        32
  645  300                       199        172       186
  545  400                       172        169

LOOPS  LABEL    INDEX     FROM-TO    LENGTH    PROPERTIES
   36  4        I          43 96      221B              EXT REFS  NOT INNER
   37  5        JJ         47 63       61B              EXT REFS
  121  6        K          64 92      123B              EXT REFS  NOT INNER
  122  2        J          68 84       61B              EXT REFS
  265  11       I         100 168     254B              EXT REFS  NOT INNER
  272  12       J         101 102       2B      INSTACK
  276  13       J         106 121      60B              EXT REFS
  360  16       II        126 142      63B              EXT REFS
  446  22       K         145 152      31B              EXT REFS
  554  31       J         174 183      31B              EXT REFS  NOT INNER
  560  32       I         177 182      21B              EXT REFS
  616  26       I         189 193      11B        OPT
  635  27       I         196 198      10B              EXT REFS
  650  18       I         200 223     102B              EXT REFS  NOT INNER
  661  19       J         203 206       6B      INSTACK
  672  20       K         208 214      25B              EXT REFS
  726  33       J         217 221      15B              EXT REFS

COMMON BLOCKS   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       CTAPES       50              0 ITAPES (50)
       CORPSE     4000              0 R1     (4000)
       TOMB       2162              0 XW     (350)          350 YW     (350)          700 NDB    (1)
                                  701 LS     (5)            706 XMAX   (5)            711 NWB    (1)
                                  712 AD     (250)          962 XD     (250)         1212 YD     (250)
                                 1462 IND    (350)         1812 AW     (350)

EQUIV CLASSES   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       PP           700             0 CDWD   (700)
       DWSH         700             0 CDW    (700)

STATISTICS
  PROGRAM LENGTH              10117B    4175
  CM LABELED COMMON LENGTH    14104B    6212
        52000B CM USED
```

STATEMENT LABELS			DEF LINE	REFERENCES	
1730	46	FMT	281	205	
0	47		207	206	
1737	48	FMT	282	207	
222	49		103	101	
1742	51	FMT	283	212	
664	52		222	217	
1750	53	FMT	284	218	
1756	54	FMT	285	222	
705	55		232	227	
1764	56	FMT	286	228	
0	57		125	115	
1772	58	FMT	287	232	
2000	59	FMT	288	238	
307	60		124	116	117
0	75		211	210	
403	108		154	144	150
420	109		162	141	158
2006	110	FMT	289	174	178
726	200		242	104	237

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
33	3	I	58 59	3B	INSTACK
44	4	I	60 63	4B	INSTACK
52	5	J	64 70	32B	EXT REFS NOT INNER
63	6	I	66 69	16B	OPT
112	7	I	71 81	22B	OPT
151	18	I	86 92	23B	EXT REFS
201	30	I	95 96	4B	INSTACK
224	200	K	104 242	505B	EXT REFS NOT INNER
235	10	JJ	107 109	3B	INSTACK
242	19	I	111 114	16B	NOT INNER
251	19	J	112 114	3B	INSTACK
261	57	KL	115 125	33B	NOT INNER
273	60	I	116 124	16B	OPT
316	21	I	127 140	33B	NOT INNER
323	22	J	129 131	11B	OPT EXITS
352	109	IX	141 162	51B	NOT INNER
366	108	IXL	144 154	21B	OPT
426	26	II	165 173	44B	EXT REFS NOT INNER
445	26	JJ	169 173	23B	EXT REFS
523	38	I	188 189	13B	EXT REFS
537	42	I	191 196	25B	EXT REFS
566	45	I	198 202	24B	EXT REFS
620	47	I	206 207	12B	EXT REFS
640	75	I	210 211	2B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
TOMB	2162	0	XW (350)	350	YW (350)	700	NDB (1)
		701	LS (5)	706	XMAX (5)	711	NWB (1)
		712	AD (250)	962	XD (250)	1212	YD (250)
		1462	IND (350)	1812	AW (350)		
IDIOT	411	0	CLEXR (100)	100	CLEYR (100)	200	CTEXR (100)
		300	CTEYR (100)	400	NCLER (5)	405	NCTER (5)
		410	NS (1)				
KIMA	10	0	LZ (5)	5	IINC (5)		
CTAPES	50	0	ITAPES (50)				
COMA	41	0	LC (40)	40	BR (1)		

VARIABLES SN TYPE RELOCATION

202 207 208 215 220 225 230 235
240 DEFINED 128

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES							
CNRW		3		65	105						
FATAN	REAL	2		193	200						
PICTUR		14		175	179	215	220	225	230	235	240
SQRT	REAL	1	LIBRARY	192	199						

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES					
AIMAG	REAL	1	INTRIN		2*77	2*78	151			
AMAX1	REAL	0	INTRIN		96					
CMPLX	COMPLEX	2	INTRIN		61	62	63	80	81	114
FLOAT	REAL	1	INTRIN		98	100				
REAL	REAL	1	INTRIN		2*72	2*73	88	89	90	146

STATEMENT LABELS			DEF LINE	REFERENCES						
0	3		59	58						
0	4		63	60						
0	5		70	64						
0	6		69	66						
0	7		81	71						
124	8		79	76						
1457	9	FMT	247	82						
0	10		109	107						
1470	11	FMT	249	83						
1475	12	FMT	250	84						
1522	13	FMT	254	85						
1533	16	FMT	256	87						
1545	17	FMT	258	91						
0	18		92	86						
0	19		114	111	112					
0	21		140	127						
0	22		131	129						
334	23		133	130						
503	25		181	177						
0	26		173	165	169					
1552	27	FMT	259	166						
1603	28	FMT	263	167						
1630	29	FMT	267	171						
0	30		96	95						
1634	31	FMT	268	172						
1637	32	FMT	269	182	203					
1651	33	FMT	271	183	204	213	219	223	229	233	239
1660	34	FMT	273	184	214	224	234				
1666	35	FMT	274	185						
1701	36	FMT	276	186						
536	37		191	187						
0	38		189	188						
1707	39	FMT	277	189						
212	40		99	102						
632	41		208	190						
0	42		196	191						
1712	43	FMT	278	196	202					
1715	44	FMT	279	197						
0	45		202	198						

VARIABLES	SN		TYPE		RELOCATION							
632	NS		INTEGER		IDIOT	REFS	22					
2055	NSTA		INTEGER			REFS	99	2*100	2*101	103	115	127	141
						165	188	191	198	206	208	209	215
						220	225	230	235	240	DEFINED	97	99
						103							
2076	NSYM		INTEGER	ARRAY		REFS	5	123	175	179	DEFINED	108	123
1307	NWB		INTEGER		TOMB	REFS	21	58	65	66	95	105	116
3466	PI		REAL	ARRAY		REFS	7	152	153	171	179		
						DEFINED	151						
11402	PP		COMPLEX	ARRAY		REFS	27	65	67	68	69	105	122
12676	PPP		COMPLEX	ARRAY		REFS	27	146	151	DEFINED	114	122	
2730	PR		REAL	ARRAY		REFS	7	147	149	171	172	175	
						DEFINED	146						
2051	RECL		REAL			REFS	91	DEFINED	88				
2052	REXP		REAL			REFS	91	DEFINED	89				
2053	REYP		REAL			REFS	91	DEFINED	90				
2073	RTD		REAL			REFS	195	201	DEFINED	194			
2057	SMAX		REAL			REFS	175	179	DEFINED	106			
2031	SS		LOGICAL			REFS	31	76	83	84	85	87	91
						150	158	166	167	171	172	177	183
						184	185	186	187	213	214	217	223
						224	227	233	234	237	DEFINED	49	50
2042	SURF		REAL			REFS	59	79	DEFINED	57	59		
2034	TOL	*	REAL			DEFINED	48						
0	VBO		REAL		F.P.	REFS	83	166	183	204	213	219	223
						229	233	239	DEFINED	1			
2172	X		REAL	ARRAY		REFS	6	149	153	171	172	175	179
						DEFINED	148						
2047	XCI		REAL			REFS	80	DEFINED	74	77			
16736	XCP		COMPLEX	ARRAY		REFS	28	68	72	77	87	89	
						DEFINED	62	68	80				
2045	XCR		REAL			REFS	80	DEFINED	72				
1702	XD		REAL	ARRAY	TOMB	REFS	9	21					
2040	XEL		REAL			REFS	56	73	78	128	DEFINED	55	
2037	XES		REAL			REFS	55	56	72	77	106	120	
						DEFINED	54						
10726	XLE		REAL	ARRAY		REFS	11	149	153	DEFINED	133		
1302	XMAX		REAL	ARRAY	TOMB	REFS	8	21	106				
11202	XNAME1		REAL	ARRAY		REFS	14	175	DEFINED	33			
11216	XNAME2		REAL	ARRAY		REFS	14	179	DEFINED	34			
0	XW		REAL	ARRAY	TOMB	REFS	6	21	68	120			
4762	XX		REAL	ARRAY		REFS	8	148	DEFINED	113	120		
2050	YCI		REAL			REFS	81	DEFINED	75	78			
17056	YCP		COMPLEX	ARRAY		REFS	28	69	73	78	87	90	
						DEFINED	63	69	81				
2046	YCR		REAL			REFS	81	DEFINED	73				
2274	YD		REAL	ARRAY	TOMB	REFS	9	21					
2075	YMAX		REAL			REFS	215	220	225	230	235	240	
						DEFINED	208						
2054	YMX		REAL			REFS	96	101	DEFINED	94	96		
11166	YNAME		REAL	ARRAY		REFS	14	175	179	DEFINED	32		
11232	YNAME2		REAL	ARRAY		REFS	15	215	220	225	230	235	240
						DEFINED	35						
11356	YS		REAL	ARRAY		REFS	19	100	2*101	117	128		
						DEFINED	98	100					
536	YW		REAL	ARRAY	TOMB	REFS	6	21	69	96	117		
2146	YY		REAL	ARRAY		REFS	5	2*130	133	166	167	189	196

VARIABLES	SN	TYPE	RELOCATION		
4224	IAUX	INTEGER	ARRAY		
2070	II	INTEGER			
5	IINC	INTEGER	ARRAY	KIMA	
2036	INC	INTEGER			
2666	IND	INTEGER	ARRAY	TOMB	
2062	IP	INTEGER			
0	ITAPES	INTEGER	ARRAY	CTAPES	
2032	ITAPEW	INTEGER			
2065	IX	INTEGER			
2067	IXL	INTEGER			
2044	J	INTEGER			
2060	JJ	INTEGER			
2056	K	INTEGER			
0	KIX	INTEGER		F.P.	
2061	KL	INTEGER			
2035	L	* INTEGER			
0	LC	INTEGER	ARRAY	COMA	
[illegible]	LL	INTEGER	ARRAY		
1275	LS	INTEGER	ARRAY	TOMB	
0	LZ	INTEGER	ARRAY	KIMA	
6732	MSYM	INTEGER	ARRAY		
2033	MTAP12	INTEGER			
2063	N	INTEGER			
2064	NCLE	* INTEGER	*UNDEF		
620	NCLER	INTEGER	ARRAY	IDIOT	
625	NCTER	INTEGER	ARRAY	IDIOT	
1274	NDB	INTEGER		TOMB	
2066	NIX	INTEGER			
0	NQ	INTEGER		F.P.	

2*72	2*73	2*77	2*78	2*79	80	81	4*87
88	89	90	91	96	113	114	117
120	121	122	2*128	2*130	2*133	137	138
139	140	175	179	4*189	2*192	2*193	3*196
2*199	2*200	3*202	3*207	211	DEFINED	58	60
66	71	86	95	111	116	127	163
188	191	198	206	210			
REFS	7	175	179	215	220	225	230
235	240						
REFS	166	167	168	DEFINED	165		
REFS	23	52					
REFS	100	DEFINED	52				
REFS	10	21					
REFS	120	121	122	DEFINED	119		
REFS	18	24	44	45	46		
DEFINED	44	I/O REFS	82	83	84	85	87
91	166	167	171	172	174	178	182
183	184	185	186	189	196	197	202
203	204	205	207	212	213	214	218
219	222	223	224	228	229	232	233
234	238	239					
REFS	142	143	146	3*147	148	4*149	151
3*152	4*153	3*154	3*155	3*156	3*157	3*159	3*160
3*161	DEFINED	141					
REFS	146	147	148	149	151	152	153
154	DEFINED	144					
REFS	2*67	2*68	2*69	113	114	2*130	6*133
DEFINED	64	112	129				
REFS	108	109	DEFINED	107	169		
REFS	166	167	174	178	182	203	212
218	222	228	232	238	DEFINED	104	
REFS	51	52	82	98	106	2*130	6*133
166	167	183	184	204	213	214	219
223	224	229	233	234	239		
DEFINED	1						
REFS	117	2*118	119	120	121	122	2*123
DEFINED	115						
DEFINED	51						
REFS	25	50					
REFS	5	118	119	143	168		
DEFINED	109	118					
REFS	8	21					
REFS	23	51	98				
REFS	10	215	220	225	230	235	240
DEFINED	209	211					
REFS	65	105	DEFINED	45	46		
I/O REFS	53	93					
REFS	145	146	147	148	2*149	151	152
2*153	163	170	3*171	2*172	DEFINED	126	145
164	170						
REFS	129						
REFS	3	22					
REFS	3	22					
REFS	21						
REFS	144	169	DEFINED	143	168		
REFS	60	64	71	86	104		
DEFINED	1						

```
      56 FORMAT (1H1,6X7HMODE = ,I3,10X15HCM-IMAG VS. ETA, //)          IMAGE     287
      58 FORMAT (1H1,6X7HMODE = ,I3,10X15HCP-REAL VS. ETA, //)         IMAGE     288
      59 FORMAT (1H1,6X7HMODE = ,I3,10X15HCP-IMAG VS. ETA, //)         IMAGE     289
     110 FORMAT(1H1,23H PRESSURE PLOT FOR MODEI3/)                     IMAGE     290
290         C                                                          IMAGE     291
            RETURN                                                     IMAGE     292
            END                                                        IMAGE     293
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	IMAGE	1	291

VARIABLES

		SN	TYPE	RELOCATION								
6756	AB		REAL	ARRAY		REFS	11	147	149	152	153	154	
						DEFINED	121						
11142	AC		REAL	ARRAY		REFS	13	154	156	160	DEFINED	142	154
1310	AD		REAL	ARRAY	TOMB	REFS	9	21					
0	AM		REAL		F.P.	REFS	82	166	167	183	184	204	213
							214	219	223	224	229	233	234	239
						DEFINED	1						
2041	ARBX	*	REAL			DEFINED	56						
3424	AW		REAL	ARRAY	TOMB	REFS	10	21	59	67	68	69	121
50	BR		REAL		COMA	REFS	25						
2071	CLAM		REAL			REFS	196	202	DEFINED	192	199		
2074	CLDG		REAL			REFS	196	202	DEFINED	195	201		
0	CLEXR		REAL	ARRAY	IDIOT	REFS	3	22	3*133				
144	CLEYR		REAL	ARRAY	IDIOT	REFS	4	22	2*130	3*133			
10776	CLI		REAL	ARRAY		REFS	12	152	159	160	192	193	196
							220	DEFINED	138	152	160		
11262	CLIN		REAL	ARRAY		REFS	15	220	DEFINED	37			
10752	CLR		REAL	ARRAY		REFS	11	147	155	156	157	189	192
							193	196	215	DEFINED	137	147	156
2072	CLRD		REAL			REFS	195	196	201	202	DEFINED	193	200
11246	CLRN		REAL	ARRAY		REFS	15	215	DEFINED	36			
16616	CLT		COMPLEX	ARRAY		REFS	28	67	72	73	77	78	79
							87	88	DEFINED	61	67	79	
11046	CMI		REAL	ARRAY		REFS	12	153	159	161	199	200	202
							230	DEFINED	140	153	161		
11312	CMIN		REAL	ARRAY		REFS	16	230	DEFINED	39			
11022	CMR		REAL	ARRAY		REFS	12	149	155	189	199	200	202
							225	DEFINED	139	149	157		
11276	CMRN		REAL	ARRAY		REFS	16	225	DEFINED	38			
11116	CPI		REAL	ARRAY		REFS	13	207	240	DEFINED	159		
11342	CPIN		REAL	ARRAY		REFS	17	240	DEFINED	41			
11072	CPR		REAL	ARRAY		REFS	13	157	161	189	207	235	
						DEFINED	155						
11326	CPRN		REAL	ARRAY		REFS	16	235	DEFINED	40			
310	CTEXR		REAL	ARRAY	IDIOT	REFS	4	22					
454	CTEYR		REAL	ARRAY	IDIOT	REFS	4	22					
0	EL		REAL		F.P.	REFS	55	DEFINED	1				
0	ES		REAL		F.P.	REFS	54	DEFINED	1				
2043	I		INTEGER			REFS	59	61	62	63	2*67	3*68	3*69

```
                WRITE (ITAPEW,33) KIX , AM , VBO                                  IMAGE     230
230             CALL PICTUR (CMI,YY,NSTA,CMIN,YNAME2,-100.0,0.0,YMAX,50.0,1.0,2.0, IMAGE     231
               1MSYM,1,IAUX)                                                      IMAGE     232
             55 WRITE (ITAPEW,58) K                                               IMAGE     233
                IF (.NOT.SS) WRITE (ITAPEW,33) KIX , AM , VBO                     IMAGE     234
                IF  (SS) WRITE (ITAPEW,34) KIX , AM                               IMAGE     235
235             CALL PICTUR (CPR,YY,NSTA,CPRN,YNAME2,-100.0,0.0,YMAX,50.0,1.0,2.0, IMAGE     236
               1MSYM,1,IAUX)                                                      IMAGE     237
                IF (SS) GO TO 200                                                 IMAGE     238
                WRITE (ITAPEW,59) K                                               IMAGE     239
                WRITE (ITAPEW,33) KIX , AM , VBO                                  IMAGE     240
240             CALL PICTUR (CPI,YY,NSTA,CPIN,YNAME2,-100.0,0.0,YMAX,50.0,1.0,2.0, IMAGE     241
               1MSYM,1,IAUX)                                                      IMAGE     242
            200 CONTINUE                                                          IMAGE     243
          C                                                                       IMAGE     244
          C                                                                       IMAGE     245
245       C FORMATS                                                               IMAGE     246
          C                                                                       IMAGE     247
              9 FORMAT (1H1,/15X36HSURFACE COEFFICIENTS FOR SURFACE NO , I2,      IMAGE     248
               1        16H  AT MACH NO. = ,F5.2  //)                            IMAGE     249
             11 FORMAT (15X19HREDUCED VELOCITY = , F7.3 //)                       IMAGE     250
250          12 FORMAT (11X4HMODE,8X16HLIFT COEFFICIENT,8X55HCENTER OF PRESSURE LO IMAGE     251
               1CATION IN INCHES FROM FORWARD APEX, /55X9HCHORDWISE,20X,8HSPANWISE IMAGE     252
               2, /23X18H(REAL , IMAGINARY),12X18H(REAL , IMAGINARY),             IMAGE     253
               318H(REAL , IMAGINARY), //)                                        IMAGE     254
             13 FORMAT (11X4HMODE,5X16HLIFT COEFFICIENT,7X18HCENTER OF PRESSURE, / IMAGE     255
255           1        42X5HX(IN),7X5HY(IN), //)                                  IMAGE     256
             16 FORMAT (12X,I3,5X2H( ,E10.3,2H, ,E10.3,2H ),4X2H( ,E10.3,2H, ,    IMAGE     257
               1        E10.3,2H ),3X2H( ,E10.3,2H, ,E10.3,2H ), /)               IMAGE     258
             17 FORMAT ((12X,I3,8X,E10.3,7X,E10.3,5X,E10.3)/)                     IMAGE     259
             27 FORMAT (1H1,/10X50HCHORDWISE PRESSURE DISTRIBUTION FOR SURFACE NO. IMAGE     260
260           1 = ,I3,2X14HAT MACH NO. = ,F7.3,2X10HFOR VBO = ,F7.3//15X23HAT SPA IMAGE     261
               2NWISE DISTANCE = ,F12.3,2X22HINCHES FROM CENTERLINE,//11X9HX(INCHE IMAGE     262
               3S),21X,8HPRESSURE,/32X4HREAL,16X4HIMAG,20X7HMODE = ,I3 //)         IMAGE     263
             28 FORMAT (1H1,/10X50HCHORDWISE PRESSURE DISTRIBUTION FOR SURFACE NO. IMAGE     264
               1 = ,I3,2X13HAT MACH NO. =,F7.3,//15X23HAT SPANWISE DISTANCE = ,   IMAGE     265
265            2F12.3,2X22HINCHES FROM CENTERLINE,//11X 9HX(INCHES),              IMAGE     266
               311X8HPRESSURE,20X7HMODE = ,I3 //)                                 IMAGE     267
             29 FORMAT (10X,F10.3,10X,E10.3,10X,E10.3)                            IMAGE     268
             31 FORMAT (10X,F10.3,10X,E10.3)                                      IMAGE     269
             32 FORMAT (1H1,/5X44HLIFT AND MOMENT COEFFICIENTS FOR MODE NO. = , I3 IMAGE     270
270           1        //15X20HSECTION COEFFICIENTS,//)                          IMAGE     271
             33 FORMAT (10X,9HSURFACE  ,I3,5X11HMACH NO. = ,F10.3,5X6HVBO = ,     IMAGE     272
               1        F10.3//)                                                  IMAGE     273
             34 FORMAT (10X,9HSURFACE  ,I3,5X11HMACH NO. = ,F10.3//)              IMAGE     274
             35 FORMAT (5X16HSPANWISE STATION,4X8HCL(REAL),8X8HCL(IMAG),8X        IMAGE     275
275           1        8HCL(AMPL),8X10HPHASE(RAD),5X10HPHASE(DEG), //)           IMAGE     276
             36 FORMAT (5X16HSPANWISE STATION,7X2HCL,14X2HCM,14X2HCP, //)         IMAGE     277
             39 FORMAT (5X,1P4E16.8)                                              IMAGE     278
             43 FORMAT (5X,1P6E16.8)                                              IMAGE     279
             44 FORMAT (//5X16HSPANWISE STATION,4X8HCM(REAL),8X8HCM(IMAG),8X      IMAGE     280
280           1        8HCM(AMPL),8X10HPHASE(RAD),5X10HPHASE(DEG), //)           IMAGE     281
             46 FORMAT (//5X16HSPANWISE STATION,4X8HCP(REAL),8X8HCP(IMAG), //)    IMAGE     282
             48 FORMAT (5X,1P3E16.8)                                              IMAGE     283
             51 FORMAT (1H1,6X7HMODE = ,I3,10X15HCL-REAL VS. ETA, //)             IMAGE     284
             53 FORMAT (1H1,6X7HMODE = ,I3,10X15HCL-IMAG VS. ETA, //)             IMAGE     285
285          54 FORMAT (1H1,6X7HMODE = ,I3,10X15HCM-REAL VS. ETA, //)             IMAGE     286
```

```
                  IF (SS) WRITE (ITAPEW,31) X(N) , PR(N)                          IMAGE     173
                26 CONTINUE                                                       IMAGE     174
                  WRITE (ITAPEW,110) K                                            IMAGE     175
175               CALL PICTUR (PR,X,I,XNAME1,YNAME,-100.0,0.0,SMAX,50.0,1.0,2.0,  IMAGE     176
                 1            NSYM,1,IAUX)                                        IMAGE     177
                  IF (SS) GO TO 25                                                IMAGE     178
                  WRITE (ITAPEW,110) K                                            IMAGE     179
                  CALL PICTUR (PI,X,I,XNAME2,YNAME,-100.0,0.0,SMAX,50.0,1.0,2.0,  IMAGE     180
180              1            NSYM,1,IAUX)                                        IMAGE     181
                25 CONTINUE                                                       IMAGE     182
                  WRITE (ITAPEW,32) K                                             IMAGE     183
                  IF (.NOT.SS) WRITE (ITAPEW,33) KIX , AM , VBO                   IMAGE     184
                  IF (SS) WRITE (ITAPEW,34) KIX , AM                              IMAGE     185
185               IF (.NOT.SS) WRITE (ITAPEW,35)                                  IMAGE     186
                  IF (SS) WRITE (ITAPEW,36)                                       IMAGE     187
                  IF (.NOT.SS) GO TO 37                                           IMAGE     188
                  DO 38 I = 1,NSTA                                                IMAGE     189
                38 WRITE (ITAPEW,39) YY(I) , CLR(I) , CMR(I) , CPR(I)             IMAGE     190
190               GO TO 41                                                        IMAGE     191
                37 DO 42 I = 1,NSTA                                               IMAGE     192
                  CLAM = SQRT (CLR(I)**2 + CLI(I)**2)                             IMAGE     193
                  CLRD = FATAN (CLI(I),CLR(I))                                    IMAGE     194
                  RTD = 180.0/3.1415927                                           IMAGE     195
195               CLDG = CLRD * RTD                                               IMAGE     196
                42 WRITE (ITAPEW,43) YY(I) , CLR(I) , CLI(I) , CLAM , CLRD , CLDG IMAGE     197
                  WRITE (ITAPEW,44)                                               IMAGE     198
                  DO 45 I = 1,NSTA                                                IMAGE     199
                  CLAM = SQRT (CMR(I)**2 + CMI(I)**2)                             IMAGE     200
200               CLRD = FATAN (CMI(I),CMR(I))                                    IMAGE     201
                  CLDG = CLRD * RTD                                               IMAGE     202
                45 WRITE (ITAPEW,43) YY(I) , CMR(I) , CMI(I) , CLAM , CLRD , CLDG IMAGE     203
                  WRITE (ITAPEW,32) K                                             IMAGE     204
                  WRITE (ITAPEW,33) KIX , AM , VBO                                IMAGE     205
205               WRITE (ITAPEW,46)                                               IMAGE     206
                  DO 47 I = 1,NSTA                                                IMAGE     207
                47 WRITE (ITAPEW,48) YY(I) , CPR(I) , CPI(I)                      IMAGE     208
                41 YMAX = YY(NSTA)                                                IMAGE     209
                  MSYM(1) = NSTA                                                  IMAGE     210
210               DO 75 I = 2,20                                                  IMAGE     211
                75 MSYM(I) = 0                                                    IMAGE     212
                  WRITE (ITAPEW,51) K                                             IMAGE     213
                  IF (.NOT.SS) WRITE (ITAPEW,33) KIX , AM , VBO                   IMAGE     214
                  IF  (SS) WRITE (ITAPEW,34) KIX , AM                             IMAGE     215
215               CALL PICTUR (CLR,YY,NSTA,CLRN,YNAME2,-100.0,0.0,YMAX,50.0,1.0,2.0, IMAGE  216
                 1MSYM,1,IAUX)                                                    IMAGE     217
                  IF (SS) GO TO 52                                                IMAGE     218
                  WRITE (ITAPEW,53) K                                             IMAGE     219
                  WRITE (ITAPEW,33) KIX , AM , VBO                                IMAGE     220
220               CALL PICTUR (CLI,YY,NSTA,CLIN,YNAME2,-100.0,0.0,YMAX,50.0,1.0,2.0, IMAGE  221
                 1MSYM,1,IAUX)                                                    IMAGE     222
                52 WRITE (ITAPEW,54) K                                            IMAGE     223
                  IF (.NOT.SS) WRITE (ITAPEW,33) KIX , AM , VBO                   IMAGE     224
                  IF (SS) WRITE (ITAPEW,34) KIX , AM                              IMAGE     225
225               CALL PICTUR (CMR,YY,NSTA,CMRN,YNAME2,-100.0,0.0,YMAX,50.0,1.0,2.0, IMAGE  226
                 1MSYM,1,IAUX)                                                    IMAGE     227
                  IF (SS) GO TO 55                                                IMAGE     228
                  WRITE (ITAPEW,56) K                                             IMAGE     229
```

```
115                DO 57  KL = 1,NSTA                                                    IMAGE     116
                   DO 60  I = 1,NWB                                                      IMAGE     117
                   IF ( YW(I) .NE. YS(KL) )     GO TO 60                                 IMAGE     118
                   LL(KL)  =  LL(KL) + 1                                                 IMAGE     119
                   IP  =  LL(KL)                                                         IMAGE     120
120                XX(IP,KL)  =  (XW(I) + 0.5) * XES                                     IMAGE     121
                   AB(IP,KL)=AW(I)                                                       IMAGE     122
                   PPP(IP,KL)  =  PP(I)                                                  IMAGE     123
                   NSYM(KL)  =  NSYM(KL) + 1                                             IMAGE     124
                60 CONTINUE                                                              IMAGE     125
125             57 CONTINUE                                                              IMAGE     126
                   N=0                                                                   IMAGE     127
                   DO 21 I = 1,NSTA                                                      IMAGE     128
                   YY(I)=(YS(I)+0.5)*XEL                                                 IMAGE     129
                   DO 22 J = 2,NCLE                                                      IMAGE     130
130                IF (YY(I).GT.CLEYR(J-1,KIX).AND.YY(I).LE.CLEYR(J,KIX)) GO TO 23       IMAGE     131
                22 CONTINUE                                                              IMAGE     132
             C     ------ LEADING EDGE COORDINATE ----------------                       IMAGE     133
                23 XLE(I) = CLEXR(J-1,KIX) + (YY(I)-CLEYR(J-1,KIX))*(CLEXR(J,KIX)-     IMAGE     134
                  1CLEXR(J-1,KIX))/(CLEYR(J,KIX)-CLEYR(J-1,KIX))                         IMAGE     135
135          C     ----------- INITIALIZATION -----------------                          IMAGE     136
             C     ------- COMPLEX LIFT AND MOMENT COEFFICIENTS -----                    IMAGE     137
                   CLR(I) = 0.0                                                          IMAGE     138
                   CLI(I) = 0.0                                                          IMAGE     139
                   CMR(I) = 0.0                                                          IMAGE     140
140             21 CMI(I) = 0.0                                                          IMAGE     141
                   DO 109 IX=1,NSTA                                                      IMAGE     142
                   AC(IX) = 0.0                                                          IMAGE     143
                   NIX=LL(IX)                                                            IMAGE     144
                   DO 108 IXL=1,NIX                                                      IMAGE     145
145                N=N+1                                                                 IMAGE     146
                   PR(N) = REAL (PPP(IXL,IX))                                            IMAGE     147
                   CLR(IX) = CLR(IX) + PR(N)*AB(IXL,IX)                                  IMAGE     148
                   X(N) = XX(IXL,IX)                                                     IMAGE     149
                   CMR(IX) = CMR(IX) + PR(N)*AB(IXL,IX)*(X(N)-XLE(IX))                   IMAGE     150
150                IF (SS) GO TO 108                                                     IMAGE     151
                   PI(N) = AIMAG (PPP(IXL,IX))                                           IMAGE     152
                   CLI(IX) = CLI(IX) + PI(N)*AB(IXL,IX)                                  IMAGE     153
                   CMI(IX) = CMI(IX) + PI(N)*AB(IXL,IX)*(X(N)-XLE(IX))                   IMAGE     154
               108 AC(IX) = AC(IX) + AB(IXL,IX)                                          IMAGE     155
155                CPR(IX) = CMR(IX) / CLR(IX)                                           IMAGE     156
                   CLR(IX) = CLR(IX) / AC(IX)                                            IMAGE     157
                   CMR(IX) = CLR(IX) * CPR(IX)                                           IMAGE     158
                   IF (SS) GO TO 109                                                     IMAGE     159
                   CPI(IX) = CMI(IX) / CLI(IX)                                           IMAGE     160
160                CLI(IX) = CLI(IX) / AC(IX)                                            IMAGE     161
                   CMI(IX) = CMI(IX) * CPR(IX)                                           IMAGE     162
               109 CONTINUE                                                              IMAGE     163
                   I=N                                                                   IMAGE     164
                   N = 0                                                                 IMAGE     165
165                DO 26 II = 1,NSTA                                                     IMAGE     166
                   IF (.NOT.SS) WRITE (ITAPEW,27) KIX , AM , VBO , YY(II) , K            IMAGE     167
                   IF (SS) WRITE (ITAPEW,28) KIX , AM , YY(II) , K                       IMAGE     168
                   NIX = LL(II)                                                          IMAGE     169
                   DO 26 JJ = 1,NIX                                                      IMAGE     170
170                N = N + 1                                                             IMAGE     171
                   IF (.NOT.SS) WRITE (ITAPEW,29) X(N) , PR(N) , PI(N)                   IMAGE     172
```

```
                  DO 3 I = 1,NWB                                                    IMAGE      59
                3 SURF = SURF + AW(I)                                               IMAGE      60
60                DO 4 I = 1,NQ                                                     IMAGE      61
                  CLT(I) = CMPLX(0.0,0.0)                                           IMAGE      62
                  XCP(I) = CMPLX(0.0,0.0)                                           IMAGE      63
                4 YCP(I) = CMPLX(0.0,0.0)                                           IMAGE      64
                  DO 5 J = 1,NQ                                                     IMAGE      65
65                CALL CNRW (-MTAP12,PP,NWB)                                        IMAGE      66
                  DO 6 I = 1,NWB                                                    IMAGE      67
                  CLT(J) = CLT(J) + PP(I)*AW(I)                                     IMAGE      68
                  XCP(J)   =  XCP(J) + PP(I)*AW(I) * (XW(I) + 0.5)                  IMAGE      69
                6 YCP(J)   =  YCP(J) + PP(I)*AW(I) * (YW(I) + 0.5)                  IMAGE      70
70              5 CONTINUE                                                          IMAGE      71
                  DO 7 I = 1,NQ                                                     IMAGE      72
                  XCR = REAL(XCP(I))*XES/(REAL(CLT(I)))                             IMAGE      73
                  YCR = REAL(YCP(I))*XEL/(REAL(CLT(I)))                             IMAGE      74
                  XCI = 0.0                                                         IMAGE      75
75                YCI = 0.0                                                         IMAGE      76
                  IF (SS) GO TO 8                                                   IMAGE      77
                  XCI = AIMAG(XCP(I))*XES/(AIMAG(CLT(I)))                           IMAGE      78
                  YCI = AIMAG(YCP(I))*XEL/(AIMAG(CLT(I)))                           IMAGE      79
                8 CLT(I) = CLT(I) / SURF                                            IMAGE      80
80                XCP(I) = CMPLX (XCR,XCI)                                          IMAGE      81
                7 YCP(I) = CMPLX (YCR,YCI)                                          IMAGE      82
                  WRITE (ITAPEW,9) KIX , AM                                         IMAGE      83
                  IF (.NOT.SS)WRITE (ITAPEW,11) VBO                                 IMAGE      84
                  IF (.NOT.SS) WRITE (ITAPEW,12)                                    IMAGE      85
85                IF (SS) WRITE (ITAPEW,13)                                         IMAGE      86
                  DO 18 I = 1,NQ                                                    IMAGE      87
                  IF (.NOT.SS) WRITE (ITAPEW,16) I , CLT(I) , XCP(I) , YCP(I)       IMAGE      88
                  RECL = REAL (CLT(I))                                              IMAGE      89
                  REXP = REAL (XCP(I))                                              IMAGE      90
90                REYP = REAL (YCP(I))                                              IMAGE      91
                  IF (SS) WRITE (ITAPEW,17) I , RECL , REXP , REYP                  IMAGE      92
               18 CONTINUE                                                          IMAGE      93
                  REWIND MTAP12                                                     IMAGE      94
                  YMX  =  0.0                                                       IMAGE      95
95                DO 30  I = 1,NWB                                                  IMAGE      96
               30 YMX  =  AMAX1 (YMX , YW(I))                                       IMAGE      97
                  NSTA  =  1                                                        IMAGE      98
                  YS(1)  =  FLOAT (LZ(KIX)-1)                                       IMAGE      99
               40 NSTA  =  NSTA + 1                                                 IMAGE     100
100               YS(NSTA)  = YS(NSTA-1) + FLOAT(INC)                               IMAGE     101
                  IF ( YS(NSTA) .GT. YMX .OR. YS(NSTA) .GT. 19.0)  GO TO 49         IMAGE     102
                  GO TO 40                                                          IMAGE     103
               49 NSTA  =  NSTA - 1                                                 IMAGE     104
                  DO 200 K = 1,NQ                                                   IMAGE     105
105               CALL CNRW (-MTAP12,PP,NWB)                                        IMAGE     106
                  SMAX = (XMAX(KIX) + 0.5)*XES                                      IMAGE     107
                  DO 10 JJ=1,20                                                     IMAGE     108
                  NSYM(JJ)=0                                                        IMAGE     109
               10 LL(JJ)=0                                                          IMAGE     110
110         C                                                                       IMAGE     111
                  DO 19  I = 1,50                                                   IMAGE     112
                  DO 19  J = 1,20                                                   IMAGE     113
                  XX(I,J) = 0.0                                                     IMAGE     114
               19 PPP(I,J) = CMPLX(0.0,0.0)                                         IMAGE     115
```

```
      SUBROUTINE IMAGE (NQ,KIX,ES,EL,VBO,AM)                                IMAGE    2
C                                                                           IMAGE    3
      DIMENSION       NCLER(5) ,     NCTER(5) ,  CLEXR(20,5)                IMAGE    4
      DIMENSION    CLEYR(20,5) ,  CTEXR(20,5) ,  CTEYR(20,5)                IMAGE    5
      DIMENSION       NSYM(20) ,       LL(20) ,       YY(20)                IMAGE    6
      DIMENSION         XW(350) ,      YW(350) ,        X(350)              IMAGE    7
      DIMENSION         PR(350) ,      PI(350) ,     IAUX(350)              IMAGE    8
      DIMENSION       XX(50,20) ,       LS(5) ,      XMAX(5)               IMAGE    9
      DIMENSION         AD(250) ,      XD(250) ,      YD(250)              IMAGE   10
      DIMENSION        IND(350) ,      AW(350) ,     MSYM(20)              IMAGE   11
      DIMENSION       AB(50,20) ,      XLE(20) ,      CLR(20)              IMAGE   12
      DIMENSION         CLI(20) ,      CMR(20) ,      CMI(20)              IMAGE   13
      DIMENSION         CPR(20) ,      CPI(20) ,       AC(20)              IMAGE   14
      DIMENSION      YNAME(12) ,   XNAME1(12) ,   XNAME2(12)               IMAGE   15
      DIMENSION     YNAME2(12) ,     CLRN(12) ,     CLIN(12)              IMAGE   16
      DIMENSION       CMRN(12) ,     CMIN(12) ,     CPRN(12)              IMAGE   17
      DIMENSION       CPIN(12)                                              IMAGE   18
      DIMENSION ITAPES(50)                                                  IMAGE   19
      DIMENSION YS(20)                                                      IMAGE   20
C                                                                           IMAGE   21
      COMMON/TOMB/XW,YW,NDB,LS,XMAX,NWB,AD,XD,YD,IND,AW                     IMAGE   22
      COMMON/IDIOT/ CLEXR, CLEYR, CTEXR, CTEYR, NCLER, NCTER, NS            IMAGE   23
      COMMON/KIMA / LZ(5), IINC(5)                                          IMAGE   24
      COMMON/CTAPES/ ITAPES                                                 IMAGE   25
      COMMON /COMA/ LC(40) , BR                                             IMAGE   26
C                                                                           IMAGE   27
      COMPLEX  PP(350), PPP(50,20)                                          IMAGE   28
      COMPLEX  CLT(40), XCP(40), YCP(40)                                    IMAGE   29
C                                                                           IMAGE   30
C     ---- PRESSURES AND LIFT COEFFICIENTS ----                           IMAGE   31
      LOGICAL SS                                                            IMAGE   32
      DATA     YNAME/1HX,1H ,1HC,1HO,1HO,1HR,1HD,1H.,1H(,1HI,1HN,1H)/       IMAGE   33
      DATA    XNAME1/1H ,1HP,1HR,1HE,1HS,1HS,1H-,1HR,1HE,1HA,1HL,1H /       IMAGE   34
      DATA    XNAME2/1H ,1HP,1HR,1HE,1HS,1HS,1H-,1HI,1HM,1HA,1HG,1H /       IMAGE   35
      DATA    YNAME2/1HY,1H ,1HC,1HO,1HO,1HR,1HD,1H.,1H(,1HI,1HN,1H)/       IMAGE   36
      DATA      CLRN/1H ,1HC,1HL,1H-,1HR,1HE,1HA,1HL,1H ,1H ,1H ,1H /       IMAGE   37
      DATA      CLIN/1H ,1HC,1HL,1H-,1HI,1HM,1HA,1HG,1H ,1H ,1H ,1H /       IMAGE   38
      DATA      CMRN/1H ,1HC,1HM,1H-,1HR,1HE,1HA,1HL,1H ,1H ,1H ,1H /       IMAGE   39
      DATA      CMIN/1H ,1HC,1HM,1H-,1HI,1HM,1HA,1HG,1H ,1H ,1H ,1H /       IMAGE   40
      DATA      CPRN/1H ,1HC,1HP,1H-,1HR,1HE,1HA,1HL,1H ,1H ,1H ,1H /       IMAGE   41
      DATA      CPIN/1H ,1HC,1HP,1H-,1HI,1HM,1HA,1HG,1H ,1H ,1H ,1H /       IMAGE   42
C                                                                           IMAGE   43
C                                                                           IMAGE   44
      ITAPEW = ITAPES(6)                                                    IMAGE   45
      MTAP12 = ITAPES(12)                                                   IMAGE   46
      MTAP12 =  ITAPES(32)                                                  IMAGE   47
C                                                                           IMAGE   48
      TOL = 1.0E-05                                                         IMAGE   49
      SS  =  .FALSE.                                                        IMAGE   50
      IF ( LC(33) .NE. 0 )    SS = .TRUE.                                   IMAGE   51
      L = LZ(KIX)                                                           IMAGE   52
      INC = IINC(KIX)                                                       IMAGE   53
      REWIND MTAP12                                                         IMAGE   54
      XES = ES * 12.0                                                       IMAGE   55
      XEL = EL * XES                                                        IMAGE   56
      ARBX = XES * XEL                                                      IMAGE   57
      SURF = 0.0                                                            IMAGE   58
```

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)						
		701	LS	(5)	706	XMXX	(5)	711	NWB	(1)
		712	AD	(250)	962	XD	(250)	1212	YD	(250)
		1462	IND	(350)	1812	AW	(350)			

STATISTICS

PROGRAM LENGTH	2411B	1289
CM LABELED COMMON LENGTH	4244B	2212

520000B CM USED

VARIABLES	SN	TYPE		RELOCATION								
0	KK	INTEGER		F.P.	REFS	38	39	DEFINED	1			
316	KOUNT	INTEGER			REFS	42	50	DEFINED	41	59		
1275	LS	INTEGER	ARRAY	TOMB	REFS	10						
0	MDRAW	INTEGER		F.P.	REFS	63	DEFINED	1				
302	MTAP2	INTEGER			REFS	26	DEFINED	16	I/O REFS	18	66	
1274	NDB	INTEGER		TOMB	REFS	10	21	26	28	42	50	
0	NS	INTEGER		F.P.	REFS	24	DEFINED	1				
1307	NWB	INTEGER		TOMB	REFS	10						
414	QHOL	REAL	ARRAY		REFS	6	55	DEFINED	13			
0	VBO	REAL		F.P.	REFS	38	39	DEFINED	1			
315	X	REAL			REFS	43	51	60	61	DEFINED	40	60
1702	XD	REAL	ARRAY	TOMB	REFS	10	23	43	51			
305	XMAX	REAL			REFS	23	61	DEFINED	20	23		
1302	XMXX	REAL	ARRAY	TOMB	REFS	10						
0	XW	REAL	ARRAY	TOMB	REFS	10						
2274	YD	REAL	ARRAY	TOMB	REFS	10	22	44	54			
304	YMIN	REAL			REFS	22	44	54	DEFINED	19	22	
536	YW	REAL	ARRAY	TOMB	REFS	10						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
ALOG10	REAL	1	LIBRARY	35
CNRW		3		26

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
ABS	REAL	1	INTRIN	31	48	
AIMAG	REAL	1	INTRIN	30	47	
AMAX1	REAL	0	INTRIN	23	31	
AMIN1	REAL	0	INTRIN	22		
MINO	INTEGER	0	INTRIN	57		
REAL	REAL	1	INTRIN	29	46	
SIGN	REAL	2	INTRIN	36		

STATEMENT LABELS			DEF LINE	REFERENCES	
177	1		65	24	63
0	2		31	28	
67	3		38	33	34
133	4		49	42	43
0	5		52	50	
145	6		54	51	
0	10		23	21	
237	100	FMT	70	38	
256	110	FMT	73	39	
33	200		27	64	
101	300		42	61	
165	400		60	53	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
17	10	I	21 23	6B	INSTACK		
27	1	IM	24 65	153B		EXT REFS	NOT INNER
44	2	I	28 31	11B	OPT		
103	4	I	42 49	33B		EXT REFS	
137	5	I	50 52	5B	INSTACK	EXITS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
CTAPES	50	0 ITAPES (50)					
TOMB	2162	0 XW (350)	350 YW (350)	700 NDB (1)			

```
                      WRITE (ITAPEW,FMT)  (H(I) , I=IY1,IY2)                          DSPDDW     59
                      KOUNT  =  IK + 1                                                DSPDDW     60
   60               400 X  =  X + 1.0                                                 DSPDDW     61
                      IF ( X .LE. XMAX )       GO TO 300                             DSPDDW     62
                      ICAP  =  ICAP + 1                                              DSPDDW     63
                      IF ( ICAP .EQ. 2 .AND. MDRAW .NE. 0 )       GO TO 1            DSPDDW     64
                      IF ( ICAP .EQ. 2 )       GO TO 200                             DSPDDW     65
   65                 1 CONTINUE                                                     DSPDDW     66
                      REWIND MTAP2                                                   DSPDDW     67
                C                                                                    DSPDDW     68
                C     FORMATS                                                        DSPDDW     69
                C                                                                    DSPDDW     70
   70               100 FORMAT (1H1,10X49HREAL PART OF DIAPHRAGM DOWNWASH VALUES TIMES 1.0 DSPDDW     71
                     1E,I3 / 10X9HFOR MODE ,I3,5X12HFOR SURFACE ,I3,5X               DSPDDW     72
                     223HFOR REDUCED VELOCITY = ,E10.3  //)                          DSPDDW     73
                    110 FORMAT (1H1,10X54HIMAGINARY PART OF DIAPHRAGM DOWNWASH VALUES TIME DSPDDW     74
                     1S 1.0E, I3 / 10X9HFOR MODE ,I3,5X12HFOR SURFACE , I3, 5X       DSPDDW     75
   75                2 23HFOR REDUCED VELOCITY = , E10.3  //)                       DSPDDW     76
                C                                                                    DSPDDW     77
                C                                                                    DSPDDW     78
                      RETURN                                                         DSPDDW     79
                      END                                                            DSPDDW     80
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	DSPDDW	1	78

VARIABLES

	SN	TYPE			RELOCATION							
314	AA	REAL			REFS	2*36	DEFINED	35				
1310	AD	REAL	ARRAY	TOMB	REFS	10						
3424	AW	REAL	ARRAY	TOMB	REFS	10						
436	DWSH	COMPLEX	ARRAY		REFS	7	26	29	30	46	47	
406	FMT	REAL	ARRAY		REFS	6	58	DEFINED	12	55		
324	H	REAL	ARRAY		REFS	6	48	58	DEFINED	46	47	48
312	HH	REAL			REFS	31	DEFINED	29	30			
311	HMAX	REAL			REFS	31	2*33	34	35	DEFINED	27	31
306	I	INTEGER			REFS	22	23	29	30	43	44	45
						46	47	51	54	58	DEFINED	21	28
						42	50	58				
310	ICAP	INTEGER			REFS	29	30	38	39	46	47	62
						63	64	DEFINED	25	62		
320	IK	INTEGER			REFS	59	DEFINED	45				
307	IM	INTEGER			REFS	38	39	DEFINED	24			
2666	IND	INTEGER	ARRAY	TOMB	REFS	10						
313	ISCL	INTEGER			REFS	37	38	39	46	47		
					DEFINED	32	36	37				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	5	9	16	17			
303	ITAPEW	INTEGER			DEFINED	17	I/O REFS	38	39	58		
317	IY	INTEGER			REFS	46	47	2*48	57	DEFINED	44	
321	IYY	INTEGER			REFS	55	56	DEFINED	54			
322	IY1	INTEGER			REFS	58	DEFINED	56				
323	IY2	INTEGER			REFS	58	DEFINED	57				

```
      SUBROUTINE DSPDDW ( KK , NS , VBO , MDRAW )                        DSPDDW     2
C                                                                        DSPDDW     3
C     PROVIDES DISPLAY OF DIAPHRAGM DOWNWASH VELOCITIES                  DSPDDW     4
C                                                                        DSPDDW     5
      DIMENSION ITAPES(50)                                               DSPDDW     6
      DIMENSION          H(50) ,       FMT(6) ,     QHOL(18)            DSPDDW     7
      COMPLEX        DWSH(500)                                           DSPDDW     8
C                                                                        DSPDDW     9
      COMMON /CTAPES/  ITAPES                                            DSPDDW    10
      COMMON /TOMB/ XW(350) , YW(350) , NDB , LS(5) , XMXX(5) , NWB ,    DSPDDW    11
     1              AD(250) , XD(250) , YD(250) , IND(350), AW(350)      DSPDDW    12
      DATA FMT /4H(    ,4H    ,4HX,  ,4H18(1,4HX,F6,4H.3))/              DSPDDW    13
      DATA QHOL /1H2,1H9,2H16,2H23,2H30,2H37,2H44,2H51,2H58,2H65,2H72,   DSPDDW    14
     1          2H79,2H86,2H93,3H100,3H107,3H114,3H121/                  DSPDDW    15
C                                                                        DSPDDW    16
      MTAP2  = ITAPES(22)                                                DSPDDW    17
      ITAPEW=  ITAPES(6)                                                 DSPDDW    18
      REWIND MTAP2                                                       DSPDDW    19
      YMIN   =  100.0                                                    DSPDDW    20
      XMAX   =  0.0                                                      DSPDDW    21
      DO 10  I = 1,NDB                                                   DSPDDW    22
      YMIN   =  AMIN1 (YMIN , YD(I))                                     DSPDDW    23
   10 XMAX   =  AMAX1 (XMAX , XD(I))                                     DSPDDW    24
      DO 1    IM = 1,NS                                                  DSPDDW    25
      ICAP   =  1                                                        DSPDDW    26
      CALL CNRW (-MTAP2,DWSH,NDB)                                        DSPDDW    27
  200 HMAX   =  0.0                                                      DSPDDW    28
      DO 2  I = 1,NDB                                                    DSPDDW    29
      IF ( ICAP .EQ. 1 )       HH = REAL (DWSH(I))                       DSPDDW    30
      IF ( ICAP .EQ. 2 )       HH = AIMAG (DWSH(I))                      DSPDDW    31
    2 HMAX   =  AMAX1 ( HMAX , ABS(HH) )                                 DSPDDW    32
      ISCL   =  0                                                        DSPDDW    33
      IF ( HMAX .GE. 1.0 .AND. HMAX .LT. 10.0 )   GO TO 3                DSPDDW    34
      IF ( HMAX .EQ. 0.0 )    GO TO 3                                    DSPDDW    35
      AA     =  ALOG10 (HMAX)                                            DSPDDW    36
      ISCL   =  AA - 0.5 + SIGN(0.5,AA)                                  DSPDDW    37
      ISCL   =  -ISCL                                                    DSPDDW    38
    3 IF ( ICAP .EQ. 1 )       WRITE (ITAPEW,100)  ISCL , IM , KK , VBO  DSPDDW    39
      IF ( ICAP .EQ. 2 )       WRITE (ITAPEW,110)  ISCL , IM , KK , VBO  DSPDDW    40
      X      =  0.0                                                      DSPDDW    41
      KOUNT  =  1                                                        DSPDDW    42
  300 DO 4  I = KOUNT,NDB                                                DSPDDW    43
      IF ( XD(I) .NE. X )     GO TO 4                                    DSPDDW    44
      IY   =  YD(I) + 1.0 - YMIN                                         DSPDDW    45
      IK     =  I                                                        DSPDDW    46
      IF ( ICAP .EQ. 1 )       H(IY) =  REAL (DWSH(I)) * 10.0**ISCL      DSPDDW    47
      IF ( ICAP .EQ. 2 )       H(IY) = AIMAG (DWSH(I)) * 10.0**ISCL      DSPDDW    48
      IF ( ABS(H(IY)) .LT. 0.001 )      H(IY) = 0.0                      DSPDDW    49
    4 CONTINUE                                                           DSPDDW    50
      DO 5  I = KOUNT,NDB                                                DSPDDW    51
      IF ( XD(I) .EQ. X )     GO TO 6                                    DSPDDW    52
    5  CONTINUE                                                          DSPDDW    53
      GO TO 400                                                          DSPDDW    54
    6 IYY  =  YD(I) - YMIN                                               DSPDDW    55
      FMT(2)  =  QHOL (IYY+1)                                            DSPDDW    56
      IY1    =  IYY + 1                                                  DSPDDW    57
      IY2    =  MINO ( 18 , IY )                                         DSPDDW    58
```

	172058	7813
MMON LENGTH	51628	2674
B LM USED		

```
      SUBROUTINE KERN                                                   KERN       2
C                                                                       KERN       3
C     CALLING PROGRAM FOR COLLOCATION PROCEDURE                         KERN       4
C                                                                       KERN       5
C     SUBSONIC KERNEL FUNCTION FLUTTER PROGRAM                          KERN       6
C                                                                       KERN       7
C     MIT METHOD                                                        KERN       8
C     MAIN PROGRAM                                                      KERN       9
C                                                                       KERN      10
      DIMENSION             LIP(5) ,            AL(5) ,       BTP(5)  KERN      11
      DIMENSION             MCP(5) ,            MC(5)                 KERN      12
      DIMENSION              NC(5) ,           IRP(5) ,       IRC(5)  KERN      13
      DIMENSION             NRS(5) ,           NPR(5) ,      NCLA(5)  KERN      14
      DIMENSION            NTEX(5) ,          NTEY(5) ,     X1(10,5)  KERN      15
      DIMENSION          Y1(10,5) ,       XMW1(10,5) ,    RBB1(10,5)  KERN      16
      DIMENSION        XII1(20,5) ,       XIS1(60,5) ,   ETA1(100,5)  KERN      17
      DIMENSION       XIM1(100,5) ,      SBB1(100,5) ,    XMP1(20,5)  KERN      18
      DIMENSION           KKF1(5) ,            AB(5)                 KERN      19
      DIMENSION         QR(20,20) ,        QI(20,20)                 KERN      20
      DIMENSION        QRC(20,20) ,       QIC(20,20) ,      KGH1(5)  KERN      21
      DIMENSION            LMU(5)                                     KERN      22
      DIMENSION PBB1(20,5), LKG(5), LKF(5)                            KERN      23
      DIMENSION ITAPES(50)                                            KERN      24
      DIMENSION         BIR(25,20) ,       BII(25,20)                 KERN      25
      DIMENSION          IKM(5)                                       KERN      26
      DIMENSION TSHF(1)                                               KERN      27
      DIMENSION VBO(30), RVBO(15)                                     KERN      28
C                                                                     KERN      29
      LOGICAL  KQINT                                                  KERN      30
C                                                                     KERN      31
      COMMON /COMA/ LC(40) , BR                                       KERN      32
      COMMON /FLUTAN/ FMACH ,BETA  ,VBO   ,RVBO  ,NRVBO               KERN      33
      COMMON /FLUTQ/ QMWT(40,5), QMU(5)                               KERN      34
      COMMON /COMB  / ISI,M,IRR,N,ISS,LIRR,NO1,NO2,NMOD,ABO,ALO,M2    KERN      35
      COMMON/COMC/NPRES,NCL,NTEPX,NTEPY,NPRD,XMP(20),PBBO(20),BBT     KERN      36
      COMMON/COMD/X(10),Y(10),XMW(10),RBBO(10),XII(20),XIS(60),ETAS(100) KERN   37
     1,XIMW(100),SBBO(100)                                            KERN      38
      COMMON/COMF/MCC,NLRR,NNP,XCP                                    KERN      39
      COMMON/COMH/KQR,KGH,KFF,NHV                                     KERN      40
      COMMON/COMI/ZK,ZKX,YOE,YOEX                                     KERN      41
      COMMON/COMJ/ZM,ZMX,XOE,XOEX,ZETA,BETAX,RE4,RE4X,RM4,RM4X        KERN      42
      COMMON/COMX/X1A(100),Y1A(100)                                   KERN      43
      COMMON /CTSHF / LTSHF ,TSHF                                     KERN      44
      COMMON / CTAPES / ITAPES                                        KERN      45
      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                            KERN      46
      COMMON /CTABLE/ KTABLE,NPASS ,NROWS, NCOLS , NCOLST,KTABLO,NPAGEA KERN    47
     1               ,ITAPET                                          KERN      48
C                                                                     KERN      49
      ITAPEW = ITAPES(6)                                              KERN      50
      MTAP2  =  ITAPES(22)                                            KERN      51
      MTAP11 =  ITAPES(31)                                            KERN      52
      MTAP50 = ITAPES(50)                                             KERN      53
      NROWS  =  1                                                     KERN      54
      NCOLS  =  3                                                     KERN      55
      KTABLE =  2                                                     KERN      56
      CALL PTABLE (1,48,48                                            KERN      57
     1   HSUBSONIC UNSTEADY AERODYNAMICS USING COLLOCATION)           KERN      58
```

```
                KTABLE =  2                                                    KERN      59
                CALL PTABLE (1,18,18                                           KERN      60
     60        1   HPROCEDURE (KERNEL))                                        KERN      61
          C                                                                    KERN      62
          C                                                                    KERN      63
                KQINT  =  .FALSE.                                              KERN      64
                ZETA   =  BETA                                                 KERN      65
     65         LC3    =  LC(3)                                                KERN      66
                ZM     =  FMACH                                                KERN      67
                IF ( LC(1) .EQ. -1 )    KQINT = .TRUE.                         KERN      68
                IF ( LC(13) .NE. 0 )    KQINT = .TRUE.                         KERN      69
                LC2  =  LC(2)                                                  KERN      70
     70         C                                                              KERN      71
                C                                                              KERN      72
                REWIND MTAP2                                                   KERN      73
                REWIND MTAP11                                                  KERN      74
                READ (ITAPER,102)   NLKG , NLKF                                KERN      75
     75         C     CONTROL WORDS FOR PRINTOUT                               KERN      76
                C     KQR=SUM QRS , KGH1(I)=A ARRAY , KFF1(I)=KERNEL FUNCTION LISTING  KERN  77
                KQR = LC(29)                                                   KERN      78
                IF (NLKG.NE.0) READ (ITAPER,102) (LKG(I),I=1,NLKG)             KERN      79
                IF (NLKF.NE.0) READ (ITAPER,102) (LKF(I),I=1,NLKF)             KERN      80
     80         DO 1 I = 1,5                                                   KERN      81
                KGH1(I) = 0                                                    KERN      82
                KKF1(I) = 0                                                    KERN      83
                II = I                                                         KERN      84
                IF (NLKG.EQ.0) GO TO 10                                        KERN      85
     85         DO 7 J = 1,NLKG                                                KERN      86
                IF (LKG(J).EQ.II) GO TO 8                                      KERN      87
              7 CONTINUE                                                       KERN      88
                GO TO 10                                                       KERN      89
              8 KGH1(I) = 1                                                    KERN      90
     90        10 IF (NLKF.EQ.0) GO TO 1                                       KERN      91
                DO 9 J = 1,NLKF                                                KERN      92
                IF (LKF(J).EQ.II) GO TO 11                                     KERN      93
              9 CONTINUE                                                       KERN      94
                GO TO 1                                                        KERN      95
     95        11 KKF1(I) = 1                                                  KERN      96
              1 CONTINUE                                                       KERN      97
          C     READ COLLOCATION AND INTEGRATION CONTROLS                      KERN      98
                DO 15 I = 1,LC3                                                KERN      99
                READ (ITAPER,102) MCP(I) , MC(I) , NC(I)                       KERN     100
    100         AMC = MC(I)                                                    KERN     101
                ANC = 2*NC(I) - 1                                              KERN     102
                NC(I) = (AMC + 0.5) * ANC                                      KERN     103
                READ (ITAPER,102) IRP(I) , IRC(I) , NRS(I)                     KERN     104
             15 CONTINUE                                                       KERN     105
    105         DO 16  I = 1,LC3                                               KERN     106
                READ (ITAPER,103)  AB(I), AL(I), BTP(I), IKM(I), NPR(I), NCLA(I)  KERN  107
                NPRD = NPR(I) + NCLA(I)                                        KERN     108
                NTEX(I) = 1                                                    KERN     109
                NTEY(I) = 1                                                    KERN     110
    110         IF (NPRD.EQ.0) GO TO 16                                        KERN     111
                READ (ITAPER,102) NTEX(I) , NTEY(I)                            KERN     112
             16 CONTINUE                                                       KERN     113
          C                                                                    KERN     114
                DO 18 I=1,LC3                                                  KERN     115
```

```
115               NSURF=I                                                    KERN     116
                  ISI = I                                                    KERN     117
                  M = MC(I)                                                  KERN     118
                  IRR = IRC(I)                                               KERN     119
                  N = NC(I)                                                  KERN     120
120               ISS = NRS(I)*(IRR+1)                                       KERN     121
                  LIRR = IRR/2                                               KERN     122
                  IQS = ISS - 2*(ISS/2)                                      KERN     123
                  IRS = ISS/2 + IQS                                          KERN     124
                  NO1 = M*LIRR                                               KERN     125
125               NO2 = 2*NO1                                                KERN     126
                  NMOD  = LC2                                                KERN     127
                  ABO = AB(I)                                                KERN     128
                  ALO = AL(I)                                                KERN     129
                  NPRES = NPR(I)                                             KERN     130
130               NCL = NCLA(I)                                              KERN     131
                  NTEPX = NTEX(I)                                            KERN     132
                  NTEPY = NTEY(I)                                            KERN     133
                  NPRD = NPRES+NCL                                           KERN     134
                  M2 = 2*M                                                   KERN     135
135           C                                                              KERN     136
              C     CALL ROUTINE              ***** GEOM   *****             CALL ROUTINE KERN 137
                    CALL GEOM(NSURF)                                         KERN     138
              C     PUT MODAL DATA ON TAPE                                   KERN     139
                 20 DO 22 J =1,M                                             KERN     140
140              22 X1(J,I) = X(J)                                           KERN     141
                    DO 23 J =1,LIRR                                          KERN     142
                    Y1(J,I) = Y(J)                                           KERN     143
                    XMW1(J,I) = XMW(J)                                       KERN     144
                 23 RBB1(J,I) = RBBO(J)                                      KERN     145
145                 DO 24 J =1,M2                                            KERN     146
                 24 XII1(J,I) = XII(J)                                       KERN     147
                    DO 25 J=1,N                                              KERN     148
                 25 XIS1(J,I) = XIS(J)                                       KERN     149
                    DO 26 J =1,ISS                                           KERN     150
150                 ETA1(J,I) = ETAS(J)                                      KERN     151
                    XIM1(J,I) = XIMW(J)                                      KERN     152
                 26 SBB1(J,I) = SBBO(J)                                      KERN     153
                    IF(NCL.EQ.0)GO TO 18                                     KERN     154
                    DO 28 J=1,NTEPY                                          KERN     155
155                 XMP1(J,I) = XMP(J)                                       KERN     156
                 28 PBB1(J,I) = PBBO(J)                                      KERN     157
                 18 CONTINUE                                                 KERN     158
              C                                                              KERN     159
              C     CALL ROUTINE              ***** TIME   *****             CALL ROUTINE KERN 160
160                 CALL TIMEB (23,23HFROM KERN, AFTER GEOM  )               KERN     161
                 19 REWIND MTAP2                                             KERN     162
              C     PRINT OUT PRESSURE POLYNOMIAL DEGREE                     KERN     163
                 46 WRITE (ITAPEW,123)                                       KERN     164
                    DO 147 I=1,LC3                                           KERN     165
165              147 WRITE (ITAPEW,124)I,MCP(I),IRP(I)                       KERN     166
              C     READ CONTROL WORDS FOR WEIGHTING GEN. AIR FORCES         KERN     167
              C     CONTROL WORDS FOR INTERMEDIATE PRINTOUT AND FLUTTER ANALYSIS KERN  168
                    NRF = LC(4)                                              KERN     169
                    IF(LC(1) .EQ. -1) GO TO 42                               KERN     170
170                 IF(LC(1) .EQ. 2 .OR. LC(33) .EQ. 1) GO TO 43             KERN     171
                    IF (LC(13).EQ.1)  NRF = NRVBO                            KERN     172
```

```
                  GO TO 42                                                    KERN      173
               43 NRF = 1                                                     KERN      174
               42 CONTINUE                                                    KERN      175
175            C     REDUCED VELOCITY LOOP                                    KERN      176
                  IGH = 0                                                     KERN      177
                  DO 200 II= 1,NRF                                            KERN      178
                  DO 88 J=1,LC2                                               KERN      179
                  DO 88 I=1,LC2                                               KERN      180
180               QRC(I,J) =  0.0                                             KERN      181
               88 QIC(I,J) =  0.0                                             KERN      182
               C     SURFACE LOOP                                             KERN      183
                  REWIND MTAP2                                                KERN      184
                  DO 89 ISU=1,LC3                                             KERN      185
185               IGH = IGH + 1                                               KERN      186
                  ISI    =  ISU                                               KERN      187
               C                                                              KERN      188
                  KGH=KGH1(ISU)                                               KERN      189
                  KFF=KKF1(ISU)                                               KERN      190
190               IND = IKM(ISU)                                              KERN      191
                  ABO = AB(ISU)/12.0                                          KERN      192
                  ALO=AL(ISU)/12.0                                            KERN      193
                  BTIP = BTP(ISU)/12.0                                        KERN      194
                  BBT=BTIP/ABO                                                KERN      195
195               M=MC(ISU)                                                   KERN      196
                  N = NC(ISU)                                                 KERN      197
                  M2=M+M                                                      KERN      198
               C                                                              KERN      199
                  KSS=0                                                       KERN      200
200               IF (LC(33).NE.0.OR.LC(1).EQ.2)    KSS = 1                   KERN      201
                  ZK=0.0                                                      KERN      202
                  IF ( KSS .EQ. 0 .AND. KQINT )     VBOR = RVBO(II)           KERN      203
                  IF ( KSS .EQ. 0 .AND. .NOT. KQINT )    VBOR = VBO(II)       KERN      204
                  IF(KSS.EQ.0)ZK=ABO/(VBOR*[illegible])                       KERN      205
205               IF (KSS .NE. 0) VBOR = 0.0                                  KERN      206
                  IRR=IRC(ISU)                                                KERN      207
                  LIRR=IRR/2                                                  KERN      208
                  ISS = NRS(ISU)*(IRR+1)                                      KERN      209
                  IQS = ISS - 2*(ISS/2)                                       KERN      210
210               IRS = ISS/2 + IQS                                           KERN      211
                  NO1=M*LIRR                                                  KERN      212
                  NO2=2*NO1                                                   KERN      213
                  MCC=MCP(ISU)                                                KERN      214
                  NLRR=IRP(ISU)/2                                             KERN      215
215               NNP=MCC*NLRR                                                KERN      216
                  DO 92 I=1,M                                                 KERN      217
               92 X(I)=X1(I,ISU)                                              KERN      218
                  DO 93 I=1,LIRR                                              KERN      219
                  Y(I)=Y1(I,ISU)                                              KERN      220
220               XMW(I)=XMW1(I,ISU)                                          KERN      221
               93 RBBO(I)=RBB1(I,ISU)                                         KERN      222
                  DO 94 I=1,M2                                                KERN      223
               94 XII(I)=XII1(I,ISU)                                          KERN      224
                  DO 95 I=1,N                                                 KERN      225
225            95 XIS(I)=XIS1(I,ISU)                                          KERN      226
                  DO 96 I=1,ISS                                               KERN      227
                  ETAS(I)=ETA1(I,ISU)                                         KERN      228
                  XIMW(I)=XIM1(I,ISU)                                         KERN      229
```

```
                96 SBBO(I)=SBB1(I,ISU)                                          KERN      230
230                NPRES=NPR(ISU)                                               KERN      231
                   NCL=NCLA(ISU)                                                KERN      232
                   NPRD=NPRES+NCL                                               KERN      233
                   NTEPX=NTEX(ISU)                                              KERN      234
                   NTEPY=NTEY(ISU)                                              KERN      235
235                IF (NCL.EQ.O) GOTO 13                                        KERN      236
                   KK = NTEPY                                                   KERN      237
                   DO 98 I=1,KK                                                 KERN      238
                   XMP(I)=XMP1(I,ISU)                                           KERN      239
                98 PBBO(I)=PBB1(I,ISU)                                          KERN      240
240             13 CONTINUE                                                     KERN      241
                   NTAPE  =  11                                                 KERN      242
                   IF (LC(22) .EQ. 1) GOTO 203                                  KERN      243
              C                                                                 KERN      244
              C    CALL ROUTINE              ***** INVK   *****          CALL ROUTINE KERN      245
245                CALL INVK(IND )                                              KERN      246
                   CALL TIMEB (23,23HFROM KERN, AFTER INVK  )                   KERN      247
              C                                                                 KERN      248
              C    CALL ROUTINE              ***** GRS    *****          CALL ROUTINE KERN      249
             203 CALL GRS (QR,QI,IND,                BIR,BII)                   KERN      250
250                IF (NPRD.NE.O) CALL PRESS (BIR,BII,IND)                      KERN      251
                   CALL TIMEB (23,23HFROM KERN, AFTER PRESS )                   KERN      252
              C    ELIMINATE MODES AND WEIGHTING                                KERN      253
                   DO 217 I=1,LC2                                               KERN      254
                   ZQOI=QMWT(I,ISU)                                             KERN      255
255                DO 217 J=1,LC2                                               KERN      256
                   ZQOJ=QMWT(J,ISU)                                             KERN      257
                   QR(I,J)=QR(I,J)*ZQOI*ZQOJ*QMU(ISU)                           KERN      258
             217 QI(I,J)=QI(I,J)*ZQOI*ZQOJ*QMU(ISU)                             KERN      259
                   IF ( LC(6).EQ. O )     GO TO 6                               KERN      260
260           C    WRITE REVISED QRS TERMS                                      KERN      261
                   LINE = 8                                                     KERN      262
                   KONS = LC2/3 + LC2 - 3*(LC2/3) + 1                           KERN      263
                   WRITE (ITAPEW,128)ZM,VBOR   ,ISU                             KERN      264
                   DO 218 I=1,LC2                                               KERN      265
265                LINE = LINE + KONS                                           KERN      266
                   IF (LINE.LE.62)  GO TO 218                                   KERN      267
                   LINE = 8 + KONS                                              KERN      268
                   WRITE (ITAPEW,128) ZM , VBOR     , ISU                       KERN      269
             218 WRITE (ITAPEW,129)(QR(I,J),QI(I,J),J=1,LC2)                    KERN      270
270            6 CONTINUE                                                      KERN      271
              C    SUM OF QRS                                                   KERN      272
                   DO 219 I=1,LC2                                               KERN      273
                   DO 219 J=1,LC2                                               KERN      274
                   QRC(I,J) =  QRC(I,J) + QR(I,J)                               KERN      275
275          219 QIC(I,J) =  QIC(I,J) + QI(I,J)                                KERN      276
              89 CONTINUE                                                       KERN      277
                   IF (LC(6).EQ.O)          GO TO 223                           KERN      278
                   WRITE (ITAPEW,130)ZM,VBOR                                    KERN      279
                   DO 225 I=1,LC2                                               KERN      280
280          225 WRITE (ITAPEW,129) (QRC(I,J),QIC(I,J), J=1,LC2)                KERN      281
             223 IF (LC(1).EQ.O) GO TO 200                                      KERN      282
                   DO 72 I=1,LC2                                                KERN      283
              72 WRITE(MTAP50)  (QRC(I,J),QIC(I,J),J=1,LC2)                     KERN      284
             200 CONTINUE                                                       KERN      285
285                IF ( LC(22) .NE. O )    REWIND NTAPE                         KERN      286
```

```
                      IF (.NOT.KQINT) GO TO 2                                   KERN      287
                      CALL QINTP (MTAP50,LC2,LC(4),RVBO,NRVBO,ZM,VBO)           KERN      288
                    2 CONTINUE                                                  KERN      289
                C                                                               KERN      290
      290       C                                                               KERN      291
                C FORMATS                                                       KERN      292
                C                                                               KERN      293
                  102 FORMAT(10I5)                                              KERN      294
                  103 FORMAT (3E10.3,3I5)                                       KERN      295
      295         123 FORMAT (1H1,4X32HNO. OF PRESSURE POLYNOMIAL TERMS, /8X    KERN      296
                     1        11HSURFACE NO.,4X,9HCHORDWISE,4X,8HSPANWISE, /)  KERN      297
                  124 FORMAT(13X,I2,12X,I2,11X,I2)                              KERN      298
                  128 FORMAT (1H1,5X38HGENERALIZED AIR FORCES FOR MACH NO. = ,E10.3,/5X KERN 299
                     1        6HVBO = ,E10.3,/5X14HSURFACE NO. = ,I3,5X7HBY ROWS, KERN   300
      300            2        10X11H(REAL,IMAG), /)                           KERN      301
                  129 FORMAT(/( T3,1PE10.3,T15,1PE10.3, T1,2H (,T13,2H, , T25,2H) , KERN 302
                     1          T29,1PE10.3,T41,1PE10.3,T27,2H (,T39,2H, , T51,2H) , KERN 303
                     2          T55,1PE10.3,T67,1PE10.3,T53,2H (,T65,2H, ,T77,2H) )) KERN 304
                  130 FORMAT (1H1,5X25HSUM OF QRS FOR MACH NO = ,E10.3,/5X5HVBO= ,E10.3, KERN 305
      305            1        /15X7HBY ROWS,10X11H(REAL,IMAG), /)              KERN      306
                C                                                               KERN      307
                      RETURN                                                    KERN      308
                      END                                                       KERN      309
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
1	KERN	1	307

VARIABLES

		SN	TYPE		RELOCATION							
5700	AB		REAL	ARRAY		REFS	18	127	191	DEFINED	106	
11	ABO		REAL		COMB	REFS	34	194	204	DEFINED	127	191
1347	AL		REAL	ARRAY		REFS	10	128	192	DEFINED	106	
12	ALO		REAL		COMB	REFS	34	DEFINED	128	192		
1320	AMC		REAL			REFS	102	DEFINED	100			
1321	ANC		REAL			REFS	102	DEFINED	101			
55	BBT		REAL		COMC	REFS	35	DEFINED	194			
1	BETA		REAL		FLUTAN	REFS	32	64				
5	BETAX		REAL		COMJ	REFS	41					
12161	BII		REAL	ARRAY		REFS	24	249	250			
11175	BIR		REAL	ARRAY		REFS	24	249	250			
50	BR		REAL		COMA	REFS	31	204				
1331	BTIP		REAL			REFS	194	DEFINED	193			
1354	BTP		REAL	ARRAY		REFS	10	193	DEFINED	106		
170	ETAS		REAL	ARRAY	COMD	REFS	36	150	DEFINED	227		
2573	ETA1		REAL	ARRAY		REFS	16	227	DEFINED	150		
0	FMACH		REAL		FLUTAN	REFS	32	66				
1315	I		INTEGER			REFS	78	79	81	82	83	89	95
							3*99	100	101	102	3*103	6*106	2*107	108
							109	2*111	115	116	117	118	119	120
							127	128	129	130	131	132	140	142
							143	144	146	148	150	151	152	155
							156	3*165	180	181	2*217	2*219	2*220	2*221

VARIABLES	SN	TYPE		RELOCATION	
					2*223 2*225 2*227 2*228 2*229 2*238 2*239 254
					2*257 2*258 2*269 3*274 3*275 2*280 2*283
					DEFINED 78 79 80 98 105 114 164
					179 216 218 222 224 226 237 253
					264 272 279 282
1326	IGH	INTEGER			REFS 185 DEFINED 176 185
1316	II	INTEGER			REFS 86 92 202 203 DEFINED 83 177
13145	IKM	INTEGER	ARRAY		REFS 25 190 DEFINED 106
1330	IND	INTEGER			REFS 245 249 250 DEFINED 190
1323	IQS	INTEGER			REFS 123 210 DEFINED 122 209
1405	IRC	INTEGER	ARRAY		REFS 12 118 206 DEFINED 103
1400	IRP	INTEGER	ARRAY		REFS 12 165 214 DEFINED 103
2	IRR	INTEGER		COMB	REFS 34 120 121 207 208
					DEFINED 118 206
1324	IRS	INTEGER			DEFINED 123 210
0	ISI	INTEGER		COMB	REFS 34 DEFINED 116 186
4	ISS	INTEGER		COMB	REFS 34 2*122 123 149 2*209 210 226
					DEFINED 120 208
1327	ISU	INTEGER			REFS 186 188 189 190 191 192 193
					195 196 206 208 213 214 217 219
					220 221 223 225 227 228 229 230
					231 233 234 238 239 254 256 257
					258 263 268 DEFINED 184
2	ITAPEP	INTEGER		COMRWP	REFS 45
0	ITAPER	INTEGER		COMRWP	REFS 45 I/O REFS 74 78 79 99 103
					106 111
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS 23 44 49 50 51 52
7	ITAPET	INTEGER		CTABLE	REFS 46
1	ITAPEW	INTEGER		COMRWP	REFS 45 DEFINED 49 I/O REFS 163 165 263
					268 269 278 280
1317	J	INTEGER			REFS 86 92 2*140 2*142 2*143 2*144 2*146
					2*148 2*150 2*151 2*152 2*155 2*156 180 181
					256 2*257 2*258 2*269 3*274 3*275 2*280 2*283
					DEFINED 85 91 139 141 145 147 149
					154 178 255 269 273 280 283
2	KFF	INTEGER		COMH	REFS 39 DEFINED 189
1	KGH	INTEGER		COMH	REFS 39 DEFINED 188
11005	KGH1	INTEGER	ARRAY		REFS 20 188 DEFINED 81 89
1334	KK	INTEGER			REFS 237 DEFINED 236
5673	KKF1	INTEGER	ARRAY		REFS 18 189 DEFINED 82 95
1341	KONS	INTEGER			REFS 265 267 DEFINED 262
1305	KQINT	LOGICAL			REFS 29 202 203 286 DEFINED 63 67
					68
0	KQR	INTEGER		COMH	REFS 39 DEFINED 77
1332	KSS	INTEGER			REFS 202 203 204 205 DEFINED 199 200
0	KTABLE	INTEGER		CTABLE	REFS 46 DEFINED 55 58
5	KTABLO	INTEGER		CTABLE	REFS 46
0	LC	INTEGER	ARRAY	COMA	REFS 31 65 67 68 69 77 168
					169 2*170 171 2*200 242 259 277 281
					285 287
1312	LC2	INTEGER			REFS 126 178 179 253 255 3*262 264
					269 272 273 279 280 282 283 287
					DEFINED 69
1311	LC3	INTEGER			REFS 98 105 114 164 184
					DEFINED 65
1340	LINE	INTEGER			REFS 265 266 DEFINED 261 265 267
1342	LIP	INTEGER	*UNDEF		REFS 10

VARIABLES	SN	TYPE		RELOCATION								
5	LIRR	INTEGER		COMB	REFS	34	124	141	211	218		
					DEFINED	121	207					
11170	LKF	INTEGER	ARRAY		REFS	22	92	DEFINED	79			
11163	LKG	INTEGER	ARRAY		REFS	22	86	DEFINED	78			
11012	LMU	INTEGER	*UNDEF		REFS	21						
0	LTSHF	INTEGER		CTSHF	REFS	43						
1	M	INTEGER		COMB	REFS	34	124	134	139	2*197	211	216
					DEFINED	117	195					
1366	MC	INTEGER	ARRAY		REFS	11	100	117	195	DEFINED	99	
0	MCC	INTEGER		COMF	REFS	38	215	DEFINED	213			
1361	MCP	INTEGER	ARRAY		REFS	11	165	213	DEFINED	99		
1307	MTAP11	INTEGER			DEFINED	51	I/O REFS	73				
1306	MTAP2	INTEGER			DEFINED	50	I/O REFS	72	161	183		
1310	MTAP50	INTEGER			REFS	287	DEFINED	52	I/O REFS	283		
13	M2	INTEGER		COMB	REFS	34	145	222	DEFINED	134	197	
3	N	INTEGER		COMB	REFS	34	147	224	DEFINED	119	196	
1373	NC	INTEGER	ARRAY		REFS	12	101	119	196	DEFINED	99	102
1	NCL	INTEGER		COMC	REFS	35	133	153	232	235		
					DEFINED	130	231					
1424	NCLA	INTEGER	ARRAY		REFS	13	107	130	231	DEFINED	106	
3	NCOLS	INTEGER		CTABLE	REFS	46	DEFINED	54				
∞	NCOLST	INTEGER		CTABLE	REFS	46						
3	NHV	INTEGER		COMH	REFS	39						
1314	NLKF	INTEGER			REFS	2*79	90	91	DEFINED	74		
1313	NLKG	INTEGER			REFS	2*78	84	85	DEFINED	74		
1	NLRR	INTEGER		COMF	REFS	38	215	DEFINED	214			
10	NMOD	INTEGER		COMB	REFS	34	DEFINED	126				
2	NNP	INTEGER		COMF	REFS	38	DEFINED	215				
6	NO1	INTEGER		COMB	REFS	34	125	212	DEFINED	124	211	
7	NO2	INTEGER		COMB	REFS	34	DEFINED	125	212			
6	NPAGEA	INTEGER		CTABLE	REFS	46						
1	NPASS	INTEGER		CTABLE	REFS	46						
1417	NPR	INTEGER	ARRAY		REFS	13	107	129	230	DEFINED	106	
4	NPRD	INTEGER		COMC	REFS	35	110	250	DEFINED	107	133	232
0	NPRES	INTEGER		COMC	REFS	35	133	232	DEFINED	129	230	
1325	NRF	INTEGER			REFS	177	DEFINED	168	171	173		
2	NROWS	INTEGER		CTABLE	REFS	46	DEFINED	53				
1412	NRS	INTEGER	ARRAY		REFS	13	120	208	DEFINED	103		
57	NRVBO	INTEGER		FLUTAN	REFS	32	171	287				
1322	NSURF	INTEGER			REFS	137	DEFINED	115				
1335	NTAPE	INTEGER			DEFINED	241	I/O REFS	285				
2	NTEPX	INTEGER		COMC	REFS	35	DEFINED	131	233			
3	NTEPY	INTEGER		COMC	REFS	35	154	236	DEFINED	132	234	
1431	NTEX	INTEGER	ARRAY		REFS	14	131	233	DEFINED	108	111	
1436	NTEY	INTEGER	ARRAY		REFS	14	132	234	DEFINED	109	111	
31	PBBO	REAL	ARRAY	COMC	REFS	35	156	DEFINED	239			
11017	PBB1	REAL	ARRAY		REFS	22	239	DEFINED	156			
6525	QI	REAL	ARRAY		REFS	19	249	258	269	275		
					DEFINED	258						
10165	QIC	REAL	ARRAY		REFS	20	275	280	283	DEFINED	181	275
310	QMU	REAL	ARRAY	FLUTQ	REFS	33	257	258				
0	QMWT	REAL	ARRAY	FLUTQ	REFS	33	254	256				
5705	QR	REAL	ARRAY		REFS	19	249	257	269	274		
					DEFINED	257						
7345	QRC	REAL	ARRAY		REFS	20	274	280	283	DEFINED	180	274
36	RBBO	REAL	ARRAY	COMD	REFS	36	144	DEFINED	221			
1671	RBB1	REAL	ARRAY		REFS	15	221	DEFINED	144			

VARIABLES	SN	TYPE	RELOCATION								
6	RE4	REAL		COMJ	REFS	41					
7	RE4X	REAL		COMJ	REFS	41					
10	RM4	REAL		COMJ	REFS	41					
11	RM4X	REAL		COMJ	REFS	41					
40	RVBO	REAL	ARRAY	FLUTAN	REFS	27	32	202	287		
500	SBBO	REAL	ARRAY	COMD	REFS	36	152	DEFINED	229		
4543	SBB1	REAL	ARRAY		REFS	17	229	DEFINED	152		
1	TSHF	REAL	ARRAY	CTSHF	REFS	26	43				
2	VBO	REAL	ARRAY	FLUTAN	REFS	27	32	203	287		
1333	VBOR	REAL			REFS	204	263	268	278	DEFINED	202
					205						
0	X	REAL	ARRAY	COMD	REFS	36	140	DEFINED	217		
3	XCP	REAL		COMF	REFS	38					
50	XII	REAL	ARRAY	COMD	REFS	36	146	DEFINED	223		
1753	XII1	REAL	ARRAY		REFS	16	223	DEFINED	146		
334	XIMW	REAL	ARRAY	COMD	REFS	36	151	DEFINED	228		
3557	XIM1	REAL	ARRAY		REFS	17	228	DEFINED	151		
74	XIS	REAL	ARRAY	COMD	REFS	36	148	DEFINED	225		
2117	XIS1	REAL	ARRAY		REFS	16	225	DEFINED	148		
5	XMP	REAL	ARRAY	COMC	REFS	35	155	DEFINED	238		
5527	XMP1	REAL	ARRAY		REFS	17	238	DEFINED	155		
24	XMW	REAL	ARRAY	COMD	REFS	36	143	DEFINED	220		
1607	XMW1	REAL	ARRAY		REFS	15	220	DEFINED	143		
2	XOE	REAL		COMJ	REFS	41					
3	XOEX	REAL		COMJ	REFS	41					
1443	X1	REAL	ARRAY		REFS	14	217	DEFINED	140		
0	X1A	REAL	ARRAY	COMX	REFS	42					
12	Y	REAL	ARRAY	COMD	REFS	36	142	DEFINED	219		
2	YOE	REAL		COMI	REFS	40					
3	YOEX	REAL		COMI	REFS	40					
1525	Y1	REAL	ARRAY		REFS	15	219	DEFINED	142		
144	Y1A	REAL	ARRAY	COMX	REFS	42					
4	ZETA	REAL		COMJ	REFS	41	DEFINED	64			
0	ZK	REAL		COMI	REFS	40	DEFINED	201	204		
1	ZKX	REAL		COMI	REFS	40					
0	ZM	REAL		COMJ	REFS	41	263	268	278	287	
					DEFINED	66					
1	ZMX	REAL		COMJ	REFS	41					
1336	ZQOI	REAL			REFS	257	258	DEFINED	254		
1337	ZQOJ	REAL			REFS	257	258	DEFINED	256		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES		
GEOM		1	137		
GRS		5	249		
INVK		1	245		
PRESS		3	250		
PTABLE		3	56	59	
QINTP		7	287		
TIMEB		2	160	246	251

STATEMENT LABELS		DEF LINE	REFERENCES		
104	1	96	80	90	94
775	2	288	286		
674	6	270	259		
0	7	87	85		
70	8	89	86		

STATEMENT LABELS			DEF LINE	REFERENCES					
0	9		93	91					
72	10		90	84	88				
102	11		95	92					
565	13		240	235					
0	15		104	98					
166	16		112	105	110				
317	18		157	114	153				
0	19	INACTIVE	161						
0	20	INACTIVE	139						
0	22		140	139					
0	23		144	141					
0	24		146	145					
0	25		148	147					
0	26		152	149					
0	28		156	154					
354	42		174	169	172				
353	43		173	170					
0	46	INACTIVE	163						
0	72		283	282					
0	88		181	178	179				
0	89		276	184					
0	92		217	216					
0	93		221	218					
0	94		223	222					
0	95		225	224					
0	96		229	226					
0	98		239	237					
1205	102	FMT	293	74	78	79	99	103	111
1207	103	FMT	294	106					
1212	123	FMT	295	163					
1224	124	FMT	297	165					
1227	128	FMT	298	263	268				
1245	129	FMT	301	269	280				
1265	130	FMT	304	278					
0	147		165	164					
765	200		284	177	281				
574	203		249	242					
0	217		258	253	255				
653	218		269	264	266				
0	219		275	272	273				
742	223		281	277					
0	225		280	279					

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
55	1	I	80 96	32B		NOT INNER	
62	7	J	85 87	5B	INSTACK	EXITS	
74	9	J	91 93	5B	INSTACK	EXITS	
110	15	I	98 104	27B		EXT REFS	
140	16	I	105 112	31B		EXT REFS	
172	18	I	114 157	130B		EXT REFS	NOT INNER
232	22	J	139 140	2B	INSTACK		
242	23	J	141 144	5B	INSTACK		
255	24	J	145 146	2B	INSTACK		
266	25	J	147 148	2B	INSTACK		
276	26	J	149 152	5B	INSTACK		
312	28	J	154 156	4B	INSTACK		
330	147	I	164 165	11B		EXT REFS	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
356	200	II	177 284	412B	EXT REFS NOT INNER
357	88	J	178 181	13B	NOT INNER
364	88	I	179 181	3B	INSTACK
375	89	ISU	184 276	321B	EXT REFS NOT INNER
470	92	I	216 217	3B	INSTACK
501	93	I	218 221	5B	INSTACK
514	94	I	222 223	3B	INSTACK
525	95	I	224 225	3B	INSTACK
536	96	I	226 229	5B	INSTACK
560	98	I	237 239	4B	INSTACK
604	217	I	253 258	30B	NOT INNER
622	217	J	255 258	6B	INSTACK
645	218	I	264 269	27B	EXT REFS NOT INNER
656		J	269 269	12B	EXT REFS
675	219	I	272 275	16B	NOT INNER
703	219	J	273 275	5B	INSTACK
721	225	I	279 280	21B	EXT REFS NOT INNER
724		J	280 280	12B	EXT REFS
744	72	I	282 283	21B	EXT REFS NOT INNER
747		J	283 283	12B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
COMA	41	0	LC	(40)	40	BR	(1)			
FLUTAN	48	0	FMACH	(1)	1	BETA	(1)	2	VBO	(30)
		32	RVBO	(15)	47	NRVBO	(1)			
FLUTQ	205	0	QMWT	(200)	200	QMU	(5)			
COMB	12	0	ISI	(1)	1	M	(1)	2	IRR	(1)
		3	N	(1)	4	ISS	(1)	5	LIRR	(1)
		6	NO1	(1)	7	NO2	(1)	8	NMOD	(1)
		9	ABO	(1)	10	ALO	(1)	11	M2	(1)
COMC	46	0	NPRES	(1)	1	NCL	(1)	2	NTEPX	(1)
		3	NTEPY	(1)	4	NPRD	(1)	5	XMP	(20)
		25	PBBO	(20)	45	BBT	(1)			
COMD	420	0	X	(10)	10	Y	(10)	20	XMW	(10)
		30	RBBO	(10)	40	XII	(20)	60	XIS	(60)
		120	ETAS	(100)	220	XIMW	(100)	320	SBBO	(100)
COMF	4	0	MCC	(1)	1	NLRR	(1)	2	NNP	(1)
		3	XCP	(1)						
COMH	4	0	KQR	(1)	1	KGH	(1)	2	KFF	(1)
		3	NHV	(1)						
COMI	4	0	ZK	(1)	1	ZKX	(1)	2	YOE	(1)
		3	YOEX	(1)						
COMJ	10	0	ZM	(1)	1	ZMX	(1)	2	XOE	(1)
		3	XOEX	(1)	4	ZETA	(1)	5	BETAX	(1)
		6	RE4	(1)	7	RE4X	(1)	8	RM4	(1)
		9	RM4X	(1)						
COMX	200	0	X1A	(100)	100	Y1A	(100)			
CTSHF	2	0	LTSHF	(1)	1	TSHF	(1)			
CTAPES	50	0	ITAPES	(50)						
COMRWP	3	0	ITAPER	(1)	1	ITAPEW	(1)	2	ITAPEP	(1)
CTABLE	8	0	KTABLE	(1)	1	NPASS	(1)	2	NROWS	(1)
		3	NCOLS	(1)	4	NCOLST	(1)	5	KTABLO	(1)
		6	NPAGEA	(1)	7	ITAPET	(1)			

STATISTICS

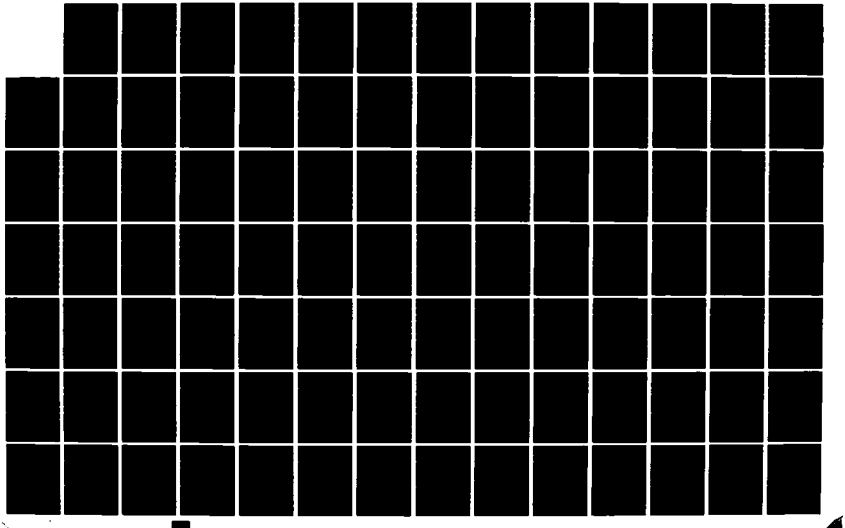
PROGRAM LENGTH	13177B	5759
CM LABELED COMMON LENGTH	2041B	1057

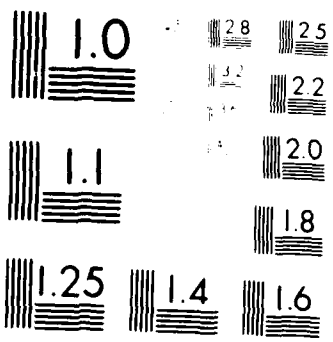
STATISTICS
52000B CM USED

```
      SUBROUTINE GEOM(NSURF)                                                  GEOM       2
C                                                                             GEOM       3
      DIMENSION        AN(1,2) ,      XAT(10) ,   DEFL(10,2)                 GEOM       4
      DIMENSION        ETC(20)                                                GEOM       5
      DIMENSION      JN(4)                                                    GEOM       6
      DIMENSION XLE(20)           ,XTE(20)                                   GEOM       7
      DIMENSION YLE(20)           ,YTE(20)                                   GEOM       8
      DIMENSION     ALPHA(100)                                               GEOM       9
      DIMENSION       CHR(100)                                               GEOM      10
      DIMENSION        HR(200)                                               GEOM      11
      DIMENSION       HCP(400)                                               GEOM      12
      DIMENSION      SLCP(400)                                               GEOM      13
      DIMENSION ITAPES(50)                                                   GEOM      14
C                                                                             GEOM      15
      LOGICAL KSURF, WILK                                                     GEOM      16
      COMMON/COMA/LC(40),BR                                                   GEOM      17
      COMMON /COMB  / ISI,M,IRR,N,ISS,LIRR,NO1,NO2,NMOD,ABO,ALO,M2            GEOM      18
      COMMON/COMC/NPRES,NCL,NTEPX,NTEPY,NPRD,XMP(20),PBBO(20),BBT             GEOM      19
      COMMON/COMD/X(10),Y(10),XMW(10),RBBO(10),XII(20),XI(60),ETA(100),       GEOM      20
     1XIMW(100),SBBO(100)                                                     GEOM      21
      COMMON / CTAPES / ITAPES                                                GEOM      22
      COMMON /MODV/ XPL(400) , YPL(400) , ZPL(400)                            GEOM      23
      DATA   KERN /4HKERN/                                                    GEOM      24
C                                                                             GEOM      25
C                                                                             GEOM      26
      ITAPER = ITAPES(5)                                                      GEOM      27
      ITAPEW = ITAPES(6)                                                      GEOM      28
      MTAP2  =  ITAPES(22)                                                    GEOM      29
      MTAP8  =  ITAPES(28)                                                    GEOM      30
      MTAP9  =  ITAPES(29)                                                    GEOM      31
C                                                                             GEOM      32
C                                                                             GEOM      33
      NMOD  =  LC(2)                                                          GEOM      34
      WILK=.FALSE.                                                            GEOM      35
      ABO = ABO/12.0                                                          GEOM      36
      ALO = ALO/12.0                                                          GEOM      37
      WRITE (ITAPEW,102)ISI,BR,ABO,ALO,M,IRR,N,ISS                            GEOM      38
      PI=3.14159265                                                           GEOM      39
      IQS = ISS - 2*(ISS/2)                                                   GEOM      40
      IRS = ISS/2 + IQS                                                       GEOM      41
      RR=IRR                                                                  GEOM      42
      SS = ISS                                                                GEOM      43
      NN=NO1                                                                  GEOM      44
      NN2=NO2                                                                 GEOM      45
      M2 = 2*M                                                                GEOM      46
      FM = M                                                                  GEOM      47
      FN = N                                                                  GEOM      48
      DO 70 IR = 1,LIRR                                                       GEOM      49
      R = IR                                                                  GEOM      50
   70 Y(IR) =-COS((2.0*R*PI)/(2.0*(RR+1.0)))                                  GEOM      51
      DO 71 I = 1,M                                                           GEOM      52
      FI = I                                                                  GEOM      53
      X(I)=-COS((2.0*FI*PI)/(2.0*FM+1.0))                                     GEOM      54
   71   CONTINUE                                                             GEOM      55
      DO 72 IS = 1,ISS                                                        GEOM      56
      S = IS                                                                  GEOM      57
   72 ETA(IS) =-COS((2.0*S-1.0)*PI/(2.0*SS))                                  GEOM      58
```

AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING..(U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2

UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL





MICROCOPY RESOLUTION TEST CHART

```
      IF(IQS.NE.0)ETA(IRS)=0.0                                          GEOM       59
      DO 73 J = 1,N                                                     GEOM       60
60    FJ = J                                                            GEOM       61
   73 XI(J) =-COS((2.0*FJ-1.0)*PI/(2.0*FN+1.0))                         GEOM       62
C     CHORDWISE COORDINATES FOR QRS                                     GEOM       63
      DO 400 J=1,M2                                                     GEOM       64
      FJ = J                                                            GEOM       65
65 400 XII(J) = -COS((2.0*FJ-1.0)*PI/(4.0*FM+1.0))                      GEOM       66
      READ (ITAPER,100) NLE,NTE                                         GEOM       67
      READ (ITAPER,118)  (XLE(I), YLE(I), I=1,NLE)                      GEOM       68
      READ (ITAPER,118)  (XTE(I), YTE(I), I=1,NTE)                      GEOM       69
      DO 8  I=1,NLE                                                     GEOM       70
70  8 YLE(I) = -YLE(I)                                                  GEOM       71
      DO 9  I=1,NTE                                                     GEOM       72
   9  YTE(I) = -YTE(I)                                                  GEOM       73
      CALL WHSA (ABO,ALO,LIRR,Y,XMW,RBBO,IRS,ETA,XIMW,SBBO,             GEOM       74
     1           NLE,NTE,XLE,YLE,XTE,YTE)                               GEOM       75
75    IPQ    = IRS + 1                                                  GEOM       76
      DO 82 IS =IPQ,ISS                                                 GEOM       77
      ISQ = ISS + 1 - IS                                                GEOM       78
      SBBO(IS) = SBBO(ISQ)                                              GEOM       79
   82 XIMW(IS) = XIMW(ISQ)                                              GEOM       80
80    WRITE (ITAPEW,106)                                                GEOM       81
      DO 27 I=1,IRS                                                     GEOM       82
      IF(I.GT.LIRR)GO TO 28                                             GEOM       83
      WRITE (ITAPEW,107)Y(I),XMW(I),RBBO(I),ETA(I),XIMW(I),SBBO(I)      GEOM       84
      GO TO 27                                                          GEOM       85
85    28 WRITE (ITAPEW,108)ETA(I),XIMW(I),SBBO(I)                       GEOM       86
   27 CONTINUE                                                          GEOM       87
      READ (ITAPER,700)KSURF                                            GEOM       88
      CALL INTP (X,Y,M,LIRR,NO1,NMOD,ABO,LP,NSURF,RBBO,XMW,             GEOM       89
     1   ALO,WILK,ALPHA,CHR,ICH,KSURF,NPOINT)                           GEOM       90
90    IF(KSURF)WILK=.TRUE.                                              GEOM       91
      IF (KSURF) CALL INTP(X,Y,M,LIRR,NO1,NMOD,ABO,LP,NSURF,RBBO,       GEOM       92
     1   XMW,ALO,WILK,ALPHA,CHR,ICH,KSURF,NPOINT)                       GEOM       93
      DO 7 I=1,NMOD                                                     GEOM       94
      CALL RNRW (-MTAP9,CHR,NO1)                                        GEOM       95
95    CALL RNRW (-MTAP9,ALPHA,NO1)                                      GEOM       96
      CALL RNRW (MTAP2,CHR,NO1)                                         GEOM       97
   7  CALL RNRW (MTAP2,ALPHA,NO1)                                       GEOM       98
      REWIND MTAP9                                                      GEOM       99
      REWIND MTAP8                                                      GEOM      100
100   42 DO 404 K =1,NMOD                                               GEOM      101
      CALL RNRW (-MTAP9,CHR,NO1)                                        GEOM      102
      CALL RNRW (-MTAP9,ALPHA,NO1)                                      GEOM      103
      DO 406  J=1,LIRR                                                  GEOM      104
      KK = J - 1                                                        GEOM      105
105   DO 405 I = 1,M                                                    GEOM      106
      XAT(I) = RBBO(J) * ABO * X(I)                                     GEOM      107
      DEFL(I,1) = CHR(I+KK*M)                                           GEOM      108
  405 DEFL(I,2) = ALPHA(I+KK*M)                                         GEOM      109
      MQ = MINO (4,M)                                                   GEOM      110
110   DO 406 I = 1,M2                                                   GEOM      111
      ARG = XII(I) * RBBO(J) * ABO                                      GEOM      112
      IF (ARG.GE.XAT(1) .AND. ARG.LE.XAT(M)) GO TO 79                   GEOM      113
      IF (ICH.EQ.1) MQ = MINO(3,M)                                      GEOM      114
      IF (ICH.GE.1) GO TO 79                                            GEOM      115
```

```
115                IF (ARG.GT.XAT(M)) ARG = XAT(M)                                  GEOM      116
                   IF (ARG .LT.XAT(1)) ARG = XAT(1)                                 GEOM      117
                   CALL HELGX (ARG,AN,XAT,DEFL,M,1,MQ,1,10,1,1)                     GEOM      118
                   IF (ABS(AN(1,1)) .LE. 1.0E-05) AN(1,1) = 0.                      GEOM      119
                   IF (ABS(AN(1,2)) .LE. 1.0E-04) AN(1,2) = 0.                      GEOM      120
120                HR(I+KK*M2) = AN(1,1) + (XII(I)*RBBO(J)*ABO - ARG) * AN(1,2)     GEOM      121
                   GO TO 406                                                        GEOM      122
                79 CALL HELGX (ARG,AN,XAT,DEFL,M,1,MQ,1,10,1,0)                     GEOM      123
                   HR(I+KK*M2)  =  AN(1,1)                                          GEOM      124
               406 CONTINUE                                                         GEOM      125
125                CALL RNRW (MTAP2,HR,NO2)                                         GEOM      126
                   CALL RNRW (MTAP8,HR,NO2)                                         GEOM      127
               404 CONTINUE                                                         GEOM      128
                   REWIND MTAP8                                                     GEOM      129
                   REWIND MTAP9                                                     GEOM      130
130                IF (LC(24)  .EQ. 0 ) GOTO 2                                      GEOM      131
                   DO 44 I=1,NMOD                                                   GEOM      132
                   KOUNT = 9                                                        GEOM      133
                   CALL RNRW (-MTAP9,CHR,NO1)                                       GEOM      134
                   CALL RNRW (-MTAP9,ALPHA,NO1)                                     GEOM      135
135                IF(KOUNT.EQ.9)WRITE (ITAPEW,109)NSURF                            GEOM      136
                45 WRITE (ITAPEW,110)  I                                            GEOM      137
                   WRITE (ITAPEW,111)                                               GEOM      138
                   DO 50 IB=1,NN,M                                                  GEOM      139
                   KOUNT=KOUNT + M + 1                                              GEOM      140
140                IF(KOUNT.LE.45)GO TO 56                                          GEOM      141
                   KOUNT = M + 10                                                   GEOM      142
                   WRITE (ITAPEW,109) NSURF                                         GEOM      143
                   WRITE (ITAPEW,110)  I                                            GEOM      144
                   WRITE (ITAPEW,111)                                               GEOM      145
145                56 NCHORD = (IB-1)/M + 1                                         GEOM      146
                   YT        =  -Y(NCHORD) * ALO * 12.0                            GEOM      147
                   DO 50 JB=1,M                                                     GEOM      148
                   XT        =  (X(JB)*RBBO(NCHORD) + XMW(NCHORD) + 1.0) * ABO *12.0 GEOM      149
                   JC = (NCHORD-1)*M + JB                                           GEOM      150
150                IF(JB-1)51,51,52                                                 GEOM      151
                51 WRITE (ITAPEW,116)  YT, XT, ALPHA(JC), CHR(JC)                   GEOM      152
                   GO TO 50                                                         GEOM      153
                52 WRITE (ITAPEW,112)  XT, ALPHA(JC), CHR(JC)                       GEOM      154
                50 CONTINUE                                                         GEOM      155
155             44 CONTINUE                                                         GEOM      156
                   REWIND MTAP9                                                     GEOM      157
                   KOUNT = 7                                                        GEOM      158
                 2 DO 5  I=1,NMOD                                                   GEOM      159
                   CALL RNRW (-MTAP9,CHR,NO1)                                       GEOM      160
160                CALL RNRW (-MTAP9,ALPHA,NO1)                                     GEOM      161
                   INDX  =  0                                                       GEOM      162
                   DO 4  IB = 1,NN, M                                               GEOM      163
                   NCHORD = (IB-1)/M + 1                                            GEOM      164
                   YT = -Y(NCHORD)*ALO*12.0                                         GEOM      165
165                DO 4  JB=1,M                                                     GEOM      166
                   XT = (X(JB)*RBBO(NCHORD) + XMW(NCHORD) + 1.0)*ABO * 12.0         GEOM      167
                   JC = (NCHORD - 1) * M + JB                                       GEOM      168
                   INDX = INDX + 1                                                  GEOM      169
                   XPL(INDX) = XT                                                   GEOM      170
170                YPL(INDX) = YT                                                   GEOM      171
                   ZPL(INDX) = 0.                                                   GEOM      172
```

```
                  HCP(INDX) = CHR(JC)                                                    GEOM      173
                  SLCP(INDX) = ALPHA(JC)                                                 GEOM      174
                4 CONTINUE                                                               GEOM      175
175           C   PLOT DEFLECTIONS AND SLOPES                                            GEOM      176
                  CALL MOVIS (NSURF,I    ,2,INDX,1,KERN,HCP)                           GEOM      177
                  CALL MOVIS (NSURF,I    ,3,INDX,1,KERN,SLCP)                          GEOM      178
                5 CONTINUE                                                               GEOM      179
                  REWIND MTAP9                                                           GEOM      180
180               IF (LC(24) .EQ. 0) GOTO 1                                              GEOM      181
                  DO 47  I=1,NMOD                                                        GEOM      182
                  CALL RNRW (-MTAP8,HR,NO2)                                              GEOM      183
                  IF(KOUNT.EQ.7)WRITE (ITAPEW,113)NSURF                                  GEOM      184
                  WRITE (ITAPEW,114)  I                                                  GEOM      185
185               DO 53 IK=1,NN2,M2                                                      GEOM      186
                  KOUNT = KOUNT + M2 + 1                                                 GEOM      187
                  IF(KOUNT.LE.45)GO TO 57                                                GEOM      188
                  WRITE (ITAPEW,113) NSURF                                               GEOM      189
                  WRITE (ITAPEW,114)  I                                                  GEOM      190
190               KOUNT = M2 + 8                                                         GEOM      191
               57 NCHORD = (IK-1)/M2 + 1                                                 GEOM      192
                  YT       =  -Y(NCHORD) * ALO * 12.0                                    GEOM      193
                  DO 53 IG=1,M2                                                          GEOM      194
                  XT       =  (XII(IG)*RBBO(NCHORD) + XMW(NCHORD) + 1.0)*ABO*12.0        GEOM      195
195               JC = (NCHORD-1)*M2 + IG                                                GEOM      196
                  IF(IG-1)54,54,55                                                       GEOM      197
               54 WRITE (ITAPEW,117) YT, XT, HR(JC)                                      GEOM      198
                  GO TO 53                                                               GEOM      199
               55 WRITE (ITAPEW,115)     XT, HR(JC)                                      GEOM      200
200            53 CONTINUE                                                              GEOM      201
               47 CONTINUE                                                               GEOM      202
                  REWIND MTAP8                                                           GEOM      203
                1 IF ( NPRD .EQ. 0 )      GO TO 60                                     GEOM      204
                  KK=NTEPY                                                               GEOM      205
205               AKK=KK                                                                 GEOM      206
                  STEPY=1.0/AKK                                                          GEOM      207
                  DO 61 I=1,KK                                                           GEOM      208
                  IF(I.EQ.1)ETC(I) =0.0                                                  GEOM      209
                  IF(I.GT.1)ETC(I)=ETC(I-1)-STEPY                                        GEOM      210
210            61 CONTINUE                                                              GEOM      211
                  CALL WHSA (ABO,ALO,KK,ETC,XMP,PBBO,0,Z1,Z2,Z3,                         GEOM      212
                 1          NLE,NTE,XLE,YLE,XTE,YTE)                                   GEOM      213
              C                                                                          GEOM      214
              C                                                                          GEOM      215
215           C FORMATS                                                                  GEOM      216
              C                                                                          GEOM      217
                100 FORMAT(10I5)                                                         GEOM      218
                102 FORMAT (1H1,4X14HSURFACE NO. = ,I5,5X22HREF. SEMI-CHORD(FT) = ,     GEOM      219
                   1        1PE10.3/5X22HROOT SEMI-CHORD(FT) = ,1PE10.3,5X             GEOM      220
220                2        16HSEMI-SPAN(FT) = ,1PE10.3/5X                             GEOM      221
                   3        24HNO CHORDWISE COLL PTS = ,I5,5X                          GEOM      222
                   4        23HNO SPANWISE COLL PTS = ,I5/5X                           GEOM      223
                   5        23HNO CHORDWISE INT PTS = ,I5,5X                           GEOM      224
                   6        22HNO SPANWISE INT PTS = ,I5//)                            GEOM      225
225             106 FORMAT (1H ,25X27HNON-DIMENSIONAL COORDINATES,/8X                    GEOM      226
                   1        18HCOLLOCATION POINTS,20X18HINTEGRATION POINTS,/7X          GEOM      227
                   2        6HY/L(0),4X6HX/B(0),4X6HB/B(0),8X8HETA/L(0),3X7HXI/B(0),    GEOM      228
                   3        3X6HB/B(0),/13X11H(MID-CHORD),25X11H(MID-CHORD),/)          GEOM      229
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                  107 FORMAT(2(5X,1P3E10.3))                                    GEOM      230
230               108 FORMAT(40X,1P3E10.3)                                      GEOM      231
                  109 FORMAT (1H1,4X34HMODE SHAPES FOR COLLOCATION POINTS, //    GEOM      232
                     1        10X17HSURFACE NUMBER = ,I3)                      GEOM      233
                  110 FORMAT (/10X11HCOORDINATES,13X7HMODE = , I5,/)            GEOM      234
                  111 FORMAT (6X5HY(IN),8X5HX(IN),7X5HALPHA,9X2HR,/)            GEOM      235
235               112 FORMAT (13X,3(3X,1PE10.3))                                GEOM      236
                  113 FORMAT (1H1,4X38HMODE SHAPES FOR GENERALIZED AIR FORCES, //GEOM      237
                     1        10X17HSURFACE NUMBER = ,I3)                      GEOM      238
                  114 FORMAT (/6X5HY(IN),7X5HX(IN),5X7HMODE = ,I3 /)            GEOM      239
                  115 FORMAT (13X,2(3X,1PE10.3))                                GEOM      240
240               116 FORMAT (/4(3X,1PE10.3))                                   GEOM      241
                  117 FORMAT (/3(3X,1PE10.3))                                   GEOM      242
                  118 FORMAT(6E10.3)                                            GEOM      243
                  700 FORMAT(L5)                                                GEOM      244
                C                                                               GEOM      245
245               60 RETURN                                                     GEOM      246
                   END                                                          GEOM      247
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	GEOM	1	245

VARIABLES

		SN	TYPE		RELOCATION							
11	ABO		REAL		COMB	REFS	17	35	37	73	88	91	106
							111	120	148	166	194	211	
						DEFINED	35						
1573	AKK		REAL			REFS	206	DEFINED	205				
2010	ALPHA		REAL	ARRAY		REFS	8	88	91	95	97	102	108
							134	151	153	160	173		
12	ALO		REAL		COMB	REFS	17	36	37	73	88	91	146
							164	192	211	DEFINED	36		
1600	AN		REAL	ARRAY		REFS	3	117	118	119	2*120	122	123
						DEFINED	118	119					
1560	ARG		REAL			REFS	2*112	115	116	117	120	122	
						DEFINED	111	115	116				
55	BBT		REAL		COMC	REFS	18						
50	BR		REAL		COMA	REFS	16	37					
2154	CHR		REAL	ARRAY		REFS	9	88	91	94	96	101	107
							133	151	153	159	172		
1614	DEFL		REAL	ARRAY		REFS	3	117	122	DEFINED	107	108	
170	ETA		REAL	ARRAY	COMD	REFS	19	73	83	85	DEFINED	57	58
1640	ETC		REAL	ARRAY		REFS	4	209	211	DEFINED	208	209	
1541	FI		REAL			REFS	53	DEFINED	52				
1545	FJ		REAL			REFS	61	65	DEFINED	60	64		
1534	FM		REAL			REFS	53	65	DEFINED	46			
1535	FN		REAL			REFS	61	DEFINED	47				
2630	HCP		REAL	ARRAY		REFS	11	176	DEFINED	172			
2320	HR		REAL	ARRAY		REFS	10	125	126	182	197	199	
						DEFINED	120	123					
1540	I		INTEGER			REFS	52	53	2*67	2*68	2*70	2*72	82
							6*83	3*85	2*106	2*107	2*108	111	2*120	123

VARIABLES	SN	TYPE	RELOCATION		
1562		IB	INTEGER		
1553		ICH	INTEGER		
1572		IG	INTEGER		
1571		IK	INTEGER		
1570		INDX	INTEGER		
1550		IPQ	INTEGER		
1526		IQS	INTEGER		
1536		IR	INTEGER		
2		IRR	INTEGER		COMB
1527		IRS	INTEGER		
1542		IS	INTEGER		
0		ISI	INTEGER		COMB
1551		ISQ	INTEGER		
4		ISS	INTEGER		COMB
1520		ITAPER	INTEGER		
0		ITAPES	INTEGER	ARRAY	CTAPES
1521		ITAPEW	INTEGER		
1544		J	INTEGER		
1565		JB	INTEGER		
1567		JC	INTEGER		
1664		JN	INTEGER	*UNDEF	
1555	*	K	INTEGER		
1134		KERN	INTEGER		
1556		KK	INTEGER		
1561		KOUNT	INTEGER		
1516		KSURF	LOGICAL		
0		LC	INTEGER	ARRAY	COMA
5		LIRR	INTEGER		COMB
1552		LP	INTEGER		
1		M	INTEGER		COMB
1557		MQ	INTEGER		
1522		MTAP2	INTEGER		
1523		MTAP8	INTEGER		
1524		MTAP9	INTEGER		
13		M2	INTEGER		COMB
3		N	INTEGER		COMB
1563		NCHORD	INTEGER		

136	143	176	177	184	189	2*208	3*209
DEFINED	51	67	68	69	71	81	93
105	110	131	158	181	207		
REFS	145	163	DEFINED	138	162		
REFS	88	91	113	114			
REFS	194	195	196	DEFINED	193		
REFS	191	DEFINED	185				
REFS	168	169	170	171	172	173	176
177	DEFINED	161	168				
REFS	76	DEFINED	75				
REFS	40	58	DEFINED	39			
REFS	49	50	DEFINED	48			
REFS	17	37	41				
REFS	58	73	75	81	DEFINED	40	
REFS	56	57	77	78	79		
DEFINED	55	76					
REFS	17	37					
REFS	78	79	DEFINED	77			
REFS	17	37	2*39	40	42	55	76
77							
DEFINED	26	I/O REFS	66	67	68	87	
REFS	13	21	26	27	28	29	30
DEFINED	27	I/O REFS	37	80	83	85	135
136	137	142	143	144	151	153	183
184	188	189	197	199			
REFS	60	61	64	65	104	106	111
120	DEFINED	59	63	103			
REFS	148	149	150	166	167		
DEFINED	147	165					
REFS	2*151	2*153	172	173	197	199	
DEFINED	149	167	195				
REFS	5						
DEFINED	100						
REFS	176	177	DEFINED	23			
REFS	107	108	120	123	205	207	211
DEFINED	104	204					
REFS	135	139	140	183	186	187	
DEFINED	132	139	141	157	186	190	
REFS	15	88	90	2*91	DEFINED	87	
REFS	16	33	130	180			
REFS	17	48	73	82	88	91	103
REFS	88	91					
REFS	17	37	45	46	51	88	91
105	107	108	109	112	113	2*115	117
122	138	139	141	145	147	149	162
163	165	167					
REFS	117	122	DEFINED	109	113		
REFS	96	97	125	DEFINED	28		
REFS	126	182	DEFINED	29	I/O REFS	99	128
202							
REFS	94	95	101	102	133	134	159
160	DEFINED	30	I/O REFS	98	129	156	179
REFS	17	63	110	120	123	185	186
190	191	193	195	DEFINED	45		
REFS	17	37	47	59			
REFS	146	2*148	149	164	2*166	167	192
2*194	195	DEFINED	145	163	191		

VARIABLES	SN	TYPE		RELOCATION							
1	NCL	INTEGER		COMC	REFS	18					
1546	NLE	INTEGER			REFS	67	69	73	211	DEFINED	66
10	NMOD	INTEGER		COMB	REFS	17	88	91	93	100	131	158
					181	DEFINED	33				
1532	NN	INTEGER			REFS	138	162	DEFINED	43		
1533	NN2	INTEGER			REFS	185	DEFINED	44			
6	NO1	INTEGER		COMB	REFS	17	43	88	91	94	95	96
					97	101	102	133	134	159	160	
7	NO2	INTEGER		COMB	REFS	17	44	125	126	182		
1554	NPOINT	INTEGER			REFS	88	91					
4	NPRD	INTEGER		COMC	REFS	18	203					
0	NPRES	INTEGER		COMC	REFS	18						
0	NSURF	INTEGER		F.P.	REFS	88	91	135	142	176	177	183
					188	DEFINED	1					
1547	NTE	INTEGER			REFS	68	71	73	211	DEFINED	66	
2	NTEPX	INTEGER		COMC	REFS	18						
3	NTEPY	INTEGER		COMC	REFS	18	204					
31	PBBO	REAL	ARRAY	COMC	REFS	18	211					
1525	PI	REAL			REFS	50	53	57	61	65		
					DEFINED	38						
1537	R	REAL			REFS	50	DEFINED	49				
36	RBBO	REAL	ARRAY	COMD	REFS	19	73	83	88	91	106	111
					120	148	166	194				
1530	RR	REAL			REFS	50	DEFINED	41				
1543	S	REAL			REFS	57	DEFINED	56				
500	SBBO	REAL	ARRAY	COMD	REFS	19	73	78	83	85		
					DEFINED	78						
3450	SLCP	REAL	ARRAY		REFS	12	177	DEFINED	173			
1531	SS	REAL			REFS	57	DEFINED	42				
1574	STEPY	REAL			REFS	209	DEFINED	206				
1517	WILK	LOGICAL			REFS	15	88	91	DEFINED	34	90	
0	X	REAL	ARRAY	COMD	REFS	19	88	91	106	148	166	
					DEFINED	53						
1602	XAT	REAL	ARRAY		REFS	3	2*112	2*115	2*116	117	122	
					DEFINED	106						
74	XI	REAL	ARRAY	COMD	REFS	19	DEFINED	61				
50	XII	REAL	ARRAY	COMD	REFS	19	111	120	194	DEFINED	65	
334	XIMW	REAL	ARRAY	COMD	REFS	19	73	79	83	85		
					DEFINED	79						
1670	XLE	REAL	ARRAY		REFS	6	73	211	DEFINED	67		
5	XMP	REAL	ARRAY	COMC	REFS	18	211					
24	XMW	REAL	ARRAY	COMD	REFS	19	73	83	88	91	148	166
					194							
0	XPL	REAL	ARRAY	MODV	REFS	22	DEFINED	169				
1566	XT	REAL			REFS	151	153	169	197	199		
					DEFINED	148	166	194				
1714	XTE	REAL	ARRAY		REFS	6	73	211	DEFINED	68		
12	Y	REAL	ARRAY	COMD	REFS	19	73	83	88	91	146	164
					192	DEFINED	50					
1740	YLE	REAL	ARRAY		REFS	7	70	73	211	DEFINED	67	70
620	YPL	REAL	ARRAY	MODV	REFS	22	DEFINED	170				
1564	YT	REAL			REFS	151	170	197	DEFINED	146	164	192
1764	YTE	REAL	ARRAY		REFS	7	72	73	211	DEFINED	68	72
1440	ZPL	REAL	ARRAY	MODV	REFS	22	DEFINED	171				
1575	Z1	* REAL			REFS	211						
1576	Z2	* REAL			REFS	211						
1577	Z3	* REAL			REFS	211						

VARIABLES SN TYPE RELOCATION
VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES							
COS	REAL	1	LIBRARY	50	53	57	61	65			
HELGX		11		117	122						
INTP		18		88	91						
MOVIS		7		176	177						
RNRW		3		94	95	96	97	101	102	125	126	133
				134	159	160	182				
WHSA		16		73	211						

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES	
ABS	REAL	1	INTRIN	118	119
MINO	INTEGER	0	INTRIN	109	113

STATEMENT LABELS			DEF LINE	REFERENCES		
715	1		203	180		
536	2		158	130		
0	4		174	162	165	
0	5		178	158		
0	7		97	93		
0	8		70	69		
0	9		72	71		
243	27		86	81	84	
234	28		85	82		
0	42	INACTIVE	100			
0	44		155	131		
0	45	INACTIVE	136			
0	47		201	181		
523	50		154	138	147	152
0	51	INACTIVE	151	2*150		
515	52		153	150		
703	53		200	185	193	198
0	54	INACTIVE	197	2*196		
676	55		199	196		
465	56		145	140		
647	57		191	187		
737	60		245	203		
0	61		210	207		
0	70		50	48		
0	71		54	51		
0	72		57	55		
0	73		61	59		
403	79		122	112	114	
0	82		79	76		
1332	100	FMT	217	66		
1334	102	FMT	218	37		
1367	106	FMT	225	80		
1413	107	FMT	229	83		
1416	108	FMT	230	85		
1421	109	FMT	231	135	142	
1432	110	FMT	233	136	143	
1437	111	FMT	234	137	144	
1444	112	FMT	235	153		
1447	113	FMT	236	183	188	
1460	114	FMT	238	184	189	
1465	115	FMT	239	199		

STATEMENT LABELS			DEF LINE	REFERENCES		
1470	116	FMT	240	151		
1473	117	FMT	241	197		
1476	118	FMT	242	67	68	
0	400		65	63		
0	404		127	100		
0	405		108	105		
411	406		124	103	110	121
1500	700	FMT	243	87		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
43	70	IR	48 50	12B		EXT REFS	
56	71	I	51 54	11B		EXT REFS	
70	72	IS	55 57	11B		EXT REFS	
104	73	J	59 61	12B		EXT REFS	
117	400	J	63 65	12B		EXT REFS	
135		I	67 67	10B		EXT REFS	
151		I	68 68	10B		EXT REFS	
165	8	I	69 70	2B	INSTACK		
173	9	I	71 72	2B	INSTACK		
206	82	IS	76 79	5B	INSTACK		
216	27	I	81 86	30B		EXT REFS	
261	7	I	93 97	15B		EXT REFS	
302	404	K	100 127	123B		EXT REFS	NOT INNER
311	406	J	103 124	105B		EXT REFS	NOT INNER
321	405	I	105 108	6B	INSTACK		
334	406	I	110 124	60B		EXT REFS	
432	44	I	131 155	101B		EXT REFS	NOT INNER
452	50	IB	138 154	57B		EXT REFS	NOT INNER
475	50	JB	147 154	31B		EXT REFS	
537	5	I	158 178	61B		EXT REFS	NOT INNER
547	1	IB	162 174	41B		NOT INNER	
566	4	JB	165 174	15B	OPT		
623	47	I	181 201	70B		EXT REFS	NOT INNER
635	53	IK	185 200	54B		EXT REFS	NOT INNER
657	53	IG	193 200	27B		EXT REFS	
726	61	I	207 210	7B	INSTACK		

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)							
COMA	41	0	LC	(40)	40	BR	(1)		
COMB	12	0	ISI	(1)	1	M	(1)	2	IRR (1)
		3	N	(1)	4	ISS	(1)	5	LIRR (1)
		6	NO1	(1)	7	NO2	(1)	8	NMOD (1)
		9	ABO	(1)	10	ALO	(1)	11	M2 (1)
COMC	46	0	NPRES	(1)	1	NCL	(1)	2	NTEPX (1)
		3	NTEPY	(1)	4	NPRD	(1)	5	XMP (20)
		25	PBBO	(20)	45	BBT	(1)		
COMD	420	0	X	(10)	10	Y	(10)	20	XMW (10)
		30	RBBO	(10)	40	XII	(20)	60	XI (60)
		120	ETA	(100)	220	XIMW	(100)	320	SBBO (100)
CTAPES	50	0	ITAPES	(50)					
MODV	1200	0	XPL	(400)	400	YPL	(400)	800	ZPL (400)

STATISTICS

PROGRAM LENGTH	4273B	2235
CM LABELED COMMON LENGTH	3351B	1769
52000B CM USED		

```
      1              SUBROUTINE WHSA (ABO,ALO,LIRR,Y,XMW,RBBO,IRS,ETA,XIMW,SBBO,        WHSA        2
                    1                 NLE,NTE,XLE,YLE,XTE,YTE)                        WHSA        3
                     DIMENSION XLE(1)            ,XTE(1)                              WHSA        4
                     DIMENSION YLE(1)            ,YTE(1)                              WHSA        5
      5              DIMENSION XIMW(1)           ,XMW(1)                              WHSA        6
                     DIMENSION RBBO(1)                                                WHSA        7
                     DIMENSION SBBO(1)                                                WHSA        8
                     DIMENSION Y(1)                                                   WHSA        9
                     DIMENSION DYLE(20),DXLE(20),DYTE(20),DXTE(20)                    WHSA       10
     10              DIMENSION ETA(1)                                                 WHSA       11
                C    NORMALIZE                                                        WHSA       12
                     DO 301 I=1,NLE                                                   WHSA       13
                     DYLE(I)=YLE(I)/(12.*ALO)                                         WHSA       14
                 301 DXLE(I)=(XLE(I)/(12.*ABO))-1.                                    WHSA       15
     15              DO 302 I=1,NTE                                                   WHSA       16
                     DYTE(I)=YTE(I)/(12.*ALO)                                         WHSA       17
                 302 DXTE(I)=(XTE(I)/(12.*ABO))-1.                                    WHSA       18
                     DO 303 I = 1,LIRR                                                WHSA       19
                     CALL XTEXLE(DXLE,DYLE,DXTE,DYTE,Y,XATYLE,XATYTE,I,NLE,NTE)       WHSA       20
     20              XMW(I) = ((XATYLE + XATYTE)/2.)                                  WHSA       21
                 303 RBBO (I) = ((XATYTE - XATYLE)/2.)                                WHSA       22
                     IF(IRS.LT.1) GO TO 2                                             WHSA       23
                     DO 304 I = 1,IRS                                                 WHSA       24
                     CALL XTEXLE(DXLE,DYLE,DXTE,DYTE,ETA,XATYLE,XATYTE,I,NLE,NTE)     WHSA       25
     25              XIMW (I) = ((XATYLE + XATYTE)/2.)                                WHSA       26
                 304 SBBO (I) = ((XATYTE - XATYLE) /2.)                               WHSA       27
                   2 CONTINUE                                                         WHSA       28
                     RETURN                                                           WHSA       29
                     END                                                              WHSA       30
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	WHSA	1	28

VARIABLES

		SN	TYPE	RELOCATION								
0	ABO		REAL		F.P.	REFS	14	17	DEFINED	1		
0	ALO		REAL		F.P.	REFS	13	16	DEFINED	1		
164	DXLE		REAL	ARRAY		REFS	9	19	24	DEFINED	14	
234	DXTE		REAL	ARRAY		REFS	9	19	24	DEFINED	17	
140	DYLE		REAL	ARRAY		REFS	9	19	24	DEFINED	13	
210	DYTE		REAL	ARRAY		REFS	9	19	24	DEFINED	16	
0	ETA		REAL	ARRAY	F.P.	REFS	10	24	DEFINED	1		
135	I		INTEGER			REFS	2*13	2*14	2*16	2*17	19	20	21
							24	25	26	DEFINED	12	15	18	23
0	IRS		INTEGER		F.P.	REFS	22	23	DEFINED	1		
0	LIRR		INTEGER		F.P.	REFS	18	DEFINED	1			
0	NLE		INTEGER		F.P.	REFS	12	19	24	DEFINED	1	
0	NTE		INTEGER		F.P.	REFS	15	19	24	DEFINED	1	
0	RBBO		REAL	ARRAY	F.P.	REFS	6	DEFINED	1	21		
0	SBBO		REAL	ARRAY	F.P.	REFS	7	DEFINED	1	26		
136	XATYLE		REAL			REFS	19	20	21	24	25	26	
137	XATYTE		REAL			REFS	19	20	21	24	25	26	

VARIABLES	SN	TYPE	RELOCATION						
0	XIMW	REAL	ARRAY	F.P.	REFS	5	DEFINED	1	25
0	XLE	REAL	ARRAY	F.P.	REFS	3	14	DEFINED	1
0	XMW	REAL	ARRAY	F.P.	REFS	5	DEFINED	1	20
0	XTE	REAL	ARRAY	F.P.	REFS	3	17	DEFINED	1
0	Y	REAL	ARRAY	F.P.	REFS	8	19	DEFINED	1
0	YLE	REAL	ARRAY	F.P.	REFS	4	13	DEFINED	1
0	YTE	REAL	ARRAY	F.P.	REFS	4	16	DEFINED	1

EXTERNALS	TYPE	ARGS	REFERENCES	
XTEXLE		10	19	24

STATEMENT LABELS		DEF LINE	REFERENCES
100	2	27	22
0	301	14	12
0	302	17	15
0	303	21	18
0	304	26	23

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
17	301	I	12 14	6B	INSTACK	
36	302	I	15 17	6B	INSTACK	
46	303	I	18 21	14B		EXT REFS
64	304	I	23 26	14B		EXT REFS

STATISTICS

PROGRAM LENGTH	275B	189

52000B CM USED

```
      SUBROUTINE XTEXLE(XLE,YLE,XTE,YTE,Y,XATYLE,XATYTE,I,NLE,NTE)
      DIMENSION XLE(1)              ,XTE(1)
      DIMENSION Y(1)                ,YLE(1)              ,YTE(1)
      AY = ABS(Y(I))
      DO 304  I1= 2,NLE
      AYLE = ABS(YLE(I1))
      IF (AYLE-AY)  304,305,305
  304 CONTINUE
C      APPROXIMATE LOCATION ON LEADING EDGE FOUND
  305 DO 306 I2 = 2,NTE
      AYTE = ABS (YTE(I2))
      IF (AYTE - AY) 306,307,307
  306 CONTINUE
C      CHECK TO SEE IF Y  COINCIDES WITH ANY OF END-POINTS
  307 IF (AY - ABS(YLE(I1-1))) 308,309,308
  308 IF (AY - AYLE)  314,311,314
  310 IF (AY - ABS(YTE(I2-1))) 312,313,312
  312 IF (AY - AYTE) 316,315,316
  309 XATYLE = XLE(I1-1)
      GO TO 310
  311 XATYLE = XLE(I1)
      GO TO 310
  313 XATYTE = XTE(I2-1)
      GO TO 317
  315 XATYTE = XTE(I2)
      GO TO 317
C     INTERPOLATE FOR X ON TRAILING & LEADING EDGES
  314 SLOLE = (XLE(I1) - XLE(I1-1))/(YLE(I1) - YLE(I1-1))
      XATYLE = XLE(I1-1) + SLOLE*(Y(I) - YLE(I1-1))
      GO TO 310
  316 SLOTE =  (XTE(I2) - XTE(I2-1))/(YTE(I2) - YTE(I2-1))
      XATYTE = XTE(I2-1) + SLOTE*(Y(I) - YTE(I2-1))
  317 RETURN
      END
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	XTEXLE	1	33

VARIABLES

		SN	TYPE	RELOCATION						
113	AY		REAL		REFS	7	12	15	16	17	18
					DEFINED	4					
115	AYLE		REAL		REFS	7	16	DEFINED	6		
117	AYTE		REAL		REFS	12	18	DEFINED	11		
0	I		INTEGER	F.P.	REFS	4	29	32	DEFINED	1	
114	I1		INTEGER		REFS	6	15	19	21	4*28	2*29
					DEFINED	5					
116	I2		INTEGER		REFS	11	17	23	25	4*31	2*32
					DEFINED	10					
0	NLE		INTEGER	F.P.	REFS	5	DEFINED	1			
0	NTE		INTEGER	F.P.	REFS	10	DEFINED	1			
120	SLOLE		REAL		REFS	29	DEFINED	28			

VARIABLES	SN	TYPE	RELOCATION								
121	SLOTE	REAL			REFS	32	DEFINED	31			
0	XATYLE	REAL		F P	DEFINED	1	19	21	29		
0	XATYTE	REAL		F P	DEFINED	1	23	25	32		
0	XLE	REAL	ARRAY	F P	REFS	2	19	21	2*28	29	
					DEFINED	1					
0	XTE	REAL	ARRAY	F P	REFS	2	23	25	2*31	32	
					DEFINED	1					
0	Y	REAL	ARRAY	F P	REFS	3	4	29	32	DEFINED	1
0	YLE	REAL	ARRAY	F P	REFS	3	6	15	2*28	29	
					DEFINED	1					
0	YTE	REAL	ARRAY	F P	REFS	3	11	17	2*31	32	
					DEFINED	1					

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES				
ABS	REAL	1	INTRIN	4	6	11	15	17

STATEMENT LABELS			DEF LINE	REFERENCES		
0	304		8	5	7	
22	305		10	2*7		
0	306		13	10	12	
32	307		15	2*12		
0	308	INACTIVE	16	2*15		
50	309		19	15		
41	310		17	20	22	30
53	311		21	16		
0	312	INACTIVE	18	2*17		
56	313		23	17		
66	314		28	2*16		
62	315		25	18		
100	316		31	2*18		
112	317		33	24	26	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
13	304	I1	5 8	7B	INSTACK	EXITS
23	306	I2	10 13	7B	INSTACK	EXITS

STATISTICS

PROGRAM LENGTH	127B	87
520008 CM USED		

```
      GO TO (5,5,5,5,8),M                                                INVK      59
    8 F1(5) =-SA*XSQ*XSQ*XSQ*(X(I)*X(I)+2.0/3.0)/5.0                     INVK      60
60  5 DO 9 KK =1,M                                                       INVK      61
      F2R(KK) =0.0                                                       INVK      62
    9 F2I(KK) =0.0                                                       INVK      63
      IF (ZK) 10,10,11                                                   INVK      64
   11 NO =ZK*RBBO(K)*(1.0+X(I))*2.0/PI                                   INVK      65
65    NIN =2 + (M+NO)/2                                                  INVK      66
      ANIN =2*NIN + 1                                                    INVK      67
      C22 =C2/ANIN                                                       INVK      68
      DO 12 J=1,NIN                                                      INVK      69
      AJ =J                                                              INVK      70
70    XX =(X(I)-1.0-(X(I)+1.0)*COS((2.0*AJ-1.0)*PI/ANIN))/2.0            INVK      71
      XOZ =RBBO(K)*(X(I)-XX)                                             INVK      72
      COF =COS(ZK*XOZ) - 1.0                                             INVK      73
      SIF =-SIN(ZK*XOZ)                                                  INVK      74
      CAF =SQRT((X(I)-XX)*(1.0-XX))*C22                                  INVK      75
75    F2R(1) = F2R(1) + CAF*COF                                          INVK      76
      F2I(1) = F2I(1) + CAF*SIF                                          INVK      77
      CAF =CAF*(1.0+XX)                                                  INVK      78
      F2R(2) = F2R(2) + CAF*COF                                          INVK      79
      F2I(2) = F2I(2) + CAF*SIF                                          INVK      80
80    GO TO (12,12,14,14,14),M                                           INVK      81
   14 DO 15 JJ =3,M                                                      INVK      82
      CAF =CAF*XX                                                        INVK      83
      F2R(JJ) = F2R(JJ) + CAF*COF                                        INVK      84
   15 F2I(JJ) = F2I(JJ) + CAF*SIF                                        INVK      85
85 12 CONTINUE                                                           INVK      86
   10 DO 16 L1 =1,M                                                      INVK      87
      DO 16 M1 =1,LIRR                                                   INVK      88
      F3R(L1,M1) = 0.0                                                   INVK      89
   16 F3I(L1,M1) = 0.0                                                   INVK      90
90    DO 17 IS =1,ISS                                                    INVK      91
      YOW = ALOB*(Y(K)-ETA(IS))                                          INVK      92
      YOW2=YOW*YOW                                                       INVK      93
      IF (ZK) 18,18,19                                                   INVK      94
   18 CONTINUE                                                           INVK      95
95    GO TO 20                                                           INVK      96
   19 CALL CONA(RE1,RI2,RI3)                                             INVK      97
   20 C3 = C1*(1.0-ETA(IS)*ETA(IS))                                      INVK      98
      DO 17 IN =1,N                                                      INVK      99
      XOW = RBBO(K)*X(I)-SBBO(IS)*XI(IN)+XMW(K)-XIMW(IS)                 INVK     100
100   XOW2=XOW*XOW                                                       INVK     101
      R1=SQRT(XOW*XOW+YOW*YOW)                                           INVK     102
      IF(R1.GE.R)GO TO 100                                               INVK     103
      IBX=I                                                              INVK     104
      IBY=K                                                              INVK     105
105   IBXI=IN                                                            INVK     106
      IBET=IS                                                            INVK     107
      R=R1                                                               INVK     108
  100 CONTINUE                                                           INVK     109
      IF (ZK) 21,21,22                                                   INVK     110
110  21 CONTINUE                                                         INVK     111
      XYB = SQRT(XOW2+BETA2*YOW2)                                        INVK     112
      AXKR=-1.0/YOW2*(1.0+XOW/XYB)                                       INVK     113
      AXKI = 0.0                                                         INVK     114
      GO TO 23                                                           INVK     115
```

```
      SUBROUTINE INVK(IND )                                              INVK        2
C                                                                        INVK        3
C     KERNEL FUNCTION ANALYSIS - A MATRIX INVERSION                      INVK        4
      DIMENSION     F1(5),        F2R(5),        F2I(5)                  INVK        5
      DIMENSION  F3R(5,5),      F3I(5,5)                                 INVK        6
      DIMENSION  AIC(100,25)                                             INVK        7
      DIMENSION ITAPES(50)                                               INVK        8
      COMMON /COMA/ LC(40) , BR                                          INVK        9
      COMMON /COMB  / ISI,MA,IRR,N,ISS,LIRA,NO1,NO2,NMOD,ABO,ALO,M2      INVK       10
      COMMON/COMD/X(10),Y(10),XMW(10),RBBO(10),XII(20),XI(60),ETA(100),  INVK       11
     1XIMW(100),SBBO(100)                                                INVK       12
      COMMON/COMF/MCC,NLRR,NNP,Z1A                                       INVK       13
      COMMON/COMH/KQR,KGH,KKF,NHV                                        INVK       14
      COMMON/COMI/ZK,ZKX,YOW,YOWX                                        INVK       15
      COMMON/COMJ/ZM,ZMX,XOW,XOWX,BETA,BETAX,RE4,RE4X,RM4,RM4X           INVK       16
      COMMON / CTAPES / ITAPES                                           INVK       17
      COMPLEX               AIC                                          INVK       18
C                                                                        INVK       19
C                                                                        INVK       20
      ITAPEW = ITAPES(6)                                                 INVK       21
      MTAP10 = ITAPES(30)                                                INVK       22
C                                                                        INVK       23
C                                                                        INVK       24
      NMOD  =  LC(2)                                                     INVK       25
      R=1.0                                                              INVK       26
      IBX=1                                                              INVK       27
      IBY=1                                                              INVK       28
      IBXI=1                                                             INVK       29
      IBET=1                                                             INVK       30
      NN = NO1                                                           INVK       31
      IF (LC(7).EQ.-1.OR.LC(7).EQ.2)  ZK = 0.                            INVK       32
      ALOB = ALO/ABO                                                     INVK       33
      ALOB2 = ALOB*ALOB                                                  INVK       34
      PI = 3.14159265                                                    INVK       35
      BETAX = 0.0                                                        INVK       36
      BETA2 = BETA*BETA                                                  INVK       37
      FN = N                                                             INVK       38
      SS = ISS                                                           INVK       39
      MAM = MA                                                           INVK       40
      JIRR = LIRA                                                        INVK       41
      M = MCC                                                            INVK       42
      LIRR = NLRR                                                        INVK       43
      C1 =2.0*PI*ALOB2/((2.0*FN+1.0)*SS)                                 INVK       44
      C2 =4.0*PI                                                         INVK       45
      LINE = 0                                                           INVK       46
      DO 4 K=1,JIRR                                                      INVK       47
      DO 4 I =1,MAM                                                      INVK       48
      XSQ = SQRT(1.0-X(I)*X(I))                                          INVK       49
      TANG = X(I)/XSQ                                                    INVK       50
      ANGLE = ATAN(TANG)                                                 INVK       51
      SA =2.0                                                            INVK       52
      F1(1) = SA*(XSQ+ANGLE+0.5*PI)                                      INVK       53
      F1(2) = SA*(X(I)*XSQ+ANGLE+0.5 *PI)/2.0                            INVK       54
      GO TO (5,5,6,6,6),M                                                INVK       55
    6 F1(3) =-SA*XSQ*XSQ*XSQ/3.0                                         INVK       56
      GO TO (5,5,5,7,7),M                                                INVK       57
    7 F1(4) = SA*(X(I)*XSQ*(-XSQ*XSQ+0.5)+0.5*ANGLE+0.25*PI)/4.0         INVK       58
```

```
VARIABLES      SN  TYPE            RELOCATION
                                                        DEFINED      22
  104  ITAPER     INTEGER                                DEFINED      11    I/O REFS      18
    0  ITAPES     INTEGER     ARRAY     CTAPES            REFS        5         6        11        12
  105  ITAPEW     INTEGER                                DEFINED      12    I/O REFS      19
  112  J          INTEGER                                  REFS     2*30       2*31   DEFINED      29
    0  KEL        INTEGER                 F.P.           DEFINED      1        20
    0  LC         INTEGER     ARRAY     COMA              REFS        8        19
    0  NGP        INTEGER     ARRAY     F.P.              REFS        4        23        28   DEFINED       1        23
  111  NGPI       INTEGER                                  REFS       29    DEFINED      28
    0  NGPTOT     INTEGER                 F.P.           REFS       15    DEFINED       1        15
  106  NLIN       INTEGER                                  REFS       21        22   DEFINED      16
    0  NLINES     INTEGER                 F.P.           REFS       16        17   DEFINED       1        17
    0  XGP        REAL        ARRAY     F.P.              REFS        4        30   DEFINED       1        30
    0  XTERM1     REAL        ARRAY     JUNK              REFS        7        24   DEFINED      24
   24  XTERM2     REAL        ARRAY     JUNK              REFS        7        25   DEFINED      25
    0  YGP        REAL        ARRAY     F.P.              REFS        4        31   DEFINED       1        31
   50  YTERM1     REAL        ARRAY     JUNK              REFS        7        26   DEFINED      26
   74  YTERM2     REAL        ARRAY     JUNK              REFS        7        27   DEFINED      27
       VARIABLES USED AS FILE NAMES, SEE ABOVE

STATEMENT LABELS                    DEF LINE   REFERENCES
   74  10        FMT                    37         19
    0  40                               32         21
  101  60        FMT                    38         18
    0  80                               31         29

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
   23  40        I           21 32        36B                NOT INNER
   52  80        J           29 31         4B      INSTACK

COMMON BLOCKS    LENGTH     MEMBERS - BIAS NAME(LENGTH)
       CTAPES        50              0 ITAPES (50)
       JUNK          80              0 XTERM1 (20)              20 XTERM2 (20)              40 YTERM1 (20)
                                     60 YTERM2 (20)
       COMA          41              0 LC     (40)              40 BR     (1)

STATISTICS
  PROGRAM LENGTH                 125B       85
  CM LABELED COMMON LENGTH       253B      171
          52000B CM USED
```

```
      SUBROUTINE FORK(NLINES,KEL,NGPTOT,NGP,XGP,YGP,DIST)                FORK      2
C                                                                        FORK      3
C                                                                        FORK      4
      DIMENSION     XGP(12,20) ,    YGP(12,20) ,       NGP(12)         FORK      5
      DIMENSION ITAPES(50)                                               FORK      6
      COMMON / CTAPES /ITAPES                                            FORK      7
      COMMON/JUNK/XTERM1(20),XTERM2(20),YTERM1(20),YTERM2(20)            FORK      8
      COMMON/ COMA/ LC(40) , BR                                          FORK      9
C                                                                        FORK     10
C                                                                        FORK     11
      ITAPER  =  ITAPES(5)                                               FORK     12
      ITAPEW = ITAPES(6)                                                 FORK     13
C                                                                        FORK     14
C                                                                        FORK     15
      NGPTOT=2*NGPTOT                                                    FORK     16
      NLIN=NLINES                                                        FORK     17
      NLINES=2*NLINES                                                    FORK     18
      READ (ITAPER,60)  DIST                                             FORK     19
      IF ( LC(23) .EQ. 0 )    WRITE (ITAPEW,10) DIST                     FORK     20
      KEL=1                                                              FORK     21
      DO 40 I=1,NLIN                                                     FORK     22
      IJ=I+NLIN                                                          FORK     23
      NGP(IJ)=NGP(I)                                                     FORK     24
      XTERM1(IJ)=XTERM1(I)+DIST/12.0                                     FORK     25
      XTERM2(IJ)=XTERM2(I)+DIST/12.0                                     FORK     26
      YTERM1(IJ)=YTERM1(I)                                               FORK     27
      YTERM2(IJ)=YTERM2(I)                                               FORK     28
      NGPI=NGP(I)                                                        FORK     29
      DO 80 J=1,NGPI                                                     FORK     30
      XGP(J,IJ)=XGP(J,I)+DIST/12.0                                       FORK     31
   80 YGP(J,IJ)=YGP(J,I)                                                 FORK     32
   40 CONTINUE                                                           FORK     33
C                                                                        FORK     34
C                                                                        FORK     35
C FORMATS                                                                FORK     36
C                                                                        FORK     37
   10 FORMAT (//5X19HDISTANCE FOR AXIS =,E10.3 //)                       FORK     38
   60 FORMAT(E10.2)                                                      FORK     39
C                                                                        FORK     40
      RETURN                                                             FORK     41
      END                                                                FORK     42
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	FORK	1	40

VARIABLES	SN	TYPE	RELOCATION								
50	BR	REAL	COMA	REFS	8						
0	DIST	REAL	F.P.	REFS	19	24	25	30	DEFINED	1	18
107	I	INTEGER		REFS	22	23	24	25	26	27	28
					30	31	DEFINED	21			
110	IJ	INTEGER		REFS	23	24	25	26	27	30	31

```
STATEMENT LABELS                DEF LINE    REFERENCES
 1455  731      FMT                 288         126
 1470  732      FMT                 291         130
 1474  735      FMT                 292          88        122        182
 1500  736      FMT                 293          89        123        183
 1504  737      FMT                 294         267
 1073  1000                      267         234
    0  1998                       43          37
 1075  9999                      297         266

LOOPS  LABEL    INDEX     FROM-TO    LENGTH    PROPERTIES
   32  1998     I          37 43        15B       OPT
   60  6        K          48 49         3B     INSTACK
   65  3        I          50 67        63B              EXT REFS  NOT INNER
  137  300      J          63 66         6B     INSTACK
  165  77       K          72 76        12B       OPT
  201  4        NN         80 84        30B              NOT INNER
  202  4        I          81 84        25B              NOT INNER
  216  4        KL         83 84         5B     INSTACK
  270  40       J         107 108        5B     INSTACK
  310  11       I         112 131       46B              EXT REFS  NOT INNER
  342  14       J         127 130       12B              EXT REFS
  361  150      MZ        134 218      327B              EXT REFS  NOT INNER
  403  26       K         142 153       36B              NOT INNER
  432  26       J         150 153        3B     INSTACK
  444  17       K         156 171       46B              NOT INNER
  501  17       J         166 171        6B     INSTACK
  520  22       J         175 185       33B              EXT REFS  NOT INNER
  523  22       L         177 185       26B              EXT REFS
  555  25       J         187 217      130B              EXT REFS  NOT INNER
  574  23       I         191 193        4B     INSTACK
  605  87       I         195 216       76B              EXT REFS
  712  571      MZ        221 264      157B              EXT REFS    EXITS   NOT INNER
  731  120      I         225 261      125B              EXT REFS    EXITS   NOT INNER
  743  130      J         228 233        6B     INSTACK
  760  112      J         236 260       74B              EXT REFS

COMMON BLOCKS   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       COMX        200              0 X       (100)          100 Y       (100)
       COMA         41              0 LC      (40)            40 BR      (1)
       MODD       8041              0 QZA     (8040)        8040 NC      (1)
       JUNK         80              0 XTERM1  (20)            20 XTERM2  (20)          40 YTERM1 (20)
                                   60 YTERM2  (20)
       CTAPES       50              0 ITAPES  (50)

STATISTICS
  PROGRAM LENGTH              14773B    6651
  CM LABELED COMMON LENGTH    20334B    8412
          52000B CM USED
```

VARIABLES SN TYPE RELOCATION
VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES				
FORK		7	69				
HELGX		11	207	213	244	251	
RNRW		3	135	222	223	262	263

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES						
ABS	REAL	1	INTRIN	208	209	214	245	246	252	253
MINO	INTEGER	0	INTRIN	194	203	235	240			

STATEMENT LABELS			DEF LINE	REFERENCES				
553	1		186	174				
374	2		139	136				
0	3		67	50				
0	4		84	80	81	83		
244	5		97	85				
0	6		49	48				
360	7		134	97				
254	8		103	100				
356	9		132	109				
1365	10	FMT	272	102				
0	11		131	112				
622	12		202	199				
335	13		125	118	120			
0	14		130	127				
0	17		171	156	166			
461	21		163	159				
540	22		185	175	177	179		
0	23		193	191				
512	24		172	154				
0	25		217	187				
0	26		153	142	150			
441	30		155	141				
0	40		108	107				
666	46		213	202	204			
42C	55		149	145				
1401	61	FMT	275	47				
1403	62	FMT	276	51				
1406	63	FMT	277	58	99			
1410	72	FMT	278	90				
0	77		76	72				
1024	79		251	239	241			
1420	82	FMT	280	185				
700	87		216	195	197	211		
1423	100	FMT	281	101				
1043	101		258	249	254			
1037	102		255	248	259			
1051	112		260	236	237	257	258	
0	120		261	225				
750	130		233	228	229			
0	150		218	134				
0	300		66	63				
1427	400	FMT	282	87	121	181		
1431	450	FMT	283	138	184			
0	571		264	221				
1442	730	FMT	285	125				

VARIABLES SN TYPE RELOCATION

					142	155	175	187	DEFINED	47		
1560	NLN	INTEGER			REFS	137	138	178	179	DEFINED	96	137
					178	180						
0	NMOD	INTEGER	*UNUSED	F.P.	DEFINED	1						
1534	NMODES	INTEGER			REFS	90	134	173	221	DEFINED	34	
1556	NN	INTEGER			REFS	84	DEFINED	80				
0	NO1	INTEGER		F.P.	REFS	37	107	222	223	236	262	263
					DEFINED	1						
0	NPOINT	INTEGER		F.P.	REFS	140	DEFINED	1	172	173		
1600	NPT	INTEGER			REFS	198	200	201	210	215	228	
					DEFINED	186	198					
0	NSURF	INTEGER		F.P.	REFS	88	101	122	140	182		
					DEFINED	1						
1577	NZLIN	INTEGER			REFS	156	165	170	DEFINED	155		
0	P	REAL	ARRAY	F.P.	REFS	6	38	DEFINED	1			
0	Q	REAL	ARRAY	F.P.	REFS	6	39	DEFINED	1			
14217	QZ	REAL	ARRAY		REFS	11	135	149	152	163	165	168
					170							
0	QZA	REAL	ARRAY	MODD	REFS	19						
0	RBBO	REAL	ARRAY	F.P.	REFS	7	38	DEFINED	1			
0	WILK	LOGICAL		F.P.	REFS	22	30	89	97	110	111	123
					140	183	222	223	248	254		
					DEFINED	1						
0	X	REAL	ARRAY	COMX	REFS	10	17	238	247	258		
					DEFINED	38						
12505	XAT	REAL	ARRAY		REFS	8	2*202	2*205	2*206	207	213	2*239
					2*242	2*243	244	251	DEFINED	192	231	
14565	XC	REAL	ARRAY		REFS	15	258	DEFINED	108			
1635	XGP	REAL	ARRAY		REFS	5	69	2*74	128	2*147	2*161	
					DEFINED	65						
0	XMW	REAL	ARRAY	F.P.	REFS	7	38	DEFINED	1			
1572	XT	REAL			REFS	130	DEFINED	128				
0	XTERM1	REAL	ARRAY	JUNK	REFS	20	52	59	65	113	188	189
					DEFINED	51	52					
24	XTERM2	REAL	ARRAY	JUNK	REFS	20	53	59	115	188		
					DEFINED	51	53					
1566	XT1	REAL			REFS	125	DEFINED	113				
1570	XT2	REAL			REFS	125	DEFINED	115				
14553	XX	REAL	*UNDEF		REFS	12						
13705	XY	REAL	ARRAY		REFS	9	231	DEFINED	201			
1561	X1	REAL			REFS	102	103	2*108	DEFINED	99	103	
1563	X2	REAL			REFS	102	104	108	DEFINED	99	104	
144	Y	REAL	ARRAY	COMX	REFS	10	17	84	108	196	210	226
					237	2*258	DEFINED	39				
2215	YGP	REAL	ARRAY		REFS	5	64	65	69	2*74	2*84	129
					2*147	2*161	192	DEFINED	58	64	84	
1573	YT	REAL			REFS	130	DEFINED	129				
50	YTERM1	REAL	ARRAY	JUNK	REFS	20	54	60	65	114	188	189
					197	DEFINED	51	54				
74	YTERM2	REAL	ARRAY	JUNK	REFS	20	55	60	116	188	197	
					DEFINED	51	55					
1567	YT1	REAL			REFS	125	DEFINED	114				
1571	YT2	REAL			REFS	125	DEFINED	116				
13375	YY	REAL	ARRAY		REFS	9	229	DEFINED	200			
1562	Y1	REAL			REFS	102	105	2*108	258	DEFINED	99	105
1564	Y2	REAL			REFS	102	106	108	258	DEFINED	99	106
1605	ZZ	REAL			REFS	229	237	DEFINED	226			

VARIABLES	SN	TYPE		RELOCATION							
					I/O REFS	265					
1526	ITAPER	INTEGER			DEFINED	25	I/O REFS	47	51	58	99
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	16	21	25	26	27	28	29
					30							
1527	ITAPEW	INTEGER			DEFINED	26	I/O REFS	87	88	89	90	101
					102	121	122	123	125	126	130	138
					181	182	183	184	185	267		
1546	J	INTEGER			REFS	58	2*64	2*65	2*108	128	129	130
					152	168	2*170	176	2*185	4*188	2*189	190
					192	193	2*197	229	231	232	237	238
					247	255	256	4*258	DEFINED	58	63	107
					127	150	166	175	187	228	236	
1575	JB	INTEGER			REFS	143	147	149	151	152	157	161
					163	164	165	167	168	169	170	172
					173	DEFINED	139	140	143	147	151	157
					161	164	167	169				
1544	K	INTEGER			REFS	49	73	4*74	144	145	146	4*147
					149	152	158	159	160	4*161	163	2*165
					168	2*170	DEFINED	48	72	142	156	
1551	KEL	INTEGER			REFS	69	DEFINED	68				
1535	KK	INTEGER			REFS	38	40	41	42	DEFINED	36	40
					42							
1557	KL	INTEGER			REFS	3*84	DEFINED	83				
0	KSURF	LOGICAL		F.P.	REFS	22	30	DEFINED	1			
1533	L	INTEGER			REFS	2*38	39	41	2*185	DEFINED	33	41
					177							
0	LC	INTEGER	ARRAY	COMA	REFS	18	34	85	100	109	136	174
1565	LINES	INTEGER			REFS	119	120	DEFINED	110	111	119	124
0	LIRR	INTEGER		F.P.	REFS	80	84	195	225	DEFINED	1	
0	LP	INTEGER	*UNUSED	F.P.	DEFINED	1						
0	M	INTEGER		F.P.	REFS	41	42	84	196	210	226	
					DEFINED	1						
1604	MQ	* INTEGER			DEFINED	224						
1531	MTAP49	INTEGER			REFS	135	DEFINED	28	I/O REFS	133	219	
1530	MTAP8	INTEGER			REFS	222	223	DEFINED	27			
1574	MZ	INTEGER			REFS	2*138	173	184	199	210	215	224
					232	DEFINED	134	221				
17550	NC	INTEGER		MODD	REFS	19	135					
1541	NELAXS	INTEGER			REFS	49	69	141	DEFINED	47		
1606	NGB	INTEGER			REFS	230	231	232	234	235	239	240
					2*242	244	251	DEFINED	227	230		
1611	NGP	INTEGER	ARRAY		REFS	5	56	57	69	73	82	110
					111	117	144	146	158	160	176	190
					DEFINED	51						
1545	NGPI	INTEGER			REFS	58	63	83	119	124	126	127
					150	166	177	191	194	202	203	2*205
					207	213	DEFINED	57	82	117	144	158
					176	190						
1555	NGPL	INTEGER			REFS	2*74	207	213	DEFINED	73	194	203
1554	NGPO	INTEGER			REFS	74	173	DEFINED	71	74		
1537	NGPTOT	INTEGER			REFS	56	69	71	90	DEFINED	46	56
1576	NGPX	INTEGER			REFS	2*147	2*161	DEFINED	146	160		
1607	NGZ	INTEGER			REFS	244	251	DEFINED	235	240		
1542	NICH	INTEGER			REFS	240	241	DEFINED	47			
1543	NISP	INTEGER			REFS	203	204	DEFINED	47			
1553	NLIN	INTEGER			REFS	72	DEFINED	70				
1540	NLINES	INTEGER			REFS	48	50	69	70	81	90	112

```
                1          6X,4HX(1),9X,4HY(1),9X,4HX(2),9X,4HY(2)/                INTP     287
                2          4(2X,E12.5)/)                                           INTP     288
              731 FORMAT ( 3X,23HNO. OF POINTS ON LINE =,I5/                        INTP     289
                1          3X,37HCOORDINATES OF POINTS (IN INCHES) ARE/            INTP     290
  290           2          3X,5HINDEX,9X,1HX,15X,1HY/)                             INTP     291
              732 FORMAT(4X,I3,3X,E14.7,3X,E14.7)                                   INTP     292
              735 FORMAT (5X17HSURFACE NUMBER = ,I3 //)                             INTP     293
              736 FORMAT (5X21HCONTROL SURFACE MODES, /)                            INTP     294
              737 FORMAT (79H LESS THAN 2 PTS ON A CHORD AVAILABLE FOR INTERPOLATION INTP     295
  295         1 - INTERPOLATION SKIPPED)                                            INTP     296
            C                                                                       INTP     297
             9999 RETURN                                                            INTP     298
                                                                                    INTP     299
                  END                                                               INTP     300
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	INTP	1	297

VARIABLES	SN	TYPE		RELOCATION								
0	ABO	REAL		F.P.	REFS	3*38	DEFINED	1				
2645	AHR	REAL	ARRAY		REFS	8	232	DEFINED	210	215		
0	ALPHA	REAL	ARRAY	F.P.	REFS	13	223	263	DEFINED	1	256	
0	ALO	REAL		F.P.	REFS	39	DEFINED	1				
14215	AN	REAL	ARRAY		REFS	10	207	208	209	2*210	213	214
						215	244	245	246	2*247	251	252	253
						255	256	DEFINED	208	209	214	245	246
						247	252	253				
1603	ARG	REAL			REFS	2*197	200	201	2*202	205	206	207
						210	213	DEFINED	196	205	206	
1610	AX	REAL			REFS	2*239	242	243	244	247	251	
					DEFINED	238	242	243				
50	BR	REAL		COMA	REFS	18						
0	CHR	REAL	ARRAY	F.P.	REFS	14	222	262	DEFINED	1	255	
1602	DECR	REAL			REFS	201	DEFINED	189				
12531	DEF	REAL	ARRAY		REFS	8	165	170	185	193		
					DEFINED	149	152	163	165	168	170	
13351	DEFL	REAL	ARRAY		REFS	9	207	213	244	251		
					DEFINED	193	232					
2621	DEL	REAL	ARRAY		REFS	7	65	DEFINED	61			
1601	DELL	REAL			REFS	189	201	DEFINED	188			
1547	DELX	REAL			REFS	61	DEFINED	59				
1550	DELY	REAL			REFS	61	DEFINED	60				
1552	DIST	REAL			REFS	69	165	170				
1536	I	INTEGER			REFS	38	39	5*51	2*52	2*53	2*54	2*55
						56	57	58	2*59	2*60	61	2*64	5*65
						82	3*84	113	114	115	116	117	118
						125	128	129	2*192	2*193	196	210	226
					DEFINED	37	50	81	112	191	195	225
0	ICH	INTEGER	*UNUSED	F.P.	DEFINED	1						
2575	IDODS	INTEGER	ARRAY		REFS	6	DEFINED	49				
1532	ITAP	INTEGER			REFS	262	263	DEFINED	29	30		

```
                IF (YY(J) .NE. ZZ)  GO TO 130                                   INTP      230
230             NGB  =  NGB + 1                                                 INTP      231
                XAT(NGB)  =  XY(J)                                              INTP      232
                DEFL(NGB,1) = AHR(J,MZ)                                         INTP      233
              130 CONTINUE                                                      INTP      234
                IF (NGB .LT. 2) GO TO 1000                                      INTP      235
235             NGZ = MINO (4,NGB)                                              INTP      236
                DO 112  J = 1,NO1                                               INTP      237
                IF (Y(J) .NE. ZZ)  GO TO 112                                    INTP      238
                   AX  =  X(J)                                                  INTP      239
                IF (AX.GE.XAT(1).AND. AX .LE. XAT(NGB)) GOTO 79                 INTP      240
240             IF (NICH .EQ. 1) NGZ = MINO (3,NGB)                             INTP      241
                IF (NICH .GE. 1) GO TO 79                                       INTP      242
                IF (AX.GT.XAT(NGB))                    AX = XAT(NGB)            INTP      243
                IF (AX .LT. XAT(1))                    AX = XAT(1)              INTP      244
                CALL HELGX (AX,AN,XAT,DEFL,NGB,1,NGZ,1,20.0,1)                  INTP      245
245             IF (ABS(AN(1,1)).LE. 1.0E-05) AN(1,1) = 0.                      INTP      246
                IF (ABS(AN(1,2)).LE. 1.0E-04) AN(1,2) = 0.                      INTP      247
                AN(1,1)    = AN(1,1) + (X(J) - AX) * AN(1,2)                    INTP      248
                IF (.NOT.WILK) GOTO 102                                         INTP      249
                GO TO 101                                                       INTP      250
250         C                                                                   INTP      251
               79 CALL HELGX (AX,AN,XAT,DEFL,NGB,1,NGZ,1,20.0,1)                INTP      252
                IF (ABS(AN(1,1)) .LE. 1.0E-05)   AN(1,1) = 0.0                  INTP      253
                IF (ABS(AN(1,2)) .LE. 1.0E-04)   AN(1,2) = 0.0                  INTP      254
                IF (WILK)   GO TO 101                                           INTP      255
255           102 CHR(J)  =  AN(1,1)                                            INTP      256
                ALPHA(J)  =  AN(1,2)                                            INTP      257
                GO TO 112                                                       INTP      258
              101 IF ((X(J).LT.XC(J)).OR.(Y(J).LT.Y1).OR.(Y(J).GT.Y2)) GOTO 112 INTP      259
                GO TO 102                                                       INTP      260
260           112 CONTINUE                                                      INTP      261
              120 CONTINUE                                                      INTP      262
                CALL RNRW (ITAP,CHR,NO1)                                        INTP      263
                CALL RNRW (ITAP,ALPHA,NO1)                                      INTP      264
              571 CONTINUE                                                      INTP      265
265             REWIND ITAP                                                     INTP      266
                GO TO 9999                                                      INTP      267
             1000 WRITE (ITAPEW,737)                                            INTP      268
            C                                                                   INTP      269
            C                                                                   INTP      270
270         C FORMATS                                                           INTP      271
            C                                                                   INTP      272
               10 FORMAT (//5X,42HCOORDINATES (IN INCHES) FOR HINGE LINE ARE//  INTP      273
                 1          5X,4HX1 =,E10.3/5X,4HX2 =,E10.3/5X,4HY1 =,E10.3/  INTP      274
                 2          5X,4HY2 =,E10.3//)                                 INTP      275
275             61 FORMAT(4I5)                                                  INTP      276
                62 FORMAT(I5,4E10.2)                                            INTP      277
                63 FORMAT(8E10.2)                                               INTP      278
                72 FORMAT (2X19HMODAL DATA GIVEN AT, I4,1X9HPOINTS ON,I3,1X     INTP      279
                  1        9HLINES FOR, I3,1X5HMODES)                         INTP      280
280             82 FORMAT (10X,I3,5X,I3,5X,E18.7)                               INTP      281
               100 FORMAT(1H1,5X,17HSURFACE NUMBER = ,I3/)                      INTP      282
               400 FORMAT (1H1)                                                 INTP      283
               450 FORMAT (//10X27HINPUT MODAL DATA FOR MODE =, I3 //           INTP      284
                  1        9X4HLINE,4X5HPOINT,8X10HDEFLECTION, /)              INTP      285
285            730 FORMAT (//3X,24HTERMINAL POINTS OF LINE ,I5,2X,13HIN INCHES ARE/ INTP     286
```

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                  24     NPOINT  =  JB                                                    INTP      173
                     IF  (MZ .NE. NMODES)   NPOINT  =  JB - NGPO                        INTP      174
                     IF ( LC(23) .EQ. 0 )    GO TO 1                                    INTP      175
175                  DO 22  J = 1,NLINES                                                INTP      176
                        NGPI  =  NGP(J)                                                 INTP      177
                     DO 22  L = 1,NGPI                                                  INTP      178
                     NLN  =  NLN  +  1                                                  INTP      179
                     IF (NLN.LT.50)  GO TO 22                                           INTP      180
180                  NLN  =  12                                                         INTP      181
                     WRITE (ITAPEW,400)                                                 INTP      182
                     WRITE (ITAPEW,735) NSURF                                           INTP      183
                     IF (WILK)  WRITE (ITAPEW,736)                                      INTP      184
                     WRITE (ITAPEW,450)  MZ                                             INTP      185
185                  22 WRITE (ITAPEW,82)  J  ,  L  ,  DEF(L,J)                         INTP      186
                      1 NPT       =  0                                                  INTP      187
                     DO  25  J = 1,NLINES                                               INTP      188
                     DELL      =  (XTERM2(J) - XTERM1(J)) / (YTERM2(J) - YTERM1(J))     INTP      189
                     DECR      =  XTERM1(J) - YTERM1(J) * DELL                          INTP      190
190                      NGPI  =  NGP(J)                                                INTP      191
                     DO  23  I = 1,NGPI                                                 INTP      192
                     XAT(I)  =  YGP(I,J)                                                INTP      193
                     23 DEFL(I,1)  =  DEF(I,J)                                          INTP      194
                     NGPL = MINO(4,NGPI)                                                INTP      195
195                  DO  87  I = 1,LIRR                                                 INTP      196
                     ARG  =  Y (1 + (I-1)*M)                                            INTP      197
                     IF (ARG .LT. YTERM1(J) .OR. ARG .GT. YTERM2(J))  GO TO 87          INTP      198
                        NPT  =  NPT  +  1                                               INTP      199
                     IF  (MZ .GT. 1)  GO TO 12                                          INTP      200
200                  YY (NPT)  =  ARG                                                   INTP      201
                     XY(NPT)  =  DECR + ARG * DELL                                      INTP      202
                     12 IF (ARG .GE. XAT(1)    .AND. ARG .LE.  XAT(NGPI))GOTO 46        INTP      203
                     IF (NISP .EQ. 1) NGPL = MINO (3,NGPI)                              INTP      204
                     IF (NISP .GE. 1) GO TO 46                                          INTP      205
205                  IF (ARG .GT.  XAT(NGPI))                    ARG = XAT(NGPI)        INTP      206
                     IF (ARG .LT.   XAT(1))                       ARG = XAT(1)          INTP      207
                     CALL HELGX (ARG,AN,XAT,DEFL,NGPI,1,NGPL,1,20,0,1)                  INTP      208
                     IF (ABS(AN(1,1)) .LE. 1.0E-07) AN(1,1) = 0.                        INTP      209
                     IF (ABS(AN(1,2)).LE.1.0E-04) AN(1,2) = 0.                          INTP      210
210                  AHR(NPT,MZ) = AN(1,1) + (Y(1+(I-1)*M)- ARG) * AN(1,2)              INTP      211
                     GO TO 87                                                           INTP      212
               C                                                                        INTP      213
                  46 CALL HELGX (ARG,AN,XAT,DEFL,NGPI,1,NGPL,1,20,0,0)                  INTP      214
                     IF (ABS(AN(1,1)).LE. 1.0E-07)   AN(1,1) = 0.0                      INTP      215
215                  AHR(NPT,MZ)  =  AN(1,1)                                            INTP      216
                  87 CONTINUE                                                           INTP      217
                  25    CONTINUE                                                        INTP      218
                 150 CONTINUE                                                           INTP      219
                     REWIND MTAP49                                                      INTP      220
220            C     CHORDWISE INTERPOLATION FOR DOWNWASH TERMS ---------------------- INTP      221
                     DO 571  MZ = 1,NMODES                                              INTP      222
                     IF (WILK)  CALL RNRW(-MTAP8,CHR,NO1)                               INTP      223
                     IF (WILK)  CALL RNRW(-MTAP8,ALPHA,NO1)                             INTP      224
                     MQ = MZ                                                            INTP      225
225                  DO 120 I = 1,LIRR                                                  INTP      226
                     ZZ = Y (1 + (I-1)*M)                                               INTP      227
                     NGB = 0                                                            INTP      228
                     DO 130 J = 1,NPT                                                   INTP      229
```

```
115               XT2  =  XTERM2(I) * 12.0                                  INTP      116
                  YT2  =  YTERM2(I) * 12.0                                  INTP      117
                  NGPI  =  NGP(I)                                           INTP      118
                  IF ( I .EQ. 1 )    GO TO 13                               INTP      119
                  LINES  =  LINES + 9 + NGPI                                INTP      120
120               IF ( LINES . LT. 55 )   GO TO 13                          INTP      121
                  WRITE (ITAPEW,400)                                        INTP      122
                  WRITE (ITAPEW,735) NSURF                                  INTP      123
                  IF ( WILK )   WRITE (ITAPEW,736)                          INTP      124
                  LINES  =  9 + NGPI                                        INTP      125
125              13 WRITE (ITAPEW,730)  I , XT1 , YT1 , XT2 , YT2           INTP      126
                  WRITE (ITAPEW,731)  NGPI                                  INTP      127
                  DO 14  J = 1,NGPI                                         INTP      128
                  XT  =  XGP(J,I) * 12.0                                    INTP      129
                  YT  =  YGP(J,I) * 12.0                                    INTP      130
130              14 WRITE (ITAPEW,732)  J , XT , YT                         INTP      131
                 11 CONTINUE                                                INTP      132
                  9 CONTINUE                                                INTP      133
                  REWIND MTAP49                                             INTP      134
                  7 DO 150 MZ = 1,NMODES                                    INTP      135
135               CALL RNRW (-MTAP49,QZ,NC)                                 INTP      136
                  IF ( LC(23) .EQ. 0 )    GO TO 2                           INTP      137
                  NLN = NLN + 4                                             INTP      138
                  IF (MZ.EQ.1.OR.NLN.LT.48) WRITE (ITAPEW,450) MZ           INTP      139
                  2 JB       =  0                                           INTP      140
140               IF (NSURF.GT.1.OR.WILK)   JB = NPOINT                     INTP      141
                  IF (NELAXS.NE.0)  GO TO 30                                INTP      142
                  DO 26  K = 1,NLINES                                       INTP      143
                  JB  =  JB + 1                                             INTP      144
                  NGPI  =  NGP(K)                                           INTP      145
145               IF  (K.EQ.1)   GO TO 55                                   INTP      146
                  NGPX  =  NGP (K-1)                                        INTP      147
                  IF (XGP(1,K) .EQ. XGP(NGPX,K-1) .AND. YGP(1,K) .EQ. YGP(NGPX,K-1)) INTP      148
                 1        JB  =  JB  -  1                                   INTP      149
                55 DEF (1,K) = QZ (JB)                                      INTP      150
150               DO 26  J = 2,NGPI                                         INTP      151
                    JB  = JB + 1                                            INTP      152
                  DEF (J,K) = QZ (JB)                                       INTP      153
                26 CONTINUE                                                 INTP      154
                  GO  TO  24                                                INTP      155
155              30 NZLIN  =  NLINES / 2                                    INTP      156
                  DO 17  K = 1,NZLIN                                        INTP      157
                    JB = JB + 1                                             INTP      158
                  NGPI  =  NGP (K)                                          INTP      159
                  IF (K.EQ.1)   GO TO 21                                    INTP      160
160               NGPX  =  NGP (K-1)                                        INTP      161
                  IF (XGP(1,K) .EQ. XGP(NGPX,K-1) .AND. YGP(1,K) .EQ. YGP(NGPX,K-1)) INTP      162
                 1        JB  =  JB  -  2                                   INTP      163
                21 DEF (1,K) = QZ (JB)                                      INTP      164
                  JB  =  JB  +  1                                           INTP      165
165               DEF (1,K+NZLIN) = DEF (1,K) + QZ(JB) * DIST               INTP      166
                  DO 17  J = 2,NGPI                                         INTP      167
                     JB  =  JB  +  1                                        INTP      168
                  DEF (J,K)  =  QZ(JB)                                      INTP      169
                     JB  =  JB  +  1                                        INTP      170
170               DEF (J,K+NZLIN) = DEF (J,K) + QZ (JB) * DIST              INTP      171
                17 CONTINUE                                                 INTP      172
```

```
                READ (ITAPER,63) (YGP(J,I),J=1,NGPI)                                  INTP       59
                DELX = XTERM2(I)-XTERM1(I)                                            INTP       60
60              DELY = YTERM2(I)-YTERM1(I)                                            INTP       61
                     DEL(I)  =  DELX / DELY                                           INTP       62
          C           POINTS  ON  LINE  ************************************          INTP       63
                DO 300 J=1,NGPI                                                       INTP       64
                  YGP(J,I)  =  YGP(J,I) / 12.0                                        INTP       65
65              XGP(J,I)  =  XTERM1(I)  +  (YGP(J,I) - YTERM1(I)) * DEL(I)            INTP       66
              300 CONTINUE                                                            INTP       67
                3 CONTINUE                                                            INTP       68
                KEL=0                                                                 INTP       69
                IF(NELAXS.EQ.1)CALL FORK(NLINES,KEL,NGPTOT,NGP,XGP,YGP,DIST)          INTP       70
70              NLIN=NLINES-1                                                         INTP       71
                NGPO=NGPTOT                                                           INTP       72
                DO 77 K=1,NLIN                                                        INTP       73
                NGPL=NGP(K)                                                           INTP       74
                IF(XGP(NGPL,K).EQ.XGP(1,K+1).AND.YGP(NGPL,K).EQ.YGP(1,K+1))           INTP       75
75             1NGPO=NGPO-1                                                           INTP       76
               77 CONTINUE                                                            INTP       77
                                                                                      INTP       78
                                                                                      INTP       79
          C                                                                           INTP       80
80              DO 4 NN=1,LIRR                                                        INTP       81
                DO 4 I=1,NLINES                                                       INTP       82
                NGPI=NGP(I)                                                           INTP       83
                DO 4 KL=1,NGPI                                                        INTP       84
              4 IF(YGP(KL,I).EQ.Y((LIRR+1-NN)*M)) YGP(KL,I)=YGP(KL,I)-.001            INTP       85
85              IF (LC(23) .EQ. 0) GOTO 5                                             INTP       86
                                                                                      INTP       87
                WRITE (ITAPEW,400)                                                    INTP       88
                WRITE (ITAPEW,735)NSURF                                               INTP       89
                IF(WILK)WRITE (ITAPEW,736)                                            INTP       90
90              WRITE (ITAPEW,72)NGPTOT,NLINES,NMODES                                 INTP       91
                                                                                      INTP       92
          C     INTERPOLATE AND EXTRAPOLATE TO GET INTERMEDIATE DISPLACEMENTS         INTP       93
          C     ON GIVEN LINE                                                         INTP       94
                                                                                      INTP       95
95        C     MODAL LOOP                                                            INTP       96
                NLN = 8                                                               INTP       97
              5 IF(.NOT.WILK) GOTO 7                                                  INTP       98
          C     READ END POINTS OF HINGE LINE                                         INTP       99
                READ (ITAPER,63) X1,Y1,X2,Y2                                          INTP      100
100             IF ( LC(23) .EQ. 0 )    GO TO 8                                       INTP      101
                WRITE (ITAPEW,100) NSURF                                              INTP      102
                WRITE (ITAPEW,10) X1,X2,Y1,Y2                                         INTP      103
              8 X1        =  X1 / 12.                                                 INTP      104
                X2        =  X2 / 12.                                                 INTP      105
105             Y1        =  Y1 / 12.                                                 INTP      106
                Y2        =  Y2 / 12.                                                 INTP      107
                DO 40 J=1,NO1                                                         INTP      108
             40 XC(J) = X1 + (X2-X1)*(Y(J)-Y1)/(Y2-Y1)                                INTP      109
                IF ( LC(23) .EQ. 0 )    GO TO 9                                       INTP      110
110             IF ( .NOT. WILK )       LINES = 13 + NGP(1)                           INTP      111
                IF ( WILK )             LINES = 27 + NGP(1)                           INTP      112
                DO 11  I = 1,NLINES                                                   INTP      113
                XT1  =  XTERM1(I) * 12.0                                              INTP      114
                YT1  =  YTERM1(I) * 12.0                                              INTP      115
```

```
      SUBROUTINE INTP (P,Q,M,LIRR,NO1,NMOD,ABO,LP,NSURF,RBBO,
     1                 XMW,ALO,WILK,ALPHA,CHR,ICH,KSURF,NPOINT)
C
C
      DIMENSION       NGP(20) ,   XGP(12,20) ,   YGP(12,20)
      DIMENSION     IDODS(20) ,       Q(10) ,       P(10)
      DIMENSION      RBBO(10) ,     XMW(10) ,     DEL(20)
      DIMENSION    AHR(200,20) ,     XAT(20) ,  DEF(20,20)
      DIMENSION    DEFL(20,1) ,     YY(200) ,     XY(200)
      DIMENSION       AN(1,2) ,      X(100) ,      Y(100)
      DIMENSION       QZ(220)
      DIMENSION        XX(10)
      DIMENSION    ALPHA(100)
      DIMENSION      CHR(100)
      DIMENSION XC(100)
      DIMENSION ITAPES(50)
      COMMON/COMX/X,Y
      COMMON /COMA/ LC(40) , BR
      COMMON /MODD/ QZA(8040), NC
      COMMON/JUNK/XTERM1(20),XTERM2(20),YTERM1(20),YTERM2(20)
      COMMON / CTAPES / ITAPES
      LOGICAL   WILK,  KSURF
C
C
      ITAPER = ITAPES(5)
      ITAPEW = ITAPES(6)
      MTAP8  =  ITAPES(28)
      MTAP49 =  ITAPES(49)
      ITAP   =  ITAPES(29)
      IF (.NOT.WILK .AND. KSURF) ITAP = ITAPES(28)
C
C
      L=1
      NMODES = LC(2)
C
      KK=0
      DO 1998 I=1,NO1
      X(I)=P(KK+1)*ABO*RBBO(L)+XMW(L)*ABO+ABO
      Y(I)=-Q(L)*ALO
      KK       =  KK + 1
      IF(KK.EQ.M) L=L+1
      IF(KK.EQ.M) KK=0
 1998 CONTINUE


      NGPTOT=0
      READ (ITAPER,61) NLINES,NELAXS,NICH,NISP
      DO 6 K = 1,NLINES
    6 IDODS(K) = 1 + NELAXS
      DO 3 I=1,NLINES
      READ (ITAPER,62) NGP(I),XTERM1(I),YTERM1(I),XTERM2(I),YTERM2(I)
      XTERM1(I)=XTERM1(I)/12.0
      XTERM2(I)=XTERM2(I)/12.0
      YTERM1(I)=YTERM1(I)/12.0
      YTERM2(I)=YTERM2(I)/12.0
      NGPTOT=NGPTOT+NGP(I)
      NGPI=NGP(I)
```

```
115            22 CALL CONB(RE5,RE6,RI5,RI6)                                        INVK     116
                  REK = RE1 - RE5 + RE6                                             INVK     117
                  RIK = RI2 + RI3 - RI5 + RI6                                       INVK     118
                  XOK = ZK*XOW                                                      INVK     119
                  SO = SIN(XOK)                                                     INVK     120
120               CO = COS(XOK)                                                     INVK     121
                  AXKR = ZK*ZK*(REK*CO+RIK*SO)                                      INVK     122
                  AXKI = ZK*ZK*(RIK*CO-REK*SO)                                      INVK     123
               23 CETR = C3*AXKR                                                    INVK     124
                  CETI = C3*AXKI                                                    INVK     125
125               IF(KKF.EQ.0)GO TO 25                                              INVK     126
                  IF(LINE.EQ.0)WRITE (ITAPEW,3)ISI,ZM,ZK                            INVK     127
                  LINE = LINE + 1                                                   INVK     128
                  IF(LINE.GT.50)LINE=0                                              INVK     129
                  WRITE (ITAPEW,26) Y(K),X(I),ETA(IS),XI(IN),YOW,XOW,AXKR,AXKI      INVK     130
130            25 DO 27 M1 =1,LIRR                                                  INVK     131
                  NU = 2*(M1-1) + IND                                               INVK     132
                  IF (NU) 28,77,28                                                  INVK     133
               77 ETANU = 1.0                                                       INVK     134
                  GO TO 29                                                          INVK     135
135            28 IF (ETA(IS)) 31,30,31                                             INVK     136
               30 ETANU = 0.0                                                       INVK     137
                  GO TO 29                                                          INVK     138
               31 ETANU = ETA(IS)**NU                                               INVK     139
               29 CXF = 1.0 - XI(IN)                                                INVK     140
140               F3R(1,M1) = F3R(1,M1) + CETR*ETANU*CXF                            INVK     141
                  F3I(1,M1) = F3I(1,M1) + CETI*ETANU*CXF                            INVK     142
                  CXF = CXF*(1.0+XI(IN))                                            INVK     143
                  F3R(2,M1) = F3R(2,M1) + CETR*ETANU*CXF                            INVK     144
                  F3I(2,M1) = F3I(2,M1) + CETI*ETANU*CXF                            INVK     145
145               GO TO (27,27,32,32,32),M                                          INVK     146
               32 DO 33 II =3,M                                                     INVK     147
                  CXF = CXF*XI(IN)                                                  INVK     148
                  F3R(II,M1) = F3R(II,M1) + CETR*ETANU*CXF                          INVK     149
               33 F3I(II,M1) = F3I(II,M1) + CETI*ETANU*CXF                          INVK     150
150            27 CONTINUE                                                          INVK     151
               17 CONTINUE                                                          INVK     152
                  IK = MAM*(K-1)+I                                                  INVK     153
                  DO 34 IJ =1,NNP                                                   INVK     154
                  M1 = IJ-LIRR*((IJ-1)/LIRR)                                        INVK     155
155               M2 = (IJ-1)/LIRR + 1                                              INVK     156
                  NU = 2*(M1-1) + IND                                               INVK     157
                  IF (NU) 36,35,36                                                  INVK     158
               35 YNU = 1.0                                                         INVK     159
                  GO TO 37                                                          INVK     160
160            36 YNU = Y(K)**NU                                                    INVK     161
               37          G       = F3R(M2,M1) + (F1(M2) + F2R(M2)) * YNU * SS      INVK     162
                           H       = F3I(M2,M1) + F2I(M2) * YNU * SS                 INVK     163
               34 AIC(IK,IJ) = CMPLX (G,H)                                          INVK     164
                4 CONTINUE                                                          INVK     165
165               REWIND MTAP10                                                     INVK     166
                  WRITE(MTAP10) AIC                                                 INVK     167
                  REWIND MTAP10                                                     INVK     168
                  IF (R.GE.0.05)                GO TO 102                           INVK     169
                  WRITE (ITAPEW,101)R,IBX,IBY,IBXI,IBET                             INVK     170
170            102 CONTINUE                                                         INVK     171
                  LITE = 0                                                          INVK     172
```

```
                      IF (KGH) 38,39,38                                          INVK      173
                   38 DO 46 I=1,NN                                               INVK      174
                      IF(LITE EQ.0)WRITE (ITAPEW,40)ISI,ZM,ZK                    INVK      175
  175                 LNS=NNP/4                                                  INVK      176
                      LDNS=NNP-4*LNS                                             INVK      177
                      IF(LDNS.NE.0)LNS=LNS+1                                     INVK      178
                      LNS=LNS+2                                                  INVK      179
                      LITE=LITE+LNS                                              INVK      180
  180                 IF(LITE.GT.50)LITE=0                                       INVK      181
                      WRITE (ITAPEW,44)I                                         INVK      182
                      WRITE(ITAPEW,41) (AIC(I,J),J=1,NNP)                        INVK      183
                   46 CONTINUE                                                   INVK      184
                C                                                                INVK      185
  185           C                                                                INVK      186
                C FORMATS                                                        INVK      187
                C                                                                INVK      188
                     3 FORMAT (1H1,6X14HSURFACE NO. = ,I3,9X10HMACH NO. = ,E10.3,10X  INVK      189
                     1         20HREDUCED FREQUENCY = ,E10.3, //6X6HY(BAR),9X6HX(BAR),  INVK      190
  190                2         8X8HETA(BAR),8X6HX(BAR),9X4HY(O),11X4HX(O),9X    INVK      191
                     3         10HKERF(REAL),5X10HKERF(IMAG), //)               INVK      192
                    26 FORMAT (8(3X,1PE12.5))                                    INVK      193
                    40 FORMAT (1H1,5X14HSURFACE NO. = ,I3,5X11HMACH NO. = ,E10.3,5X44HRED  INVK      194
                      1UCED FREQUENCY BASED ON ROOT SEMI-CHORD =,E10.3,//5X77HL MATRIX--R  INVK      195
  195                 2ELATES DOWNWASH TO PRESSURE POLYNOMIAL COEFFICIENTS BY (W)=(L)*(A)  INVK      196
                      3,//1X6HROW NO.,25X36HCOMPLEX ELEMENTS BY ROWS (REAL,IMAG),//)  INVK      197
                    41 FORMAT(/( T8,1PE10.3,T20,1PE10.3, T6,2H (,T18,2H, , T30,2H) ,  INVK      198
                      1          T34,1PE10.3,T46,1PE10.3,T32,2H (,T44,2H, , T56,2H) ,  INVK      199
                      2          T60,1PE10.3,T72,1PE10.3,T58,2H (,T70,2H, , T82,2H) ,  INVK      200
  200                 3          T86,1PE10.3,T98,1PE10.3,T84,2H (,T96,2H, ,T108,2H) ))  INVK      201
                    44 FORMAT(I5)                                                INVK      202
                   101 FORMAT (1H1,4X51HMINIMUM DISTANCE BETWEEN COLL. PTS. AND INT. PTS.  INVK      203
                      1 =,G10.3 //5X33HINDICES FOR POINTS ARE AS FOLLOWS, //5X18HCOLLOCAT  INVK      204
                      2ION POINTS,//7X1HX,10X1HY,//5X,I5,5X,I5//5X18HINTEGRATION POINTS,  INVK      205
  205                 3//6X2HXI,8X3HETA,//5X,I5,5X,I5 //)                        INVK      206
                C                                                                INVK      207
                    39 RETURN                                                    INVK      208
                       END                                                       INVK      209
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

3	INVK	1	207

VARIABLES

11	ABO	REAL	COMB	REFS	9	32				
1327	AIC	COMPLEX ARRAY		REFS	6	17	166	182	DEFINED	163
1152	AJ	REAL		REFS	70	DEFINED	69			
12	ALO	REAL	COMB	REFS	9	32				
1121	ALOB	REAL		REFS	2*33	91	DEFINED	32		
1122	ALOB2	REAL		REFS	43	DEFINED	33			
1142	ANGLE	REAL		REFS	52	53	57	DEFINED	50	
1147	ANIN	REAL		REFS	67	70	DEFINED	66		
1176	AXKI	REAL		REFS	124	129	DEFINED	113	122	

VARIABLES	SN	TYPE		RELOCATION							
1175	AXKR	REAL			REFS	123	129	DEFINED	112	121	
4	BETA	REAL		COMJ	REFS	15	2*36				
5	BETAX	REAL		COMJ	REFS	15	DEFINED	35			
1124	BETA2	REAL			REFS	111	DEFINED	36			
50	BR	REAL		COMA	REFS	8					
1157	CAF	REAL			REFS	75	76	77	78	79	82	83
						84	DEFINED	74	77	82		
1211	CETI	REAL			REFS	141	144	149	DEFINED	124		
1210	CETR	REAL			REFS	140	143	148	DEFINED	123		
1207	CO	REAL			REFS	121	122	DEFINED	120			
1155	COF	REAL			REFS	75	78	83	DEFINED	72		
1214	CXF	REAL			REFS	140	141	142	143	144	147	148
						149	DEFINED	139	142	147		
1133	C1	REAL			REFS	97	DEFINED	43				
1134	C2	REAL			REFS	67	DEFINED	44				
1150	C22	REAL			REFS	74	DEFINED	67				
1170	C3	REAL			REFS	123	124	DEFINED	97			
170	ETA	REAL	ARRAY	COMD	REFS	10	91	2*97	129	135	138	
1213	ETANU	REAL			REFS	140	141	143	144	148	149	
					DEFINED	133	136	138				
1125	FN	REAL			REFS	43	DEFINED	37				
1226	F1	REAL	ARRAY		REFS	4	161	DEFINED	52	53	55	57
					59							
1240	F2I	REAL	ARRAY		REFS	4	76	79	84	162		
					DEFINED	62	76	79	84			
1233	F2R	REAL	ARRAY		REFS	4	75	78	83	161		
					DEFINED	61	75	78	83			
1276	F3I	REAL	ARRAY		REFS	5	141	144	149	162		
					DEFINED	89	141	144	149			
1245	F3R	REAL	ARRAY		REFS	5	140	143	148	161		
					DEFINED	88	140	143	148			
1221	G	REAL			REFS	163	DEFINED	161				
1222	H	REAL			REFS	163	DEFINED	162				
1137	I	INTEGER			REFS	2*48	49	53	57	2*59	64	2*70
						71	74	99	103	129	152	181	182
					DEFINED	47	173					
1117	IBET	INTEGER			REFS	169	DEFINED	29	106			
1114	IBX	INTEGER			REFS	169	DEFINED	26	103			
1116	IBXI	INTEGER			REFS	169	DEFINED	28	105			
1115	IBY	INTEGER			REFS	169	DEFINED	27	104			
1215	II	INTEGER			REFS	2*148	2*149	DEFINED	146			
1217	IJ	INTEGER			REFS	2*154	155	163	DEFINED	153		
1216	IK	INTEGER			REFS	163	DEFINED	152				
1171	IN	INTEGER			REFS	99	105	129	139	142	147	
					DEFINED	98						
0	IND	INTEGER		F.P.	REFS	131	156	DEFINED	1			
2	IRR	INTEGER		COMB	REFS	9						
1163	IS	INTEGER			REFS	91	2*97	2*99	106	129	135	138
					DEFINED	90						
0	ISI	INTEGER		COMB	REFS	9	126	174				
4	ISS	INTEGER		COMB	REFS	9	38	90				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	7	16	20	21			
1111	ITAPEW	INTEGER			DEFINED	20	I/O REFS	126	129	169	174	181
					182							
1151	J	INTEGER			REFS	69	182	DEFINED	68	182		
1130	JIRR	INTEGER			REFS	46	DEFINED	40				
1160	JJ	INTEGER			REFS	2*83	2*84	DEFINED	81			

VARIABLES	SN	TYPE		RELOCATION								
1136	K	INTEGER			REFS	64	71	91	2*99	104	129	152
					160	DEFINED	46					
1	KGH	INTEGER		COMH	REFS	13	172					
1144	KK	INTEGER			REFS	61	62	DEFINED	60			
2	KKF	INTEGER		COMH	REFS	13	125					
0	KQR	INTEGER		COMH	REFS	13						
0	LC	INTEGER	ARRAY	COMA	REFS	8	24	2*31				
1225	LDNS	INTEGER			REFS	177	DEFINED	176				
1135	LINE	INTEGER			REFS	126	127	128	DEFINED	45	127	128
5	LIRA	INTEGER		COMB	REFS	9	40					
1132	LIRR	INTEGER			REFS	87	130	2*154	155	DEFINED	42	
1223	LITE	INTEGER			REFS	174	179	180	DEFINED	171	179	180
1224	LNS	INTEGER			REFS	176	177	178	179	DEFINED	175	177
					178							
1161	L1	INTEGER			REFS	88	89	DEFINED	86			
1131	M	INTEGER			REFS	54	56	58	60	65	80	81
					86	145	146	DEFINED	41			
1	MA	INTEGER		COMB	REFS	9	39					
1127	MAM	INTEGER			REFS	47	152	DEFINED	39			
0	MCC	INTEGER		COMF	REFS	12	41					
1112	MTAP10	INTEGER			DEFINED	21	I/O REFS	165	166	167		
1162	M1	INTEGER			REFS	88	89	131	2*140	2*141	2*143	2*144
					2*148	2*149	156	161	162	DEFINED	87	130
					154							
13	M2	INTEGER		COMB	REFS	9	3*161	2*162	DEFINED	155		
3	N	INTEGER		COMB	REFS	9	37	98				
3	NHV	INTEGER		COMH	REFS	13						
1146	NIN	INTEGER			REFS	66	68	DEFINED	65			
1	NLRR	INTEGER		COMF	REFS	12	42					
10	NMOD	INTEGER		COMB	REFS	9	DEFINED	24				
1120	NN	INTEGER			REFS	173	DEFINED	30				
2	NNP	INTEGER		COMF	REFS	12	153	175	176	182		
1145	NO	INTEGER			REFS	65	DEFINED	64				
6	NO1	INTEGER		COMB	REFS	9	30					
7	NO2	INTEGER		COMB	REFS	9						
1212	NU	INTEGER			REFS	132	138	157	160	DEFINED	131	156
1123	PI	REAL			REFS	43	44	52	53	57	64	70
					DEFINED	34						
1113	R	REAL			REFS	102	168	169	DEFINED	25	107	
36	RBBO	REAL	ARRAY	COMD	REFS	10	64	71	99			
1203	REK	REAL			REFS	121	122	DEFINED	116			
1165	RE1	REAL			REFS	96	116					
6	RE4	REAL		COMJ	REFS	15						
7	RE4X	REAL		COMJ	REFS	15						
1177	RE5	REAL			REFS	115	116					
1200	RE6	REAL			REFS	115	116					
1204	RIK	REAL			REFS	121	122	DEFINED	117			
1166	RI2	REAL			REFS	96	117					
1167	RI3	REAL			REFS	96	117					
1201	RI5	REAL			REFS	115	117					
1202	RI6	REAL			REFS	115	117					
10	RM4	REAL		COMJ	REFS	15						
11	RM4X	REAL		COMJ	REFS	15						
1173	R1	REAL			REFS	102	107	DEFINED	101			
1143	SA	REAL			REFS	52	53	55	57	59		
					DEFINED	51						
500	SBBO	REAL	ARRAY	COMD	REFS	10	99					

VARIABLES	SN	TYPE	RELOCATION								
1156	SIF	REAL			REFS	76	79	84	DEFINED	73	
1206	SO	REAL			REFS	121	122	DEFINED	119		
1126	SS	REAL			REFS	43	161	162	DEFINED	38	
1141	TANG	REAL			REFS	50	DEFINED	49			
0	X	REAL	ARRAY	COMD	REFS	10	2*48	49	53	57	2*59	64
					2*70	71	74	99	129			
74	XI	REAL	ARRAY	COMD	REFS	10	99	129	139	142	147	
50	XII	REAL	ARRAY	COMD	REFS	10						
334	XIMW	REAL	ARRAY	COMD	REFS	10	99					
24	XMW	REAL	ARRAY	COMD	REFS	10	99					
1205	XOK	REAL			REFS	119	120	DEFINED	118			
2	XOW	REAL		COMJ	REFS	15	2*100	2*101	112	118	129	
					DEFINED	99						
3	XOWX	REAL		COMJ	REFS	15						
1172	XOW2	REAL			REFS	111	DEFINED	100				
1154	XOZ	REAL			REFS	72	73	DEFINED	71			
1140	XSQ	REAL			REFS	49	52	53	3*55	3*57	3*59	
					DEFINED	48						
1153	XX	REAL			REFS	71	2*74	77	82	DEFINED	70	
1174	XYB	REAL			REFS	112	DEFINED	111				
12	Y	REAL	ARRAY	COMD	REFS	10	91	129	160			
1220	YNU	REAL			REFS	161	162	DEFINED	158	160		
2	YOW	REAL		COMI	REFS	14	2*92	2*101	129	DEFINED	91	
3	YOWX	REAL		COMI	REFS	14						
1164	YOW2	REAL			REFS	111	112	DEFINED	92			
0	ZK	REAL		COMI	REFS	14	63	64	72	73	93	109
					118	2*121	2*122	126	174	DEFINED	31	
1	ZKX	REAL		COMI	REFS	14						
0	ZM	REAL		COMJ	REFS	15	126	174				
1	ZMX	REAL		COMJ	REFS	15						
3	Z1A	REAL		COMF	REFS	12						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES			
ATAN	REAL	1	LIBRARY	50			
CONA		3		96			
CONB		4		115			
COS	REAL	1	LIBRARY	70	72	120	
SIN	REAL	1	LIBRARY	73	119		
SQRT	REAL	1	LIBRARY	48	74	101	111

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
CMPLX	COMPLEX	2	INTRIN		163

STATEMENT LABELS			DEF LINE	REFERENCES		
742	3	FMT	188	126		
0	4		164	46	47	
147	5		60	2*54	3*56	4*58
102	6		55	3*54		
117	7		57	2*56		
141	8		59	58		
0	9		62	60		
265	10		86	2*63		
0	11	INACTIVE	64	63		
262	12		85	68	2*80	
246	14		81	3*80		
0	15		84	81		

STATEMENT LABELS			DEF LINE	REFERENCES	
0	16		89	86	87
0	17		151	90	98
0	18	INACTIVE	94	2*93	
312	19		96	93	
314	20		97	95	
0	21	INACTIVE	110	2*109	
356	22		115	109	
403	23		123	114	
430	25		130	125	
765	26	FMT	192	129	
517	27		150	130	2*145
437	28		135	2*132	
445	29		139	134	137
0	30	INACTIVE	136	135	
442	31		138	2*135	
474	32		146	3*145	
0	33		149	146	
0	34		163	153	
0	35	INACTIVE	158	157	
545	36		160	2*157	
550	37		161	159	
0	38	INACTIVE	173	2*172	
647	39		207	172	
770	40	FMT	193	174	
1022	41	FMT	197	182	
1047	44	FMT	201	181	
0	46		183	173	
0	77	INACTIVE	133	132	
343	100		108	102	
1051	101	FMT	202	169	
605	102		170	168	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
51	4	K	46 164	523B	EXT REFS NOT INNER
52	4	I	47 164	517B	EXT REFS NOT INNER
152	9	KK	60 62	3B	INSTACK
174	12	J	68 85	71B	EXT REFS NOT INNER
252	15	JJ	81 84	7B	INSTACK
266	16	L1	86 89	14B	NOT INNER
273	16	M1	87 89	3B	INSTACK
303	17	IS	90 151	224B	EXT REFS NOT INNER
321	17	IN	98 151	203B	EXT REFS NOT INNER
431	27	M1	130 150	71B	EXT REFS NOT INNER
507	33	II	146 149	7B	INSTACK
533	34	IJ	153 163	34B	EXT REFS
610	46	I	173 183	37B	EXT REFS NOT INNER
632		J	182 182	11B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
COMA	41	0	LC	(40)	40	BR	(1)			
COMB	12	0	ISI	(1)	1	MA	(1)	2	IRR	(1)
		3	N	(1)	4	ISS	(1)	5	LIRA	(1)
		6	NO1	(1)	7	NO2	(1)	8	NMOD	(1)
		9	ABO	(1)	10	ALO	(1)	11	M2	(1)
COMD	420	0	X	(10)	10	Y	(10)	20	XMW	(10)
		30	RBBO	(10)	40	XII	(20)	60	XI	(60)
		120	ETA	(100)	220	XIMW	(100)	320	SBBO	(100)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)						
COMF	4	0	MCC	(1)	1	NLRR	(1)	2	NNP	(1)
		3	Z1A	(1)						
COMH	4	0	KQR	(1)	1	KGH	(1)	2	KKF	(1)
		3	NHV	(1)						
COMI	4	0	ZK	(1)	1	ZKX	(1)	2	YOW	(1)
		3	YOWX	(1)						
COMJ	10	0	ZM	(1)	1	ZMX	(1)	2	XOW	(1)
		3	XOWX	(1)	4	BETA	(1)	5	BETAX	(1)
		6	RE4	(1)	7	RE4X	(1)	8	RM4	(1)
		9	RM4X	(1)						
CTAPES	50	0	ITAPES	(50)						

STATISTICS

PROGRAM LENGTH	13142B	5730
CM LABELED COMMON LENGTH	1041B	545
52000B CM USED		

```
      SUBROUTINE CONB(RE5,RE6,RI5,RI6)                                  CONB    2
C                                                                       CONB    3
      COMMON/COMI/ZK,ZKX,YOE,YOEX                                       CONB    4
      COMMON/COMJ/ZM,ZMX,XOE,XOEX,BETA,BETAX,RE4,RE4X,RM4,RM4X          CONB    5
      YOE = ABS(YOE)                                                    CONB    6
      Z = YOE*ZK                                                        CONB    7
      XOK = ZK*XOE                                                      CONB    8
      IF(ZM.GT.0.99)GO TO 4                                             CONB    9
      SQ = SQRT(XOK**2+BETA**2*Z**2)                                    CONB   10
      ARG = (XOK-ZM*SQ)/BETA**2                                         CONB   11
      CO5 = XOK/(Z**2*SQ)                                               CONB   12
      GO TO 5                                                           CONB   13
    4 ARG = (XOK-Z*Z/XOK)/2.0                                           CONB   14
      CO5 = 1.0/(Z*Z)                                                   CONB   15
    5 RI5 = CO5*SIN(ARG)                                                CONB   16
      RE5 = CO5*COS(ARG)                                                CONB   17
      BETA2=BETA*BETA                                                   CONB   18
      IF(ZM.GT.0.99)GO TO 7                                             CONB   19
      A=(XOE-ZM*SQRT(XOE*XOE+BETA2*YOE*YOE))/(BETA2*YOE)                CONB   20
      GO TO 6                                                           CONB   21
    7 A=(XOE/YOE-YOE/XOE)/2.0                                           CONB   22
    6 SIGNA=SIGN(1.0,A)                                                 CONB   23
      ABSA=ABS(A)                                                       CONB   24
      X1=ABSA                                                           CONB   25
      IF(ABSA.GT.2.0)X1=2.0                                             CONB   26
      CALL QUADX(X1,Z,REX,EMX)                                          CONB   27
      IF(ABSA.LE.2.0)GO TO 1                                            CONB   28
      X1=ABSA                                                           CONB   29
      IF(X1.GT.10.0)X1=10.0                                             CONB   30
      CALL QUAXA(X1,Z,XREX,XEMX)                                        CONB   31
      REX=REX+XREX                                                      CONB   32
      EMX=EMX+XEMX                                                      CONB   33
      IF(ABSA.LE.10.0)GO TO 1                                           CONB   34
      CALL QUAYB(ABSA,Z,YREX,YEMX)                                      CONB   35
      REX=REX+YREX                                                      CONB   36
      EMX=EMX+YEMX                                                      CONB   37
    1 EMX=-EMX*SIGNA                                                    CONB   38
      RE6=-EMX/Z                                                        CONB   39
      RI6=REX/Z                                                         CONB   40
      RETURN                                                            CONB   41
       END                                                              CONB   42
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CONB	1	40

VARIABLES

		SN	TYPE	RELOCATION							
152	A		REAL		REFS	22	23	DEFINED	19	21	
154	ABSA		REAL		REFS	24	25	27	28	33	34
					DEFINED	23					
147	ARG		REAL		REFS	15	16	DEFINED	10	13	
4	BETA		REAL	COMJ	REFS	4	9	10	2*17		

VARIABLES	SN	TYPE	RELOCATION								
5	BETAX	REAL	COMJ	REFS	4						
151	BETA2	REAL		REFS	2*19	DEFINED	17				
150	CO5	REAL		REFS	15	16	DEFINED	11	14		
157	EMX	REAL		REFS	26	32	36	37	38		
				DEFINED	32	36	37				
156	REX	REAL		REFS	26	31	35	39	DEFINED	31	35
6	RE4	REAL	COMJ	REFS	4						
7	RE4X	REAL	COMJ	REFS	4						
0	RE5	REAL	F.P.	DEFINED	1	16					
0	RE6	REAL	F.P.	DEFINED	1	38					
0	RI5	REAL	F.P.	DEFINED	1	15					
0	RI6	REAL	F.P.	DEFINED	1	39					
10	RM4	REAL	COMJ	REFS	4						
11	RM4X	REAL	COMJ	REFS	4						
153	SIGNA	REAL		REFS	37	DEFINED	22				
146	SQ	REAL		REFS	10	11	DEFINED	9			
161	XEMX	REAL		REFS	30	32					
2	XOE	REAL	COMJ	REFS	4	7	3*19	2*21			
3	XOEX	REAL	COMJ	REFS	4						
145	XOK	REAL		REFS	9	10	11	2*13	DEFINED	7	
160	XREX	REAL		REFS	30	31					
155	X1	REAL		REFS	26	29	30	DEFINED	24	25	28
				29							
163	YEMX	REAL		REFS	34	36					
2	YOE	REAL	COMI	REFS	3	5	6	3*19	2*21		
				DEFINED	5						
3	YOEX	REAL	COMI	REFS	3						
162	YREX	REAL		REFS	34	35					
144	Z	REAL		REFS	9	11	2*13	2*14	26	30	34
				38	39	DEFINED	6				
0	ZK	REAL	COMI	REFS	3	6	7				
1	ZKX	REAL	COMI	REFS	3						
0	ZM	REAL	COMJ	REFS	4	8	10	18	19		
1	ZMX	REAL	COMJ	REFS	4						

EXTERNALS	TYPE	ARGS		REFERENCES	
COS	REAL	1	LIBRARY	16	
QUADX		4		26	
QUAXA		4		30	
QUAYB		4		34	
SIN	REAL	1	LIBRARY	15	
SQRT	REAL	1	LIBRARY	9	19

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
ABS	REAL	1	INTRIN	5	23	
SIGN	REAL	2	INTRIN	22		

STATEMENT LABELS		DEF LINE	REFERENCES	
112	1	37	27	33
24	4	13	8	
31	5	15	12	
56	6	22	20	
52	7	21	18	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
COMI	4	0 ZK (1)	1 ZKX (1)	2 YOE (1)
		3 YOEX (1)		

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

COMJ	10	0	ZM (1)	1	ZMX (1)	2	XOE (1)	
		3	XOEX (1)	4	BETA (1)	5	BETAX (1)	
		6	RE4 (1)	7	RE4X (1)	8	RM4 (1)	
		9	RM4X (1)					

STATISTICS

PROGRAM LENGTH	1648	116
CM LABELED COMMON LENGTH	168	14

520008 CM USED

```
      SUBROUTINE  QUADX  (W,ZETA,REX,EMX)                              QUADX      2
C                                                                       QUADX      3
      DIMENSION   C1(10),A1(10)                                         QUADX      4
      DATA  KTEST/0/                                                    QUADX      5
      IF(KTEST.EQ.1)   GO TO 1                                          QUADX      6
      KTEST=1                                                           QUADX      7
      C1(1)=-  .725642591                                               QUADX      8
      C1(2)=   .104651988E+01                                           QUADX      9
      C1(3)=-  .471568448                                               QUADX     10
      C1(4)=-  .138318000                                               QUADX     11
      C1(5)=-  .645496168E-02                                           QUADX     12
      C1(6)=-  .137733492E-01                                           QUADX     13
      C1(7)=   .295420522                                               QUADX     14
      C1(8)=   .528421787                                               QUADX     15
      C1(9)=    435983163E-04                                           QUADX     16
      C1(10)=  .169000864E-03                                           QUADX     17
      A1(1)=-  .2398784396                                              QUADX     18
      A1(2)=-  .4734195684E-03                                          QUADX     19
      A1(3)=-  .1180816044                                              QUADX     20
      A1(4)=-  .2557061615E-01                                          QUADX     21
      A1(5)=-  .9556770514                                              QUADX     22
      A1(6)=   .4644321052                                              QUADX     23
      A1(7)=-  .6203627756                                              QUADX     24
      A1(8)=   .1057208731                                              QUADX     25
      A1(9)=-  .1305516353E+01                                          QUADX     26
      A1(10)=  .9459520710                                              QUADX     27
    1 EM=9.5                                                            QUADX     28
      Z=ZETA/EM                                                         QUADX     29
      EMW=EM*W                                                          QUADX     30
      EMZW=EMW*Z                                                        QUADX     31
      CMZW=COS(EMZW)                                                    QUADX     32
      SMZW=SIN(EMZW)                                                    QUADX     33
      ZCMZW=Z*CMZW                                                      QUADX     34
      ZSMZW=Z*SMZW                                                      QUADX     35
      Z2=Z**2                                                           QUADX     36
      REX=0.0                                                           QUADX     37
      EMX=0.0                                                           QUADX     38
      DO  2    J=1,2                                                    QUADX     39
      J2=2*J                                                            QUADX     40
      J1=J2-1                                                           QUADX     41
      AJ11=A1(J1)                                                       QUADX     42
      AJ12=A1(J2)                                                       QUADX     43
      CJ11=C1(J1)                                                       QUADX     44
      CJ12=C1(J2)                                                       QUADX     45
      E11=EXP(AJ11*EMW)                                                 QUADX     46
      E12=EXP(AJ12*EMW)                                                 QUADX     47
      T111=E11*(AJ11*CMZW+ZSMZW)-AJ11                                   QUADX     48
      T112=E12*(AJ12*CMZW+ZSMZW)-AJ12                                   QUADX     49
      T211=E11*(ZCMZW-AJ11*SMZW)-Z                                      QUADX     50
      T212=E12*(ZCMZW-AJ12*SMZW)-Z                                      QUADX     51
      T311=AJ11**2+Z2                                                   QUADX     52
      T312=AJ12**2+Z2                                                   QUADX     53
      REX=REX+CJ11*(T111/T311)+CJ12*(T112/T312)                         QUADX     54
      EMX=EMX+CJ11*(T211/T311)+CJ12*(T212/T312)                         QUADX     55
    2 CONTINUE                                                          QUADX     56
      DO  4    J=5,9,2                                                  QUADX     57
      J1=J+1                                                            QUADX     58
```

```
                      AJ1=A1(J)                                                  QUADX      59
                      B1=A1(J1)                                                  QUADX      60
   60                 CJ1=C1(J)                                                  QUADX      61
                      DJ1=C1(J1)                                                 QUADX      62
                      E1=EXP(AJ1*EMW)                                            QUADX      63
                      T11=AJ1**2-Z2+B1**2                                        QUADX      64
                      T31=2.0*AJ1*Z                                              QUADX      65
   65                 T21=T31**2                                                 QUADX      66
                      T41=AJ1*CJ1-B1*DJ1                                         QUADX      67
                      T51=AJ1*DJ1+B1*CJ1                                         QUADX      68
                      T61=Z*CJ1                                                  QUADX      69
                      T71=Z*DJ1                                                  QUADX      70
   70                 EMB1W=B1*EMW                                               QUADX      71
                      CC1=CMZW*COS(EMB1W)                                        QUADX      72
                      CS1=CMZW*SIN(EMB1W)                                        QUADX      73
                      SC1=SMZW*COS(EMB1W)                                        QUADX      74
                      SS1=SMZW*SIN(EMB1W)                                        QUADX      75
   75                 T81 =E1*(T41*CC1-T61*SC1+T51*CS1-T71*SS1)-T41              QUADX      76
                      T91 =E1*(T61*CC1+T41*SC1+T71*CS1+T51*SS1)-T61              QUADX      77
                      T101=T11*T81+T31*T91                                       QUADX      78
                      T111=T31*T81-T11*T91                                       QUADX      79
                      T121=T11**2+T21                                            QUADX      80
   80                 REX =REX +(T101/T121)                                      QUADX      81
                      EMX =EMX +(T111/T121)                                      QUADX      82
                    4 CONTINUE                                                   QUADX      83
                      REX=REX  /EM                                               QUADX      84
                      EMX=EMX  /EM                                               QUADX      85
   85                 RETURN                                                     QUADX      86
                      END                                                        QUADX      87
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	QUADX	1	85

VARIABLES		SN	TYPE	RELOCATION								
330	AJ1		REAL		REFS	62	63	64	66	67		
					DEFINED	58						
314	AJ11		REAL		REFS	45	2*47	49	51	DEFINED	41	
315	AJ12		REAL		REFS	46	2*48	50	52	DEFINED	42	
367	A1		REAL	ARRAY	REFS	3	41	42	58	59		
					DEFINED	17	18	19	20	21	22	23
						24	25	26				
331	B1		REAL		REFS	63	66	67	70	DEFINED	59	
345	CC1		REAL		REFS	75	76	DEFINED	71			
332	CJ1		REAL		REFS	66	67	68	DEFINED	60		
316	CJ11		REAL		REFS	53	54	DEFINED	43			
317	CJ12		REAL		REFS	53	54	DEFINED	44			
304	CMZW		REAL		REFS	33	47	48	71	72		
					DEFINED	31						
346	CS1		REAL		REFS	75	76	DEFINED	72			
355	C1		REAL	ARRAY	REFS	3	43	44	60	61		
					DEFINED	7	8	9	10	11	12	*3

VARIABLES	SN	TYPE	RELOCATION								
				14	15	16					
333	DJ1	REAL		REFS	66	67	69	DEFINED	61		
300	EM	REAL		REFS	28	29	83	84	DEFINED	27	
344	EMB1W	REAL		REFS	71	72	73	74	DEFINED	70	
302	EMW	REAL		REFS	30	45	46	62	70		
				DEFINED	29						
0	EMX	REAL	F.P.	REFS	54	81	84	DEFINED	1	37	54
				81	84						
303	EMZW	REAL		REFS	31	32	DEFINED	30			
334	E1	REAL		REFS	75	76	DEFINED	62			
320	E11	REAL		REFS	47	49	DEFINED	45			
321	E12	REAL		REFS	48	50	DEFINED	46			
311	J	INTEGER		REFS	39	57	58	60	DEFINED	38	56
313	J1	INTEGER		REFS	41	43	59	61	DEFINED	40	57
312	J2	INTEGER		REFS	40	42	44	DEFINED	39		
235	KTEST	INTEGER		REFS	5	DEFINED	4	6			
0	REX	REAL	F.P.	REFS	53	80	83	DEFINED	1	36	53
				80	83						
347	SC1	REAL		REFS	75	76	DEFINED	73			
305	SMZW	REAL		REFS	34	49	50	73	74		
				DEFINED	32						
350	SS1	REAL		REFS	75	76	DEFINED	74			
353	T101	REAL		REFS	80	DEFINED	77				
335	T11	REAL		REFS	77	78	79	DEFINED	63		
322	T111	REAL		REFS	53	81	DEFINED	47	78		
323	T112	REAL		REFS	53	DEFINED	48				
354	T121	REAL		REFS	80	81	DEFINED	79			
337	T21	REAL		REFS	79	DEFINED	65				
324	T211	REAL		REFS	54	DEFINED	49				
325	T212	REAL		REFS	54	DEFINED	50				
336	T31	REAL		REFS	65	77	78	DEFINED	64		
326	T311	REAL		REFS	53	54	DEFINED	51			
327	T312	REAL		REFS	53	54	DEFINED	52			
340	T41	REAL		REFS	2*75	76	DEFINED	66			
341	T51	REAL		REFS	75	76	DEFINED	67			
342	T61	REAL		REFS	75	2*76	DEFINED	68			
343	T71	REAL		REFS	75	76	DEFINED	69			
351	T81	REAL		REFS	77	78	DEFINED	75			
352	T91	REAL		REFS	77	78	DEFINED	76			
0	W	REAL	F.P.	REFS	29	DEFINED	1				
301	Z	REAL		REFS	30	33	34	35	49	50	64
				68	69	DEFINED	28				
306	ZCMZW	REAL		REFS	49	50	DEFINED	33			
0	ZETA	REAL	F.P.	REFS	28	DEFINED	1				
307	ZSMZW	REAL		REFS	47	48	DEFINED	34			
310	Z2	REAL		REFS	51	52	63	DEFINED	35		

EXTERNALS	TYPE	ARGS	REFERENCES		
COS	REAL	1 LIBRARY	31	71	73
EXP	REAL	1 LIBRARY	45	46	62
SIN	REAL	1 LIBRARY	32	72	74

STATEMENT LABELS		DEF LINE	REFERENCES
45	1	27	5
0	2	55	38
0	4	82	56

```
LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
   64  2         J            38 55        50B              EXT REFS
  135  4         J            56 82        75B              EXT REFS

STATISTICS
  PROGRAM LENGTH                  4078      263
          52000B CM USED
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      SUBROUTINE GRS (QR, QI,LL,BIR,BII)                                GRS      2
C                                                                       GRS      3
      DIMENSION     BIR(25, 1) ,   BII(25, 1)                           GRS      4
      DIMENSION      QR(20,20) ,    QI(20,20)                           GRS      5
      DIMENSION      ALPHA(100,20)                                      GRS      6
      DIMENSION      CHR  (100,20)                                      GRS      7
      DIMENSION      HR   (200,20)                                      GRS      8
      DIMENSION GETA(25)                                                GRS      9
      DIMENSION ITAPES(50)                                              GRS     10
      COMPLEX AIC(100,25), CDW(100,20)                                  GRS     11
      COMMON /COMA/ LC(40) , BR                                         GRS     12
      COMMON /COMB  / ISI,M,IRR,N,ISS,LIRA,NO1,NO2,NMOD,ABO,ALO,M2      GRS     13
      COMMON/COMD/X(10),Y(10),XMW(10),RBBO(10),XII(20),XI(60),ETA(100),  GRS     14
     1XIMW(100),SBBO(100)                                               GRS     15
      COMMON/COMF/MCC,NLRR,NNP,Z2A                                      GRS     16
      COMMON/COMI/ZK,ZKX,YOE,YOEX                                       GRS     17
      COMMON/COMJ/ZM                                                    GRS     18
      COMMON / CTAPES / ITAPES                                          GRS     19
      EQUIVALENCE (ALPHA(1,1),HR(1,1)), (CHR(1,1),HR(1,11))             GRS     20
C                                                                       GRS     21
C                                                                       GRS     22
      ITAPEW = ITAPES(6)                                                GRS     23
      MTAP2  =  ITAPES(22)                                              GRS     24
      MTAP10 =  ITAPES(30)                                              GRS     25
      MTAP11 =  ITAPES(31)                                              GRS     26
C                                                                       GRS     27
C                                                                       GRS     28
      LC12  =  LC(22)                                                   GRS     29
      NS=NMOD                                                           GRS     30
      IF (LC(33).NE.0.OR.LC(1).EQ.2)    ZK = 0.0                        GRS     31
      NN=NO1                                                            GRS     32
      MM = M                                                            GRS     33
      AQ = (4*MM+1)*(IRR+1)                                             GRS     34
      PIF = 3.1415927                                                   GRS     35
      TINT = 2.0*PIF*PIF/AQ                                             GRS     36
      IF(ZK.EQ.0.0)GO TO 200                                            GRS     37
      CONST = ALO/ZK*ABO/BR                                             GRS     38
      CONSTA =-CONST*CONST/BR*TINT                                      GRS     39
  200 CONSS = 8.0*ALO*ALO*TINT                                          GRS     40
      CONSS = 0.5*CONSS                                                 GRS     41
      IF(ZK.EQ.0.0)GO TO 201                                            GRS     42
      BR4 = 4.0*BR*BR*BR                                                GRS     43
      CONSTA = BR4*CONSTA                                               GRS     44
  201 ZKB = ZK/ABO                                                      GRS     45
C                                                                       GRS     46
      MLR = MM*LIRA                                                     GRS     47
      MLR2 = MLR+MLR                                                    GRS     48
      MAMM = MM                                                         GRS     49
      LIRR = NLRR                                                       GRS     50
C     MATRIX MULTIPLICATION - POLYNOMIAL COEFFICIENTS                   GRS     51
      KLUE = NS                                                         GRS     52
C     CHECK TO SEE IF FACTORIZATION HAS BEEN COMPLETED                  GRS     53
      IF (LC12.NE.0) KLUE = - NS                                        GRS     54
      IF (LC12.EQ.0) GO TO 73                                           GRS     55
      READ(MTAP11) AIC                                                  GRS     56
      READ(MTAP11) GETA                                                 GRS     57
      GO TO 75                                                          GRS     58
```

VARIABLES	SN	TYPE	RELOCATION								
O	A2	REAL	ARRAY	F.P.	REFS	3	DEFINED	1	11	12	13	14
					15	16	17					
O	A5	REAL	ARRAY	F.P.	REFS	3	DEFINED	1	18	19	20	21
					22	23	24	25	26	27	28	
O	A6	REAL	ARRAY	F.P.	REFS	3	DEFINED	1	29	30	31	32
					33	34	35	36	37	38	39	
O	A8	REAL	ARRAY	F.P.	REFS	3	DEFINED	1	40	41	42	43
					44	45						
O	C2	REAL	ARRAY	F.P.	REFS	3	DEFINED	1	4	5	6	7
					8	9	10					

STATISTICS

PROGRAM LENGTH 206B 134

52000B CM USED

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
5	I	C2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
6	I	C2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
7	I	C2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
8	I	C2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
9	I	C2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
10	I	C2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
12	I	A2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
13	I	A2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
14	I	A2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
15	I	A2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
16	I	A2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
17	I	A2	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
19	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
20	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
21	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
22	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
23	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
24	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
25	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
26	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
27	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
28	I	A5	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
30	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
31	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
32	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
33	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
34	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
35	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
36	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
37	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
38	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
39	I	A6	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
41	I	A8	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
42	I	A8	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
43	I	A8	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
44	I	A8	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
45	I	A8	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
47	I	A10	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
48	I	A10	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
49	I	A10	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
50	I	A10	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.
51	I	A10	ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 PARAM1	1	52

VARIABLES	SN	TYPE		RELOCATION								
0 A10		REAL	ARRAY	F.P.	REFS	3	DEFINED	1	46	47	48	49
						50	51					

```
      SUBROUTINE  PARAM1 (C2,A2,A5,A6,A8,A10)                          PARAM1      2
C                                                                      PARAM1      3
      DIMENSION  C2(1),A2(1),A5(1),A6(1),A8(1),A10(1)                  PARAM1      4
      C2(1)=-  .2084718313E-03                                         PARAM1      5
      C2(2)=-  .3487065945                                             PARAM1      6
      C2(3)=-  .1890378526                                             PARAM1      7
      C2(4)=-  .7583855332E-01                                         PARAM1      8
      C2(5)=-  .2122355710E-01                                         PARAM1      9
      C2(6)=   .6350150293                                             PARAM1     10
      C2(7)=   .2890418545E-21                                         PARAM1     11
      A2(1)=-  .1903231342E+01                                         PARAM1     12
      A2(2)=-  .1176831521E+01                                         PARAM1     13
      A2(3)=-  .8592458597                                             PARAM1     14
      A2(4)=-  .4965823037                                             PARAM1     15
      A2(5)=-  .2113879894                                             PARAM1     16
      A2(6)=   .6879924569E-04                                         PARAM1     17
      A2(7)=   .2441971770E+01                                         PARAM1     18
      A5(1)=    .1299451189E+03                                        PARAM1     19
      A5(2)=    .1813126160E+03                                        PARAM1     20
      A5(3)=    .6939591763E+02                                        PARAM1     21
      A5(4)=    .1633455055E+02                                        PARAM1     22
      A5(5)=    .2571459906E+01                                        PARAM1     23
      A5(6)=    .2878555118                                            PARAM1     24
      A5(7)=    .0239930791                                            PARAM1     25
      A5(8)=    .0015430190                                            PARAM1     26
      A5(9)=    .0000787567                                            PARAM1     27
      A5(10)=   .0000032641                                            PARAM1     28
      A5(11)=   .0000001119                                            PARAM1     29
      A6(1)= -  .1334404774E+02                                        PARAM1     30
      A6(2)= -  .1839239224E+01                                        PARAM1     31
      A6(3)=    .9361617831E+01                                        PARAM1     32
      A6(4)=    .4666387027E+01                                        PARAM1     33
      A6(5)=    .1101461993E+01                                        PARAM1     34
      A6(6)=    .1610743017                                            PARAM1     35
      A6(7)=    .0163000493                                            PARAM1     36
      A6(8)=    .0012170570                                            PARAM1     37
      A6(9)=    .0000700106                                            PARAM1     38
      A6(10)=   .0000032025                                            PARAM1     39
      A6(11)=   .0000001194                                            PARAM1     40
      A8(1)=-  .1996057005E+01                                         PARAM1     41
      A8(2)=   .39558508E-02                                           PARAM1     42
      A8(3)=   .133895E-04                                             PARAM1     43
      A8(4)=   .7446E-06                                               PARAM1     44
      A8(5)=   .3227E-06                                               PARAM1     45
      A8(6)=   .1663E-06                                               PARAM1     46
      A10(1)=  .3985713852                                             PARAM1     47
      A10(2)=- .187627251E-01                                          PARAM1     48
      A10(3)=- .3728518E-03                                            PARAM1     49
      A10(4)=- .211985E-04                                             PARAM1     50
      A10(5)=- .20039E-05                                              PARAM1     51
      A10(6)=- .2729E-06                                               PARAM1     52
      RETURN                                                           PARAM1     53
       END                                                             PARAM1     54
```

```
EXTERNALS            TYPE    ARGS       REFERENCES
       SQRT         REAL       1 LIBRARY      58

STATEMENT LABELS                DEF LINE    REFERENCES
    13  1                           9           5
     0  2                          16          14
     0  3                          33          25
   115  4                          38          10
     0  6                          45          41
   143  7                          48          19
     0  8                          56          52
   177  9                          60           8          37

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
    23  2         L           14 16        11B                EXT REFS
    63  3         L           25 33        13B          OPT
   127  6         L           41 45         7B       INSTACK
   154  8         L           52 56         7B       INSTACK

STATISTICS
  PROGRAM LENGTH                335B       221
          52000B CM USED
```

```
                    EFACT=3.1415927*(EXP(-X)/SQRT(X))                    SPCLA      59
                    EK1=EFACT*EK1                                        SPCLA      60
60                9 RETURN                                               SPCLA      61
                    END                                                  SPCLA      62
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	SPCLA	1	60

VARIABLES

		SN	TYPE	RELOCATION								
325	A10		REAL	ARRAY	REFS	3	9	50	51	55		
262	A2		REAL	ARRAY	REFS	3	9	16	18			
271	A5		REAL	ARRAY	REFS	3	9	21	22	28		
304	A6		REAL	ARRAY	REFS	3	9	23	24	31		
317	A8		REAL	ARRAY	REFS	3	9	39	40	44		
251	C10DUM		REAL		REFS	56	DEFINED	54				
247	C101		REAL		REFS	54	55	57	DEFINED	50	56	
250	C102		REAL		REFS	54	57	DEFINED	51	55		
253	C2		REAL	ARRAY	REFS	3	9	16	18			
241	C5DUM		REAL		REFS	29	DEFINED	27				
234	C51		REAL		REFS	27	28	34	DEFINED	21	29	
235	C52		REAL		REFS	27	34	DEFINED	22	28		
242	C6DUM		REAL		REFS	32	DEFINED	30				
236	C61		REAL		REFS	30	31	35	DEFINED	23	32	
237	C62		REAL		REFS	30	35	DEFINED	24	31		
246	C8DUM		REAL		REFS	45	DEFINED	43				
244	C81		REAL		REFS	43	44	46	DEFINED	39	45	
245	C82		REAL		REFS	43	46	DEFINED	40	44		
252	EFACT		REAL		REFS	59	DEFINED	58				
0	EIL1		REAL	F.P.	REFS	16	18	47	DEFINED	1	6	13
						16	18	46	47			
243	EI1		REAL		REFS	36	DEFINED	34				
0	EK1		REAL	F.P.	REFS	36	59	DEFINED	1	7	35	36
						57	59					
233	FX		REAL		REFS	27	30	34	35	43	46	49
						54	57	DEFINED	20	38	48	49
226	GINV		REAL		REFS	12	DEFINED	11				
230	L		INTEGER		REFS	15	26	42	53	DEFINED	14	25
						41	52					
231	L1		INTEGER		REFS	2*16	DEFINED	15				
240	NM3		INTEGER		REFS	28	31	44	55	DEFINED	26	42
						53						
232	PI		REAL		REFS	18	DEFINED	17				
0	X		REAL	F.P.	REFS	5	10	12	19	20	4*36	38
						48	2*58	DEFINED	1			
227	YOVH		REAL		REFS	16	2*18	DEFINED	12			

EXTERNALS

	TYPE	ARGS		REFERENCES		
ALOG	REAL	1	LIBRARY	36		
COS	REAL	1	LIBRARY	18		
EXP	REAL	1	LIBRARY	16	18	58
PARAM1		6		9		

```
      SUBROUTINE  SPCLA (X,EIL1,EK1)                                    SPCLA      2
C                                                                       SPCLA      3
      DIMENSION  C2(7),A2(7),A5(11),A6(11),                             SPCLA      4
     1A8(6),A10(6)                                                      SPCLA      5
      IF (X.LT.100) GO TO 1                                             SPCLA      6
      EIL1 = 0.0                                                        SPCLA      7
      EK1  = 0.0                                                        SPCLA      8
      GO TO 9                                                           SPCLA      9
    1 CALL PARAM1 (C2,A2,A5,A6,A8,A10)                                  SPCLA     10
      IF (X.GT.16.0) GO TO 4                                            SPCLA     11
      GINV=0.8125                                                       SPCLA     12
      YOVH=X*GINV                                                       SPCLA     13
      EIL1=0.0                                                          SPCLA     14
      DO  2    L=2,7                                                    SPCLA     15
      L1=L-1                                                            SPCLA     16
    2 EIL1=EIL1+C2(L1)*EXP(A2(L1)*YOVH)                                 SPCLA     17
      PI=3.141592654                                                    SPCLA     18
      EIL1=EIL1+C2(7)*EXP(A2(7)*YOVH)*COS(PI*YOVH)                      SPCLA     19
      IF(X.GT.8.0)  GO TO  7                                            SPCLA     20
      FX=(X**2/16.0)-2.0                                                SPCLA     21
      C51=A5(11)                                                        SPCLA     22
      C52=A5(10)                                                        SPCLA     23
      C61=A6(11)                                                        SPCLA     24
      C62=A6(10)                                                        SPCLA     25
      DO  3    L=1,9                                                    SPCLA     26
      NM3=10-L                                                          SPCLA     27
      C5DUM=FX*C51+C52                                                  SPCLA     28
      C52=A5(NM3)-C51                                                   SPCLA     29
      C51=C5DUM                                                         SPCLA     30
      C6DUM=FX*C61+C62                                                  SPCLA     31
      C62=A6(NM3)-C61                                                   SPCLA     32
      C61=C6DUM                                                         SPCLA     33
    3 CONTINUE                                                          SPCLA     34
      EI1=0.5*FX*C51+C52                                                SPCLA     35
      EK1=0.5*FX*C61+C62                                                SPCLA     36
      EK1=(X/8.0)*EI1*ALOG(X/8.)+(1.0/X)-(X/8.0)*EK1                    SPCLA     37
      GO TO 9                                                           SPCLA     38
    4 FX=(1024.0/X**2)-2.0                                              SPCLA     39
      C81=A8(6)                                                         SPCLA     40
      C82=A8(5)                                                         SPCLA     41
      DO  6    L=1,4                                                    SPCLA     42
      NM3=5-L                                                           SPCLA     43
      C8DUM=FX*C81+C82                                                  SPCLA     44
      C82=A8(NM3)-C81                                                   SPCLA     45
    6 C81=C8DUM                                                         SPCLA     46
      EIL1=0.5*FX*C81+C82                                               SPCLA     47
      EIL1=(-0.318309886)*EIL1                                          SPCLA     48
    7 FX=16.0/X                                                         SPCLA     49
      FX=-FX                                                            SPCLA     50
      C101=A10(6)                                                       SPCLA     51
      C102=A10(5)                                                       SPCLA     52
      DO  8    L=1,4                                                    SPCLA     53
      NM3=5-L                                                           SPCLA     54
      C10DUM=( FX)*C101+C102                                            SPCLA     55
      C102=A10(NM3)-C101                                                SPCLA     56
    8 C101=C10DUM                                                       SPCLA     57
      EK1=0.5*( FX)*C101+C102                                           SPCLA     58
```

```
      1              SUBROUTINE CONA(RE1,RI2,RI3)                          CONA        2
                   C                                                       CONA        3
                     COMMON/COMI/ZK,ZKX,YOE,YOEX                           CONA        4
                     YOE = ABS(YOE)                                        CONA        5
      5              Z = YOE*ZK                                            CONA        6
                     CALL SPCLA(Z,SKER2,FMBF2)                             CONA        7
                     RE1=-1.0/Z*FMBF2                                      CONA        8
                     RI2=-3.14159/(2.0*Z)*SKER2                            CONA        9
                     RI3 = 1.0/Z                                           CONA       10
     10              RETURN                                                CONA       11
                      END                                                  CONA       12
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	CONA	1	10

VARIABLES	SN	TYPE	RELOCATION								
32	FMBF2	REAL		REFS	6	7					
0	RE1	REAL	F.P.	DEFINED	1	7					
0	RI2	REAL	F.P.	DEFINED	1	8					
0	RI3	REAL	F.P.	DEFINED	1	9					
31	SKER2	REAL		REFS	6	8					
2	YOE	REAL	COMI	REFS	3	4	5	DEFINED	4		
3	YOEX	REAL	COMI	REFS	3						
30	Z	REAL		REFS	6	7	8	9	DEFINED	5	
0	ZK	REAL	COMI	REFS	3	5					
1	ZKX	REAL	COMI	REFS	3						

EXTERNALS	TYPE	ARGS	REFERENCES
SPCLA		3	6

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
ABS	REAL	1	INTRIN	4

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
COMI	4	0 ZK (1)	1 ZKX (1)	2 YOE (1)
		3 YOEX (1)		

STATISTICS

PROGRAM LENGTH	33B	27
CM LABELED COMMON LENGTH	4B	4

520000B CM USED

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
43	100	K	26 27	68	EXT REFS
77	2	J	43 54	338	EXT REFS

STATISTICS

PROGRAM LENGTH 2628 178

520008 CM USED

END QUAYB 59

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	QUAYB	1	57

VARIABLES	SN	TYPE	RELOCATION								
237	A1	REAL	ARRAY	REFS	3	27	44	DEFINED	16	17	18
					19	20	21	22	23		
220	A1J	REAL		REFS	46	2*49	2*50	51	DEFINED	44	
205	CMZW	REAL		REFS	33	49	DEFINED	31			
227	C1	REAL	ARRAY	REFS	3	45	DEFINED	8	9	10	11
					12	13	14	15			
221	C1J	REAL		REFS	52	53	DEFINED	45			
213	C2Z	REAL		REFS	39	49	DEFINED	37			
177	EM	REAL		REFS	28	29	55	56	DEFINED	24	
203	EMW	REAL		REFS	30	46	DEFINED	29			
0	EMX	REAL	F.P.	REFS	53	56	DEFINED	1	42	53	56
204	EMZW	REAL		REFS	31	32	DEFINED	30			
222	E1	REAL		REFS	48	49	50	DEFINED	46	48	
247	E1MA	REAL	ARRAY	REFS	3	47	DEFINED	27			
223	E1MAJ	REAL		REFS	48	DEFINED	47				
217	J	INTEGER		REFS	44	45	47	DEFINED	43		
201	K	INTEGER		REFS	2*27	DEFINED	26				
135	KTEST	INTEGER		REFS	6	DEFINED	5	7			
0	REX	REAL	F.P.	REFS	52	55	DEFINED	1	41	52	55
206	SMZW	REAL		REFS	34	50	DEFINED	32			
214	S2Z	REAL		REFS	40	50	DEFINED	38			
200	TWOM	REAL		REFS	27	DEFINED	25				
212	TWOZ	REAL		REFS	37	38	DEFINED	36			
224	T11	REAL		REFS	52	DEFINED	49				
225	T12	REAL		REFS	53	DEFINED	50				
226	T13	REAL		REFS	52	53	DEFINED	51			
0	W	REAL	F.P.	REFS	29	DEFINED	1				
202	Z	REAL		REFS	30	33	34	35	39	40	
				DEFINED	28						
207	ZCMZW	REAL		REFS	50	DEFINED	33				
215	ZC2Z	REAL		REFS	50	DEFINED	39				
0	ZETA	REAL	F.P.	REFS	28	36	DEFINED	1			
210	ZSMZW	REAL		REFS	49	DEFINED	34				
216	ZS2Z	REAL		REFS	49	DEFINED	40				
211	Z2	REAL		REFS	51	DEFINED	35				

EXTERNALS	TYPE	ARGS	REFERENCES	
COS	REAL	1 LIBRARY	31	37
EXP	REAL	1 LIBRARY	27	46
SIN	REAL	1 LIBRARY	32	38

STATEMENT LABELS		DEF LINE	REFERENCES
51	1	28	6
0	2	54	43
0	100	27	26

```
      SUBROUTINE QUAYB(W,ZETA,REX,EMX)                                  QUAYB     2
C                                                                       QUAYB     3
      DIMENSION   C1(8),A1(8)                                           QUAYB     4
     1,E1MA(8)                                                          QUAYB     5
      DATA   KTEST/0/                                                   QUAYB     6
      IF(KTEST.EQ.1)  GO  TO  1                                         QUAYB     7
      KTEST=1                                                           QUAYB     8
      C1(1)= -  .12537317E-02                                           QUAYB     9
      C1(2)= -  .13001848E-02                                           QUAYB    10
      C1(3)= -  .10328237E-02                                           QUAYB    11
      C1(4)= -   19255807E-03                                           QUAYB    12
      C1(5)= -  70596083E-03                                            QUAYB    13
      C1(6)= -  41160917E-03                                            QUAYB    14
      C1(7)= -  60961111E-04                                            QUAYB    15
      C1(8)=    99999502E+00                                            QUAYB    16
      A1(1)= -  46040156E+01                                            QUAYB    17
      A1(2)= -  26084536E+01                                            QUAYB    18
      A1(3)= -  16477373E+01                                            QUAYB    19
      A1(4)= -  33591611E+00                                            QUAYB    20
      A1(5)= -  10418700E+01                                            QUAYB    21
      A1(6)= -  62626206E+00                                            QUAYB    22
      A1(7)= -  13899640E+00                                            QUAYB    23
      A1(8)=    89071555E-07                                            QUAYB    24
      EM=    078947368                                                  QUAYB    25
      TWOM=  78947368                                                   QUAYB    26
      DO   100  K=1,8                                                   QUAYB    27
  100 E1MA(K)=EXP(TWOM*A1(K))                                           QUAYB    28
    1 Z=ZETA/EM                                                         QUAYB    29
      EMW=EM*W                                                          QUAYB    30
      EMZW=EMW*Z                                                        QUAYB    31
      CMZW=COS(EMZW)                                                    QUAYB    32
      SMZW=SIN(EMZW)                                                    QUAYB    33
      ZCMZW=Z*CMZW                                                      QUAYB    34
      ZSMZW=Z*SMZW                                                      QUAYB    35
      Z2=Z**2                                                           QUAYB    36
      TWOZ=10 *ZETA                                                     QUAYB    37
      C2Z=COS(TWOZ)                                                     QUAYB    38
      S2Z=SIN(TWOZ)                                                     QUAYB    39
      ZC2Z=Z*C2Z                                                        QUAYB    40
      ZS2Z=Z*S2Z                                                        QUAYB    41
      REX=0 0                                                           QUAYB    42
      EMX=0 0                                                           QUAYB    43
      DO   2     J=1,8                                                  QUAYB    44
      A1J=A1(J)                                                         QUAYB    45
      C1J=C1(J)                                                         QUAYB    46
      E1=EXP(A1J*EMW)                                                   QUAYB    47
      E1MAJ=E1MA(J)                                                     QUAYB    48
      E1=E1/E1MAJ                                                       QUAYB    49
      T11=E1*(A1J*CMZW+ZSMZW)-       (A1J*C2Z+ZS2Z)                     QUAYB    50
      T12=E1*(ZCMZW-A1J*SMZW)-       (ZC2Z-A1J*S2Z)                     QUAYB    51
      T13=A1J**2+Z2                                                     QUAYB    52
      REX=REX+C1J*(T11/T13)                                             QUAYB    53
      EMX=EMX+C1J*(T12/T13)                                             QUAYB    54
    2 CONTINUE                                                          QUAYB    55
      REX=REX   /EM                                                     QUAYB    56
      EMX=EMX   /EM                                                     QUAYB    57
      RETURN                                                            QUAYB    58
```

STATEMENT LABELS	DEF LINE	REFERENCES
0 100	27	26

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
43	100	K	26 27	6B	EXT REFS
77	2	J	43 54	33B	EXT REFS

STATISTICS

PROGRAM LENGTH	260B	176

520000B CM USED

```
                END                                                    QUAXA       59


      SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE      REFERENCES
    3  QUAXA             1        57

VARIABLES      SN  TYPE            RELOCATION
  235  A1          REAL        ARRAY                  REFS        3       27       44   DEFINED       16       17       18
                                                         19       20       21       22       23
  216  A1J         REAL                               REFS       46     2*49     2*50       51   DEFINED       44
  203  CMZW        REAL                               REFS       33       49   DEFINED       31
  225  C1          REAL        ARRAY                  REFS        3       45   DEFINED        8        9       10       11
                                                         12       13       14       15
  217  C1J         REAL                               REFS       52       53   DEFINED       45
  211  C2Z         REAL                               REFS       39       49   DEFINED       37
  175  EM          REAL                               REFS       25       28       29       55       56
                                                     DEFINED       24
  201  EMW         REAL                               REFS       30       46   DEFINED       29
    0  EMX         REAL                    F.P.       REFS       53       56   DEFINED        1       42       53       56
  202  EMZW        REAL                               REFS       31       32   DEFINED       30
  220  E1          REAL                               REFS       48       49       50   DEFINED       46       48
  245  E1MA        REAL        ARRAY                  REFS        3       47   DEFINED       27
  221  E1MAJ       REAL                               REFS       48   DEFINED       47
  215  J           INTEGER                            REFS       44       45       47   DEFINED       43
  177  K           INTEGER                            REFS     2*27   DEFINED       26
  135  KTEST       INTEGER                            REFS        6   DEFINED        5        7
    0  REX         REAL                    F.P.       REFS       52       55   DEFINED        1       41       52       55
  204  SMZW        REAL                               REFS       34       50   DEFINED       32
  212  S2Z         REAL                               REFS       40       50   DEFINED       38
  176  TWOM        REAL                               REFS       27   DEFINED       25
  210  TWOZ        REAL                               REFS       37       38   DEFINED       36
  222  T11         REAL                               REFS       52   DEFINED       49
  223  T12         REAL                               REFS       53   DEFINED       50
  224  T13         REAL                               REFS       52       53   DEFINED       51
    0  W           REAL                    F.P.       REFS       29   DEFINED        1
  200  Z           REAL                               REFS       30       33       34       35       39       40
                                                     DEFINED       28
  205  ZCMZW       REAL                               REFS       50   DEFINED       33
  213  ZC2Z        REAL                               REFS       50   DEFINED       39
    0  ZETA        REAL                    F.P.       REFS       28       36   DEFINED        1
  206  ZSMZW       REAL                               REFS       49   DEFINED       34
  214  ZS2Z        REAL                               REFS       49   DEFINED       40
  207  Z2          REAL                               REFS       51   DEFINED       35

EXTERNALS           TYPE    ARGS        REFERENCES
       COS          REAL       1 LIBRARY      31        37
       EXP          REAL       1 LIBRARY      27        46
       SIN          REAL       1 LIBRARY      32        38

STATEMENT LABELS              DEF LINE    REFERENCES
   51  1                         28          6
    0  2                         54         43
```

```
      SUBROUTINE QUAXA(W,ZETA,REX,EMX)                                  QUAXA      2
C                                                                       QUAXA      3
      DIMENSION   C1(8),A1(8)                                           QUAXA      4
     1,E1MA(8)                                                          QUAXA      5
      DATA   KTEST/0/                                                   QUAXA      6
      IF(KTEST.EQ.1)  GO  TO  1                                         QUAXA      7
      KTEST=1                                                           QUAXA      8
      C1(1)=+0.126989568E-04                                            QUAXA      9
      C1(2)=- .184120917E-02                                            QUAXA     10
      C1(3)=- .961312933E-02                                            QUAXA     11
      C1(4)=- .225760657E-01                                            QUAXA     12
      C1(5)=- .310946110E-01                                            QUAXA     13
      C1(6)=- .265378242E-01                                            QUAXA     14
      C1(7)=- .126056180E-01                                            QUAXA     15
      C1(8)=  .998682949                                                QUAXA     16
      A1(1)=- .290031996E+01                                            QUAXA     17
      A1(2)=- .144624003E+01                                            QUAXA     18
      A1(3)=- .100501888E+01                                            QUAXA     19
      A1(4)=- .670766121E+00                                            QUAXA     20
      A1(5)=- .417168640E+00                                            QUAXA     21
      A1(6)=- .228819077E+00                                            QUAXA     22
      A1(7)=- .960618034E-01                                            QUAXA     23
      A1(8)=  .170972326E-04                                            QUAXA     24
      EM=1.875                                                          QUAXA     25
      TWOM=2.0*EM                                                       QUAXA     26
      DO  100  K=1,8                                                    QUAXA     27
  100 E1MA(K)=EXP(TWOM*A1(K))                                           QUAXA     28
    1 Z=ZETA/EM                                                         QUAXA     29
      EMW=EM*W                                                          QUAXA     30
      EMZW=EMW*Z                                                        QUAXA     31
      CMZW=COS(EMZW)                                                    QUAXA     32
      SMZW=SIN(EMZW)                                                    QUAXA     33
      ZCMZW=Z*CMZW                                                      QUAXA     34
      ZSMZW=Z*SMZW                                                      QUAXA     35
      Z2=Z**2                                                           QUAXA     36
      TWOZ=2.0*ZETA                                                     QUAXA     37
      C2Z=COS(TWOZ)                                                     QUAXA     38
      S2Z=SIN(TWOZ)                                                     QUAXA     39
      ZC2Z=Z*C2Z                                                        QUAXA     40
      ZS2Z=Z*S2Z                                                        QUAXA     41
      REX=0.0                                                           QUAXA     42
      EMX=0.0                                                           QUAXA     43
      DO  2    J=1,8                                                    QUAXA     44
      A1J=A1(J)                                                         QUAXA     45
      C1J=C1(J)                                                         QUAXA     46
      E1=EXP(A1J*EMW)                                                   QUAXA     47
      E1MAJ=E1MA(J)                                                     QUAXA     48
      E1=E1/E1MAJ                                                       QUAXA     49
      T11=E1*(A1J*CMZW+ZSMZW)-      (A1J*C2Z+ZS2Z)                      QUAXA     50
      T12=E1*(ZCMZW-A1J*SMZW)-      (ZC2Z-A1J*S2Z)                      QUAXA     51
      T13=A1J**2+Z2                                                     QUAXA     52
      REX=REX+C1J*(T11/T13)                                             QUAXA     53
      EMX=EMX+C1J*(T12/T13)                                             QUAXA     54
    2 CONTINUE                                                          QUAXA     55
      REX=REX  /EM                                                      QUAXA     56
      EMX=EMX  /EM                                                      QUAXA     57
      RETURN                                                            QUAXA     58
```

```
                73 READ (MTAP10) AIC                                                GRS        59
                   REWIND MTAP10                                                    GRS        60
60              75 DO 2  J=1,NMOD                                                   GRS        61
                   CALL RNRW (-MTAP2,CHR(1,J),NO1)                                  GRS        62
                 2 CALL RNRW (-MTAP2,ALPHA(1,J),NO1)                                GRS        63
                   DO 72 I =1,NN                                                    GRS        64
                   DO 72 J =1,NS                                                    GRS        65
65                 ZHR = ZKB * CHR(I,J)                                             GRS        66
                72 CDW(I,J) = CMPLX (ALPHA(I,J),ZHR)                                GRS        67
                   NIX  =  0                                                        GRS        68
                   CALL CLSQ (AIC,NN,NNP,CDW,KLUE,GETA,100,NIX)                     GRS        69
                   IF (NIX.NE.0) GOTO 500                                           GRS        70
70                 IF (LC12.NE.0) GOTO 1                                            GRS        71
                   WRITE(MTAP11) AIC                                                GRS        72
                   WRITE(MTAP11) GETA                                               GRS        73
                 1 DO 109 I=1,NNP                                                   GRS        74
                   DO 109 J =1,NS                                                   GRS        75
75                 BIR(I,J) = REAL(CDW(I,J))                                        GRS        76
                   BII(I,J) =AIMAG(CDW(I,J))                                        GRS        77
                   IF(ZK.EQ.0.0)BII(I,J)=0.0                                        GRS        78
               109 CONTINUE                                                         GRS        79
             C                                                                      GRS        80
80           C                                                                      GRS        81
                   DO 3  J=1,NMOD                                                   GRS        82
                 3 CALL RNRW (-MTAP2,HR(1,J),NO2)                                   GRS        83
                   M2 = MM + MM                                                     GRS        84
                   MM = MCC                                                         GRS        85
85                 MLR = NNP                                                        GRS        86
             C     GENERALIZED AERODYNAMIC FORCES                                   GRS        87
                   DO 5 I =1,NS                                                     GRS        88
                   DO 5 J =1,NS                                                     GRS        89
                   QR(I,J) = 0.0                                                    GRS        90
90                 QI(I,J) = 0.0                                                    GRS        91
                   DO 6 L1 = 1,MLR                                                  GRS        92
                   L=1+(L1-1)/LIRR                                                  GRS        93
                   K=L1-(L-1)*LIRR                                                  GRS        94
                   NU = 2*(K-1) + LL                                                GRS        95
95                 DO 6 N1 = 1,MLR2                                                 GRS        96
                   J1 = (N1-1)/M2 + 1                                               GRS        97
                   I1 = N1 - (J1-1)*M2                                              GRS        98
                   AD = HR(N1,I)*(1.0-Y(J1)**2)*(1.0-XII(I1)**2)*Y(J1)**NU          GRS        99
                   IF (L-1) 7,7,8                                                   GRS       100
100                7 AD = AD/(1.0+XII(I1))                                          GRS       101
                   GO TO 9                                                          GRS       102
                 8 AD = AD*XII(I1)**(L-2)                                           GRS       103
                 9 QR(I,J) = QR(I,J) + AD*BIR(L1,J)                                 GRS       104
                   IF (ZK) 6,6,10                                                   GRS       105
105             10 QI(I,J) = QI(I,J) + AD*BII(L1,J)                                GRS       106
                 6 CONTINUE                                                         GRS       107
                   IF (ZK) 12,12,13                                                 GRS       108
                12 QR(I,J) = CONSS*QR(I,J)                                          GRS       109
                   GO TO 5                                                          GRS       110
110             13 QR(I,J) = CONSTA*QR(I,J)                                        GRS       111
                   QI(I,J) = CONSTA*QI(I,J)                                         GRS       112
                 5 CONTINUE                                                         GRS       113
                   IF (LC(6) .EQ. 0 )     GO TO 82                                  GRS       114
                   LINE=0                                                           GRS       115
```

```
                      DO 80 J=1,NS                                                GRS       116
                      IF(LINE.EQ.0)WRITE (ITAPEW,81)ISI,ZM,ZK                     GRS       117
                      NONP = NNP/3                                                GRS       118
                      NDNP = NNP-3*NNP                                            GRS       119
                      IF(NDNP.NE.0)NONP=NONP+1                                    GRS       120
                      NONP=NONP+2                                                 GRS       121
                      LINE=LINE+NONP                                              GRS       122
                      IF(LINE.GT.50)LINE=0                                        GRS       123
                      WRITE (ITAPEW,38)J                                          GRS       124
                      WRITE (ITAPEW,39)(BIR(I,J), BII(I,J),I=1,NNP)               GRS       125
                   80 CONTINUE                                                    GRS       126
                      WRITE (ITAPEW,40) ISI, ZM, ZK                               GRS       127
                      LINE = 8                                                    GRS       128
                      KONS = NS + NS/3 - 3*(NS/3) + 1                             GRS       129
                      DO 41 I=1,NS                                                GRS       130
                      LINE = LINE + KONS                                          GRS       131
                      IF (LINE.LE.62)  GO TO 41                                   GRS       132
                      LINE = 8 + KONS                                             GRS       133
                      WRITE (ITAPEW,40) ISI , ZM , ZK                             GRS       134
                   41 WRITE (ITAPEW,42)(QR(I,J),QI(I,J),J=1,NS)                   GRS       135
                   82 M=MAMM                                                      GRS       136
                      GO TO 550                                                   GRS       137
                  500 WRITE (ITAPEW,501)                                          GRS       138
                      STOP                                                        GRS       139
                C                                                                 GRS       140
                C                                                                 GRS       141
                C FORMATS                                                         GRS       142
                C                                                                 GRS       143
                   38 FORMAT(I5)                                                  GRS       144
                   39 FORMAT(/( T8,1PE10.3,T20,1PE10.3, T6,2H (,T18,2H, , T30,2H) ,  GRS       145
                     1          T34,1PE10.3,T46,1PE10.3,T32,2H (,T44,2H,  T56,2H) ,  GRS       146
                     2         T60,1PE10.3,T72,1PE10.3,T58,2H (,T70,2H, , T82,2H) ))  GRS       147
                   40 FORMAT (1H1,5X13HSURFACE NO. =,I3,/5X10HMACH NO. =,E10.3 /5X  GRS       148
                     1         19HREDUCED FREQUENCY =,E10.3/5X                    GRS       149
                     2         40HGENERALIZED AIR FORCES WITHOUT ADDITIONS,/15X    GRS       150
                     3         16H(REAL,IMAGINARY), //)                           GRS       151
                   42 FORMAT(/( T3,1PE10.3,T15,1PE10.3, T1,2H (,T13,2H, , T25,2H) ,  GRS       152
                     1          T29,1PE10.3,T41,1PE10.3,T27,2H (,T39,2H, , T51,2H) ,  GRS       153
                     2          T55,1PE10.3,T67,1PE10.3,T53,2H (,T65,2H, ,T77,2H) ))  GRS       154
                   81 FORMAT (1H1,5X13HSURFACE NO. =,I3,/5X10HMACH NO. =,E10.3 /5X  GRS       155
                     1         19HREDUCED FREQUENCY =,E10.3/5X23HPOLYNOMIAL COEFFICIENTS,  GRS       156
                     2         /1X4HMODE,10X11H(REAL,IMAG), /)                    GRS       157
                  501 FORMAT (1H1,4X20HNO SOLUTION POSSIBLE,//5X20HCHECK INPUT DATA****)  GRS       158
                C                                                                 GRS       159
                  550 RETURN                                                      GRS       160
                      END                                                         GRS       161
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 GRS	1	159

VARIABLES	SN	TYPE		RELOCATION								
11	ABO	REAL		COMB	REFS	12	37	44				
721	AD	REAL			REFS	100	102	103	105	DEFINED	98	100
					102							
10617	AIC	COMPLEX	ARRAY		REFS	10	68	71	DEFINED	55	58	
12	ALO	REAL		COMB	REFS	12	37	2*39				
726	ALPHA	REAL	ARRAY		REFS	5	19	62	66			
671	AQ	REAL			REFS	35	DEFINED	33				
0	BII	REAL	ARRAY	F.P.	REFS	3	105	124	DEFINED	1	76	77
0	BIR	REAL	ARRAY	F.P.	REFS	3	103	124	DEFINED	1	75	
50	BR	REAL		COMA	REFS	11	37	38	3*42			
677	BR4	REAL			REFS	43	DEFINED	42				
22427	CDW	COMPLEX	ARRAY		REFS	10	68	75	76	DEFINED	66	
4646	CHR	REAL	ARRAY		REFS	6	19	61	65			
676	CONSS	REAL			REFS	40	108	DEFINED	39	40		
674	CONST	REAL			REFS	2*38	DEFINED	37				
675	CONSTA	REAL			REFS	43	110	111	DEFINED	38	43	
170	ETA	REAL	ARRAY	COMD	REFS	13						
10566	GETA	REAL	ARRAY		REFS	8	68	72	DEFINED	56		
726	HR	REAL	ARRAY		REFS	7	2*19	82	98			
707	I	INTEGER			REFS	65	2*66	2*75	2*76	77	89	90
					98	2*103	2*105	2*108	2*110	2*111	2*124	2*134
					DEFINED	63	73	87	124	129		
2	IRR	INTEGER		COMB	REFS	12	33					
0	ISI	INTEGER		COMB	REFS	12	116	126	133			
4	ISS	INTEGER		COMB	REFS	12						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	9	18	22	23	24	25	
661	ITAPEW	INTEGER			DEFINED	22	I/O REFS	116	123	124	126	133
					134	137						
720	I1	INTEGER			REFS	98	100	102	DEFINED	97		
706	J	INTEGER			REFS	61	62	65	2*66	2*75	2*76	77
					82	89	90	3*103	3*105	2*108	2*110	2*111
					123	2*124	2*134	DEFINED	60	64	74	81
					88	115	134					
717	J1	INTEGER			REFS	97	2*98	DEFINED	96			
714	K	INTEGER			REFS	94	DEFINED	93				
705	KLUE	INTEGER			REFS	68	DEFINED	51	53			
725	KONS	INTEGER			REFS	130	132	DEFINED	128			
713	L	INTEGER			REFS	93	99	102	DEFINED	92		
0	LC	INTEGER	ARRAY	COMA	REFS	11	28	2*30	113			
665	LC12	INTEGER			REFS	53	54	70	DEFINED	28		
722	LINE	INTEGER			REFS	116	121	122	130	131		
					DEFINED	114	121	122	127	130	132	
5	LIRA	INTEGER		COMB	REFS	12	46					
704	LIRR	INTEGER			REFS	92	93	DEFINED	49			
0	LL	INTEGER		F.P.	REFS	94	DEFINED	1				
712	L1	INTEGER			REFS	92	93	103	105	DEFINED	91	
1	M	INTEGER		COMB	REFS	12	32	DEFINED	135			
703	MAMM	INTEGER			REFS	135	DEFINED	48				
0	MCC	INTEGER		COMF	REFS	15	84					
701	MLR	INTEGER			REFS	2*47	91	DEFINED	46	85		
702	MLR2	INTEGER			REFS	95	DEFINED	47				
670	MM	INTEGER			REFS	33	46	48	2*83	DEFINED	32	84
663	MTAP10	INTEGER			DEFINED	24	I/O REFS	58	59			
664	MTAP11	INTEGER			DEFINED	25	I/O REFS	55	56	71	72	
662	MTAP2	INTEGER			REFS	61	62	82	DEFINED	23		
13	M2	INTEGER		COMB	REFS	12	96	97	DEFINED	83		

```
VARIABLES      SN  TYPE            RELOCATION
     3  N          INTEGER         COMB          REFS      12
   724  NDNP       INTEGER                       REFS     119    DEFINED     118
   711  NIX        INTEGER                       REFS      68     69    DEFINED      67
     1  NLRR       INTEGER         COMF          REFS      15     49
    10  NMOD       INTEGER         COMB          REFS      12     29      60      81
   667  NN         INTEGER                       REFS      63     68    DEFINED      31
     2  NNP        INTEGER         COMF          REFS      15     68      73      85     117    2*118     124
   723  NONP       INTEGER                       REFS     119    120     121    DEFINED     117     119     120
     6  NO1        INTEGER         COMB          REFS      12     31      61      62
     7  NO2        INTEGER         COMB          REFS      12     82
   666  NS         INTEGER                       REFS      51     53      64      74      87      88     115
                                                 3*128     129    134    DEFINED      29
   715  NU         INTEGER                       REFS      98    DEFINED      94
   716  N1         INTEGER                       REFS      96     97      98    DEFINED      95
   672  PIF        REAL                          REFS    2*35    DEFINED      34
     0  QI         REAL       ARRAY    F.P.      REFS       4    105     111     134    DEFINED       1      90
                                                   105     111
     0  QR         REAL       ARRAY    F.P.      REFS       4    103     108     110     134
                                                DEFINED       1     89     103     108     110
    36  RBBO       REAL       ARRAY    COMD      REFS      13
   500  SBBO       REAL       ARRAY    COMD      REFS      13
   673  TINT       REAL                          REFS      38     39    DEFINED      35
     0  X          REAL       ARRAY    COMD      REFS      13
    74  XI         REAL       ARRAY    COMD      REFS      13
    50  XII        REAL       ARRAY    COMD      REFS      13     98     100     102
   334  XIMW       REAL       ARRAY    COMD      REFS      13
    24  XMW        REAL       ARRAY    COMD      REFS      13
    12  Y          REAL       ARRAY    COMD      REFS      13   2*98
     2  YOE        REAL                COMI      REFS      16
     3  YOEX       REAL                COMI      REFS      16
   710  ZHR        REAL                          REFS      66    DEFINED      65
     0  ZK         REAL                COMI      REFS      16     36      37      41      44      77     104
                                                   107     116    126     133    DEFINED      30
   700  ZKB        REAL                          REFS      65    DEFINED      44
     1  ZKX        REAL                COMI      REFS      16
     0  ZM         REAL                COMJ      REFS      17    116     126     133
     3  Z2A        REAL                COMF      REFS      15
        VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS          TYPE   ARGS      REFERENCES
        CLSQ                 8          68
        RNRW                 3          61      62      82

INLINE FUNCTIONS   TYPE   ARGS      DEF LINE  REFERENCES
        AIMAG      REAL      1   INTRIN            76
        CMPLX      COMPLEX   2   INTRIN            66
        REAL       REAL      1   INTRIN            75

STATEMENT LABELS                   DEF LINE   REFERENCES
   144  1                             73         70
     0  2                             62         60
     0  3                             82         81
   303  5                            112         87      88      109
   263  6                            106         91      95    2*104
     0  7                 INACTIVE   100       2*99
   245  8                            102         99
   251  9                            103        101
```

STATEMENT LABELS			DEF LINE	REFERENCES	
0	10	INACTIVE	105	104	
0	12	INACTIVE	108	2*107	
276	13		110	107	
541	38	FMT	143	123	
543	39	FMT	144	124	
563	40	FMT	147	126	133
372	41		134	129	131
603	42	FMT	151	134	
0	72		66	63	64
71	73		58	54	
75	75		60	57	
0	80		125	115	
623	81	FMT	154	116	
413	82		135	113	
0	109		78	73	74
41	200		39	36	
51	201		44	41	
415	500		137	69	
642	501	FMT	157	137	
420	550		159	136	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
76	2	J	60 62	15B	EXT REFS	
114	72	I	63 66	17B	NOT INNER	
123	72	J	64 66	5B	INSTACK	
145	109	I	73 78	22B	NOT INNER	
156	109	J	74 78	5B	INSTACK	
170	3	J	81 82	10B	EXT REFS	
205	5	I	87 112	103B	EXT REFS	NOT INNER
206	5	J	88 112	100B	EXT REFS	NOT INNER
213	6	L1	91 106	55B	EXT REFS	NOT INNER
223	6	N1	95 106	43B	EXT REFS	
313	80	J	115 125	41B	EXT REFS	NOT INNER
336		I	124 124	12B	EXT REFS	
364	41	I	129 134	27B	EXT REFS	NOT INNER
375		J	134 134	12B	EXT REFS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)							
COMA	41	0	LC	(40)	40	BR	(1)		
COMB	12	0	ISI	(1)	1	M	(1)	2	IRR (1)
		3	N	(1)	4	ISS	(1)	5	LIRA (1)
		6	NO1	(1)	7	NO2	(1)	8	NMOD (1)
		9	ABO	(1)	10	ALO	(1)	11	M2 (1)
COMD	420	0	X	(10)	10	Y	(10)	20	XMW (10)
		30	RBBO	(10)	40	XII	(20)	60	XI (60)
		120	ETA	(100)	220	XIMW	(100)	320	SBBO (100)
COMF	4	0	MCC	(1)	1	NLRR	(1)	2	NNP (1)
		3	Z2A	(1)					
COMI	4	0	ZK	(1)	1	ZKX	(1)	2	YOE (1)
		3	YOEX	(1)					
COMJ	1	0	ZM	(1)					
CTAPES	50	0	ITAPES	(50)					

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
ALPHA	4000	0	HR	(4000)	2000	CHR	(2000)

STATISTICS

PROGRAM LENGTH	32311B	13513
CM LABELED COMMON LENGTH	1024B	532

520000B CM USED

```
1                SUBROUTINE CLSQ( A, L, M, Y, N, BETA, MID, NIX)                CLSQ      2
                 DIMENSION  A(2,1), Y(2,1), BETA(1)                             CLSQ      3
                 NO = IABS(N)                                                   CLSQ      4
                 IF (N)  120, 100, 100                                          CLSQ      5
5              100 CALL UNIFAC( A, L, M, BETA, MID, NIX)                        CLSQ      6
                 IF (NIX)  130, 110, 110                                        CLSQ      7
               110 IF (N)  120, 130, 120                                        CLSQ      8
               120 CALL UNISLV(A, L, M, Y, NO, BETA, MID)                       CLSQ      9
               130 RETURN                                                       CLSQ     10
10               END                                                            CLSQ     11
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CLSQ	1	9

VARIABLES

	SN	TYPE		RELOCATION						
0	A	REAL	ARRAY	F.P.	REFS	2	5	8	DEFINED	1
0	BETA	REAL	ARRAY	F.P.	REFS	2	5	8	DEFINED	1
0	L	INTEGER		F.P.	REFS	5	8	DEFINED	1	
0	M	INTEGER		F.P.	REFS	5	8	DEFINED	1	
0	MID	INTEGER		F.P.	REFS	5	8	DEFINED	1	
0	N	INTEGER		F.P.	REFS	3	4	7	DEFINED	1
0	NIX	INTEGER		F.P.	REFS	5	6	DEFINED	1	
60	NO	INTEGER			REFS	8	DEFINED	3		
0	Y	REAL	ARRAY	F.P.	REFS	2	8	DEFINED	1	

EXTERNALS

	TYPE	ARGS	REFERENCES
UNIFAC		6	5
UNISLV		7	8

INLINE FUNCTIONS

	TYPE	ARGS		DEF LINE	REFERENCES
IABS	INTEGER	1	INTRIN		3

STATEMENT LABELS

			DEF LINE	REFERENCES	
0	100	INACTIVE	5	2*4	
0	110	INACTIVE	7	2*6	
26	120		8	4	2*7
40	130		9	6	7

STATISTICS

PROGRAM LENGTH 61B 49

52000B CM USED

```
      SUBROUTINE UNIFAC(A, L, M, BETA, MID, NIX)                        UNIFAC     2
C                                                                       UNIFAC     3
C   UNITARY - TRIANGULAR FACTORIZATION OF AN L BY M COMPLEX MATRIX      UNIFAC     4
C   (WITH L GE M.)                                                      UNIFAC     5
C                                                                       UNIFAC     6
C   UNITARY FACTORS ARE HOUSEHOLDER ELEMENTARY HERMITIAN MATRICES OF    UNIFAC     7
C   THE FORM                                                            UNIFAC     8
C                   I  -  BETA * V * VC,                                UNIFAC     9
C   WHERE VC DESIGNATES V CONJUGATE TRANSPOSE, AND V HAS AN IMPLICIT 1. UNIFAC    10
C   IN THE PIVOT POSITION.  ELEMENTS OF V ARE STORED OVER CORRESPONDING UNIFAC    11
C   ELEMENTS OF A AND THE BETA VALUES ARE SAVED IN THE BETA ARRAY.      UNIFAC    12
C                                                                       UNIFAC    13
C                                                                       UNIFAC    14
C                                                                       UNIFAC    15
C   PARAMETER SIGNIFICANCE                                              UNIFAC    16
C                                                                       UNIFAC    17
C     A      -  DOUBLE ARRAY CONTAINING MATRIX TO BE FACTORED,          UNIFAC    18
C                                                                       UNIFAC    19
C     L, M   -  NUMBER OF ROWS AND COLUMNS OF A,                        UNIFAC    20
C                                                                       UNIFAC    21
C     BETA   -  ARRAY OF BETA VALUES,                                   UNIFAC    22
C                                                                       UNIFAC    23
C     MID    -  ROW (FIRST) DIMENSION OF THE ARRAY A,                   UNIFAC    24
C                                                                       UNIFAC    25
C     NIX    -  ERROR INDICATOR SET TO 0 AFTER A SUCCESSFUL EXECUTION   UNIFAC    26
C               AND TO -K IF THE K COLUMNS OF A ARE (APPROXIMATELY)     UNIFAC    27
C               LINEARLY DEPENDENT.                                     UNIFAC    28
C                                                                       UNIFAC    29
C                                                                       UNIFAC    30
      COMPLEX  CRHO, DUPER                                              UNIFAC    31
      DIMENSION  A(2,1), BETA(1), RHO(2), ALF(2)                        UNIFAC    32
      EQUIVALENCE  (CRHO, RHO(1))                                       UNIFAC    33
      KB = 1                                                            UNIFAC    34
      LK = L                                                            UNIFAC    35
      LP1MK = L                                                         UNIFAC    36
C  I.E.  L + 1 - K                                                      UNIFAC    37
      LAST = M * MID                                                    UNIFAC    38
      DO 170  K = 1, M                                                  UNIFAC    39
      K1K = KB + K                                                      UNIFAC    40
      KK = K1K - 1                                                      UNIFAC    41
      TEMP = -SQRT(SUPERF( A(1,KB), A(1,KB), 2*K-1, 2*L, 1) )           UNIFAC    42
      RHO(1) = TEMP                                                     UNIFAC    43
      RHO(2) = 0.                                                       UNIFAC    44
      IF (TEMP)  90, 190, 90                                            UNIFAC    45
   90 SIZE = SQRT( A(1,KK)**2 + A(2,KK)**2 )                            UNIFAC    46
      IF (SIZE)  100, 110, 100                                          UNIFAC    47
  100 RHO(1) = TEMP * (A(1,KK) / SIZE)                                  UNIFAC    48
      RHO(2) = TEMP * (A(2,KK) / SIZE)                                  UNIFAC    49
  110 BETA(K) = (SIZE - TEMP) / TEMP                                    UNIFAC    50
      ALF(1) = A(1,KK) - RHO(1)                                         UNIFAC    51
      ALF(2) = A(2,KK) - RHO(2)                                         UNIFAC    52
      SIZE = ALF(1)**2 + ALF(2)**2                                      UNIFAC    53
      ALF(1) = ALF(1) / SIZE                                            UNIFAC    54
      ALF(2) = ALF(2) / SIZE                                            UNIFAC    55
      DO 120  JK = KK,LK                                                UNIFAC    56
      TEMP = A(1,JK)*ALF(1) + A(2,JK)*ALF(2)                            UNIFAC    57
      A(2,JK) = A(2,JK)*ALF(1) - A(1,JK)*ALF(2)                         UNIFAC    58
```

```
                  120 A(1,JK) = TEMP                                                    UNIFAC     59
                      A(1,KK) = RHO(1)                                                  UNIFAC     60
      60              A(2,KK) = RHO(2)                                                  UNIFAC     61
                      TEMP = BETA(K)                                                    UNIFAC     62
                      KJ = KK                                                           UNIFAC     63
                  130 KJ = KJ + MID                                                     UNIFAC     64
                      IF (KJ - LAST)  140, 140, 160                                     UNIFAC     65
      65              140 CRHO = DUPER( A(1,KK), A(1,KJ), 2, LP1MK, -1)                 UNIFAC     66
                      ALF(1) = TEMP * (RHO(1) + A(1,KJ))                                UNIFAC     67
                      ALF(2) = TEMP * (RHO(2) + A(2,KJ))                                UNIFAC     68
                      A(1,KJ) = A(1,KJ) + ALF(1)                                        UNIFAC     69
                      A(2,KJ) = A(2,KJ) + ALF(2)                                        UNIFAC     70
      70              IJ = KJ                                                           UNIFAC     71
                      DO 150  IK = K1K, LK                                              UNIFAC     72
                      IJ = IJ + 1                                                       UNIFAC     73
                      A(1,IJ) = A(1,IJ) + ALF(1)*A(1,IK) - ALF(2)*A(2,IK)               UNIFAC     74
                  150 A(2,IJ) = A(2,IJ) + ALF(1)*A(2,IK) + ALF(2)*A(1,IK)               UNIFAC     75
      75              GO TO 130                                                         UNIFAC     76
                  160 LP1MK = LP1MK - 1                                                 UNIFAC     77
                      LK = LK + MID                                                     UNIFAC     78
                  170 KB = KB + MID                                                     UNIFAC     79
                      NIX = 0                                                           UNIFAC     80
      80              180 RETURN                                                        UNIFAC     81
                  190 NIX = -K                                                          UNIFAC     82
                      GO TO 180                                                         UNIFAC     83
                      END                                                               UNIFAC     84
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	UNIFAC	1	80

VARIABLES

	SN	TYPE			RELOCATION							
0	A	REAL	ARRAY	F.P.	REFS	31	2*41	2*45	47	48	50	51
					2*56	2*57	2*65	66	67	68	69	3*73
					3*74	DEFINED	1	57	58	59	60	68
					69	73	74					
213	ALF	REAL	ARRAY		REFS	31	2*52	53	54	2*56	2*57	68
					69	2*73	2*74	DEFINED	50	51	53	54
					66	67						
0	BETA	REAL	ARRAY	F.P.	REFS	31	61	DEFINED	1	49		
211	CRHO	COMPLEX			REFS	30	32	DEFINED	65			
207	IJ	INTEGER			REFS	72	2*73	2*74	DEFINED	70	72	
210	IK	INTEGER			REFS	2*73	2*74	DEFINED	71			
205	JK	INTEGER			REFS	2*56	3*57	58	DEFINED	55		
200	K	INTEGER			REFS	39	41	49	61	81		
					DEFINED	38						
174	KB	INTEGER			REFS	39	2*41	78	DEFINED	33	78	
206	KJ	INTEGER			REFS	63	64	65	66	67	2*68	2*69
					70	DEFINED	62	63				
202	KK	INTEGER			REFS	2*45	47	48	50	51	55	59
					60	62	65	DEFINED	40			
201	K1K	INTEGER			REFS	40	71	DEFINED	39			

```
VARIABLES      SN  TYPE            RELOCATION
     0  L          INTEGER              F.P.        REFS        34        35        41    DEFINED         1
   177  LAST       INTEGER                          REFS        64    DEFINED        37
   175  LK         INTEGER                          REFS        55        71        77    DEFINED        34        77
   176  LP1MK      INTEGER                          REFS        65        76    DEFINED        35        76
     0  M          INTEGER              F.P.        REFS        37        38    DEFINED         1
     0  MID        INTEGER              F.P.        REFS        37        63        77        78    DEFINED         1
     0  NIX        INTEGER              F.P.     DEFINED         1        79        81
   211  RHO        REAL       ARRAY                 REFS        31        32        50        51        59        60        66
                                                     67    DEFINED        42        43        47        48
   204  SIZE       REAL                             REFS        46        47        48        49        53        54
                                                  DEFINED        45        52
   203  TEMP       REAL                             REFS        42        44        47        48      2*49        58        66
                                                     67    DEFINED        41        56        61

EXTERNALS           TYPE    ARGS        REFERENCES
       DUPER        COMPLEX    5                30        65
       SQRT         REAL       1 LIBRARY        41        45
       SUPERF       REAL       5                41

STATEMENT LABELS                DEF LINE    REFERENCES
     0  90          INACTIVE        45        2*44
     0  100         INACTIVE        47        2*46
    43  110                         49          46
     0  120                         58          55
    76  130                         63          75
     0  140         INACTIVE        65        2*64
     0  150                         74          71
   140  160                         76          64
     0  170                         78          38
   151  180                         80          82
   152  190                         81          44

LOOPS  LABEL    INDEX      FROM-TO    LENGTH    PROPERTIES
    14  170     K            38 78      134B              EXT REFS    EXITS    NOT INNER
    61  120     JK           55 58       6B     INSTACK
   126  150     IK           71 74      11B        OPT

EQUIV CLASSES   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       CRHO          2              0 RHO    (2)

STATISTICS
  PROGRAM LENGTH                2378      159
        52000B CM USED
```

```
      CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      DUPER      2
            COMPLEX FUNCTION DUPER (X,Y,LEAST,LAST,MID)                       DUPER      3
            COMPLEX DCMPLF                                                    DUPER      4
      CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        DUPER      5
      C                                                                       DUPER      6
      CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     DUPER      7
      C     COMPLEX FUNCTION DUPER*16 (X,Y,LEAST,LAST,MID)                    DUPER      8
      C     DOUBLE PRECISION S                                                DUPER      9
      C     COMPLEX*16 DCMPLF                                                 DUPER     10
      CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        DUPER     11
      C                                                                       DUPER     12
      C   INNER PRODUCT OF 2 COMPLEX VECTORS FROM LEAST TO LAST.  CONJUGATE   DUPER     13
      C                                                                       DUPER     14
      C                                                                       DUPER     15
            DIMENSION  S(2), X(2,1), Y(2,1)                                   DUPER     16
            S(1)  =  0.0                                                      DUPER     17
            S(2)  =  0.0                                                      DUPER     18
            IF (LEAST - LAST)  100, 100, 150                                  DUPER     19
          100 MIDX = IABS(MID)                                                DUPER     20
            IX = (LEAST - 1) * MIDX  +  1                                     DUPER     21
            IF (MID)  110, 150, 130                                           DUPER     22
      C                                                                       DUPER     23
      C   WHEN MID IS LT 0,  X CONJUGATE IS USED.                            DUPER     24
      C                                                                       DUPER     25
          110 DO 120  IY = LEAST, LAST                                        DUPER     26
            S(1) = S(1) + X(1,IX)*Y(1,IY) + X(2,IX)*Y(2,IY)                   DUPER     27
            S(2) = S(2) + X(1,IX)*Y(2,IY) - X(2,IX)*Y(1,IY)                   DUPER     28
          120 IX = IX + MIDX                                                  DUPER     29
            GO TO 150                                                         DUPER     30
      C                                                                       DUPER     31
      C   WHEN MID IS GT 0,  X ITSELF IS USED.                              DUPER     32
      C                                                                       DUPER     33
          130 DO 140  IY = LEAST, LAST                                        DUPER     34
            S(1) = S(1) + X(1,IX)*Y(1,IY) - X(2,IX)*Y(2,IY)                   DUPER     35
            S(2) = S(2) + X(1,IX)*Y(2,IY) + X(2,IX)*Y(1,IY)                   DUPER     36
          140 IX = IX + MIDX                                                  DUPER     37
          150 DUPER   = DCMPLF(S(1), S(2))                                    DUPER     38
            RETURN                                                            DUPER     39
            END                                                               DUPER     40
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
5	DUPER	2	38

VARIABLES

		SN	TYPE	RELOCATION								
74	DUPER		COMPLEX		DEFINED	37						
77	IX		INTEGER		REFS	2*26	2*27	28	2*34	2*35	36	
					DEFINED	20	28	36				
100	IY		INTEGER		REFS	2*26	2*27	2*34	2*35	DEFINED	25	33
0	LAST		INTEGER	F.P.	REFS	18	25	33	DEFINED	2		
0	LEAST		INTEGER	F.P.	REFS	18	20	25	33	DEFINED	2	
0	MID		INTEGER	F.P.	REFS	19	21	DEFINED	2			

```
VARIABLES      SN  TYPE          RELOCATION
    76  MIDX       INTEGER                          REFS        20      28      36    DEFINED     19
   101  S          REAL          ARRAY              REFS        15      26      27      34        35      2*37
                                                   DEFINED      16      17      26      27        34      35
     0  X          REAL          ARRAY     F.P.     REFS        15    2*26    2*27    2*34      2*35
                                                   DEFINED      2
     0  Y          REAL          ARRAY     F.P      REFS        15    2*26    2*27    2*34      2*35
                                                   DEFINED      2

EXTERNALS            TYPE    ARGS       REFERENCES
       DCMPLF        COMPLEX   2              3        37

INLINE FUNCTIONS     TYPE    ARGS       DEF LINE   REFERENCES
       IABS          INTEGER   1   INTRIN              19

STATEMENT LABELS                 DEF LINE    REFERENCES
     0  100          INACTIVE       19         2*18
     0  110          INACTIVE       25          21
     0  120                         28          25
    42  130                         33          21
     0  140                         36          33
    65  150                         37          18          21        29

LOOPS  LABEL    INDEX      FROM-TO     LENGTH     PROPERTIES
    30  120     IY           25 28       118        OPT
    53  140     IY           33 36       118        OPT

STATISTICS
  PROGRAM LENGTH                 103B       67
          520000B CM USED
```

```
      1                FUNCTION SUPERF(X, Y, LEAST, LAST, MIDX)                    SUPERF      2
                C                                                                  SUPERF      3
                C   INNER PRODUCT OF 2 REAL VECTORS FROM LEAST TO LAST.             SUPERF      4
                C                                                                  SUPERF      5
      5         C                                                                  SUPERF      6
                CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS SUPERF      7
                C     DOUBLE PRECISION SUPERF, S                                   SUPERF      8
                CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS    SUPERF      9
                C                                                                  SUPERF     10
     10               DIMENSION  X(1), Y(1)                                        SUPERF     11
                      S = 0.0                                                      SUPERF     12
                      IF (LEAST - LAST)  100, 100, 120                             SUPERF     13
                  100 IX = (LEAST - 1) * MIDX  +  1                                SUPERF     14
                      DO 110  IY = LEAST, LAST                                     SUPERF     15
     15               S = S  +  X(IX) * Y(IY)                                      SUPERF     16
                  110 IX = IX + MIDX                                               SUPERF     17
                  120 SUPERF = S                                                   SUPERF     18
                      RETURN                                                       SUPERF     19
                      END                                                          SUPERF     20
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
4	SUPERF	1	18

VARIABLES

		SN	TYPE		RELOCATION						
33	IX		INTEGER			REFS	15	16	DEFINED	13	16
34	IY		INTEGER			REFS	15	DEFINED	14		
0	LAST		INTEGER		F.P.	REFS	12	14	DEFINED	1	
0	LEAST		INTEGER		F.P.	REFS	12	13	14	DEFINED	1
0	MIDX		INTEGER		F.P.	REFS	13	16	DEFINED	1	
32	S		REAL			REFS	15	17	DEFINED	11	15
31	SUPERF		REAL			DEFINED	17				
0	X		REAL	ARRAY	F.P.	REFS	10	15	DEFINED	1	
0	Y		REAL	ARRAY	F.P.	REFS	10	15	DEFINED	1	

STATEMENT LABELS

			DEF LINE	REFERENCES
0	100	INACTIVE	13	2*12
0	110		16	14
27	120		17	12

LOOPS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
22	110	IY	14 16	48	INSTACK

STATISTICS

PROGRAM LENGTH 358 29

52000B CM USED

```
      SUBROUTINE UNISLV(A, L, M, Y, N, BETA, MID)                       UNISLV     2
C                                                                       UNISLV     3
C                                                                       UNISLV     4
      COMPLEX  CALF, DUPER                                              UNISLV     5
      DIMENSION  A(2 1), Y(2,1), BETA(1), ALF(2)                        UNISLV     6
      EQUIVALENCE  ( CALF, ALF(1) )                                     UNISLV     7
      MID1 = MID + 1                                                    UNISLV     8
      LEAP = M - 1                                                      UNISLV     9
      KBY = 1                                                           UNISLV    10
C                                                                       UNISLV    11
C   MAJOR LOOP PROCESSES 1 RIGHT SIDE FOR EACH K VALUE.                 UNISLV    12
C                                                                       UNISLV    13
      DO 140  K = 1, N                                                  UNISLV    14
      IB = 1                                                            UNISLV    15
      LI = L                                                            UNISLV    16
      IKY = KBY                                                         UNISLV    17
C                                                                       UNISLV    18
C   I LOOP MULTIPLIES RIGHT SIDE BY THE HOUSEHOLDER MATRICES.           UNISLV    19
C                                                                       UNISLV    20
      DO 110  I = 1, M                                                  UNISLV    21
      I1I = IB + I                                                      UNISLV    22
      CALF = DUPER( A(1,IB), Y(1,KBY), I+1, L, -1)                      UNISLV    23
      ALF(1) = BETA(I) * (Y(1,IKY) + ALF(1))                            UNISLV    24
      ALF(2) = BETA(I) * (Y(2,IKY) + ALF(2))                            UNISLV    25
      Y(1,IKY) = Y(1,IKY) + ALF(1)                                      UNISLV    26
      Y(2,IKY) = Y(2,IKY) + ALF(2)                                      UNISLV    27
      JKY = IKY                                                         UNISLV    28
      DO 100  JI = I1I, LI                                              UNISLV    29
      JKY = JKY + 1                                                     UNISLV    30
      Y(1,JKY) = Y(1,JKY)  +  ALF(1) * A(1,JI)  -  ALF(2) * A(2,JI)     UNISLV    31
  100 Y(2,JKY) = Y(2,JKY)  +  ALF(1) * A(2,JI)  +  ALF(2) * A(1,JI)     UNISLV    32
      IKY = IKY + 1                                                     UNISLV    33
      IB = IB + MID                                                     UNISLV    34
  110 LI = LI + MID                                                     UNISLV    35
      IKY = KBY + LEAP                                                  UNISLV    36
      II = I1I - 1                                                      UNISLV    37
      ALF(2) = A(1,II)**2 + A(2,II)**2                                  UNISLV    38
      ALF(1)   = (Y(1,IKY)*A(1,II) + Y(2,IKY)*A(2,II)) / ALF(2)         UNISLV    39
      Y(2,IKY) = (Y(2,IKY)*A(1,II) - Y(1,IKY)*A(2,II)) / ALF(2)         UNISLV    40
      Y(1,IKY) = ALF(1)                                                 UNISLV    41
      IF (LEAP) 140, 140, 120                                           UNISLV    42
C                                                                       UNISLV    43
C   KOUNT LOOP CARRIES OUT A BACK SOLUTION TO COMPLETE LEAST-SQUARES    UNISLV    44
C   PROBLEM.                                                            UNISLV    45
C                                                                       UNISLV    46
  120 DO 130  KOUNT = 2, M                                              UNISLV    47
      IKY = IKY - 1                                                     UNISLV    48
      II = II - MID1                                                    UNISLV    49
      CALF = DUPER( A(1,II), Y(1,IKY), 2, KOUNT, MID)                   UNISLV    50
      ALF(1) = Y(1,IKY) - ALF(1)                                        UNISLV    51
      ALF(2) = Y(2,IKY) - ALF(2)                                        UNISLV    52
      TEMP = A(1,II)**2 + A(2,II)**2                                    UNISLV    53
      Y(1,IKY) = ( ALF(1)*A(1,II) + ALF(2)*A(2,II) ) / TEMP             UNISLV    54
  130 Y(2,IKY) = ( ALF(2)*A(1,II) - ALF(1)*A(2,II) ) / TEMP             UNISLV    55
  140 KBY = KBY + MID                                                   UNISLV    56
      RETURN                                                            UNISLV    57
      END                                                               UNISLV    58
```

STATEMENT LABELS			DEF LINE	REFERENCES							
722	414		275	271							
0	415	INACTIVE	282	281							
1026	416		291	2*281							
2004	418	FMT	351	296							
2020	421	FMT	354	208							
2026	422	FMT	355	291							
517	600		197	155	193	2*195					
0	601	INACTIVE	156	2*155							
0	602	INACTIVE	224	2*223							
2037	609	FMT	357	212							
2045	611	FMT	358	217							
2053	612	FMT	359	297							
2061	613	FMT	360	302							
2067	614	FMT	361	306							
2075	615	FMT	362	311							
2103	616	FMT	363	315							
2111	617	FMT	364	320							
0	630	INACTIVE	217	2*216							
0	632	INACTIVE	302	2*301							
1072	633		306	301							
0	634	INACTIVE	311	2*310							
1107	635		315	310							
0	636	INACTIVE	320	2*319							
2117	650	FMT	365	213	218	277	298	303	307	312	316	321
0	651		76	70							
350	670		150	2*145							
0	671	INACTIVE	146	145							
1050	700		294	290							
1124	701		324	77	223	319					
1053	702		296	293							
1055	703		297	295							
616	900		221	211	216						

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
53	651	IP	70 76	13B	OPT		
70	701	KL	77 324	1037B		EXT REFS	NOT INNER
73	200	K	80 210	506B		EXT REFS	NOT INNER
110	150	N	90 114	105B		EXT REFS	NOT INNER
133	150	J	97 114	60B		EXT REFS	
217	250	I	116 143	113B		EXT REFS	NOT INNER
232	250	N	123 143	75B		EXT REFS	NOT INNER
257	250	J	130 143	46B		EXT REFS	
333	201	I	144 154	27B		EXT REFS	
367	251	N	160 179	61B		EXT REFS	NOT INNER
370	251	J	161 179	56B		EXT REFS	
541		I	205 205	15B		EXT REFS	
565		I	209 209	10B		EXT REFS	
646	12	I	242 267	36B	OPT		
731	305	K	278 280	5B	INSTACK		
745		K	283 283	15B		EXT REFS	
770		K	286 286	15B		EXT REFS	
1013		K	289 289	11B		EXT REFS	
1033		K	292 292	13B		EXT REFS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
COMA	41	0 LC	(40)	40 BR	(1)		
COMB	12	0 ISI	(1)	1 M	(1)	2 IRR	(1)

STATEMENT LABELS			DEF LINE	REFERENCES				
0	1	INACTIVE	100	2*99				
153	2		103	99				
150	3		101	100				
162	4		106	4*100	2*103			
163	5		107	102	105			
0	6	INACTIVE	104	103				
0	7	INACTIVE	133	2*132				
277	8		136	132				
274	9		134	133				
306	10		139	4*133	2*136			
307	11		140	135	138			
703	12		267	242	254			
0	13	INACTIVE	164	2*163				
411	14		168	163	4*164			
405	15		165	164				
424	16		172	2*168				
426	17		174	167	171			
0	18	INACTIVE	169	168				
0	32	INACTIVE	137	136				
210	150		114	90	97	2*112		
0	160	INACTIVE	92	2*91				
116	161		94	91				
126	162		96	93				
0	170	INACTIVE	125	2*124				
241	171		127	124				
252	172		129	126				
576	200		210	80	197	207		
357	201		154	144	152			
322	250		143	116	123	130	2*141	
443	251		179	160	161	2*176		
1627	300	FMT	329	198				
1646	301	FMT	332	202				
1653	303	FMT	333	204				
1667	304	FMT	335	205	283	286		
0	305		280	278				
1672	306	FMT	336	276				
1704	307	FMT	338	282				
1720	308	FMT	340	285				
1734	309	FMT	342	288				
1743	310	FMT	343	294				
1773	390	FMT	348	289				
1776	391	FMT	349	209				
2001	392	FMT	350	292				
175	400		111	2*109				
0	401	INACTIVE	110	109				
0	402	INACTIVE	113	112				
0	403	INACTIVE	142	141				
362	404		155	115				
0	406	INACTIVE	177	176				
504	407		191	2*182				
0	408	INACTIVE	183	182				
0	409	INACTIVE	198	2*197				
0	410	INACTIVE	196	195				
0	411	INACTIVE	204	203				
560	412		208	2*203				
641	413		242	233				

VARIABLES	SN	TYPE		RELOCATION								
0	NPRES	INTEGER		COMC	REFS	26	115	197	211			
2165	NPTS	INTEGER			REFS	75	214	219	DEFINED	68	75	
2157	NS	INTEGER			REFS	77	DEFINED	62				
6407	NSYM	INTEGER	ARRAY		REFS	17	75	214	219	DEFINED	71	73
3	NZ	INTEGER		COMB	REFS	25						
2210	NZL	INTEGER			REFS	201	DEFINED	200				
2657	PHAD	REAL	ARRAY		REFS	11	283	DEFINED	187			
2633	PHAR	REAL	ARRAY		REFS	11	187	283	DEFINED	186		
2753	PHDP	REAL	ARRAY		REFS	12	205	DEFINED	149			
3047	PHMD	REAL	ARRAY		REFS	13	286	DEFINED	190			
3023	PHMR	REAL	ARRAY		REFS	13	190	286	DEFINED	189		
2727	PHRP	REAL	ARRAY		REFS	12	149	205	DEFINED	148		
6527	PREAL	REAL	ARRAY		REFS	19	214	DEFINED	31			
2703	PRES	REAL	ARRAY		REFS	12	205	DEFINED	147			
2537	PRESI	REAL	ARRAY		REFS	10	113	142	2*147	148	153	205
					DEFINED	89	113	122	142			
2513	PRESR	REAL	ARRAY		REFS	10	111	140	2*147	148	151	205
					209	DEFINED	88	111	121	140		
6543	PRIMA	REAL	ARRAY		REFS	19	219	DEFINED	32			
2154	RTD	REAL			REFS	149	187	190	DEFINED	48		
2201	SLFT	REAL			REFS	101	104	134	137	165	166	169
					170	DEFINED	96	129				
2162	STEPX	REAL			REFS	83	117	DEFINED	65			
2164	STEPY	REAL			REFS	78	81	280	DEFINED	67		
2211	SURF	REAL			REFS	243	268	272	DEFINED	224	243	
6313	XCLI	REAL	ARRAY		REFS	16	304	DEFINED	236	264		
6267	XCLR	REAL	ARRAY		REFS	16	299	DEFINED	230	251		
6363	XCMI	REAL	ARRAY		REFS	17	313	DEFINED	237	265		
6337	XCMR	REAL	ARRAY		REFS	17	308	DEFINED	231	252		
6457	XCPI	REAL	ARRAY		REFS	18	322	DEFINED	238	266		
6433	XCPR	REAL	ARRAY		REFS	18	317	DEFINED	232	253		
2227	XI	REAL	ARRAY		REFS	6	84	2*92	2*94	95	117	118
					2*125	2*127	128	DEFINED	83	117		
6557	XINA	REAL	ARRAY		REFS	19	214	219	DEFINED	33		
2607	XJ	REAL	ARRAY		REFS	11	85	120	205	209		
					DEFINED	84	118					
2224	XLTI	REAL			REFS	294	DEFINED	273				
2221	XLTR	REAL			REFS	294	296	DEFINED	269			
5	XM	REAL	ARRAY	COMC	REFS	26	245	256				
2225	YLTI	REAL			REFS	294	DEFINED	274				
2222	YLTR	REAL			REFS	294	296	DEFINED	270			
2	YOE	REAL		COMI	REFS	28						
3	YOEX	REAL		COMI	REFS	28						
0	ZK	REAL		COMI	REFS	28	109	112	141	145	152	176
					182	195	198	203	213	216	218	233
					254	271	277	281	298	301	303	307
					310	312	316	319	321	DEFINED	61	
1	ZKX	REAL		COMI	REFS	28						
0	ZM	REAL		COMJ	REFS	29	198	213	218	277	298	303
					307	312	316	321				
3	Z3A	REAL		COMF	REFS	27						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES							
FATAN	REAL	2	148	186	189					
PICTUR		14	214	219	299	304	308	313	317	322
SQRT	REAL	1 LIBRARY	92	94	96	125	127	129	147	185	188

VARIABLES	SN	TYPE		RELOCATION								
					2*266	DEFINED	116	144	205	209	242	
5423	IAUX	INTEGER	ARRAY		REFS	15	214	219	299	304	308	313
					317	322						
2	III	INTEGER		COMC	REFS	26	64	73	82	116	119	144
					150	199	200	205	209			
0	IND	INTEGER		F.P.	REFS	63	DEFINED	4				
2167	IP	INTEGER			REFS	71	72	2*73	2*74	75	76	
					DEFINED	70						
2174	IPR	INTEGER			REFS	85	120	151	153	DEFINED	82	119
					150							
2	IRR	INTEGER		COMB	REFS	25						
4	IS	INTEGER		COMB	REFS	25						
0	ISI	INTEGER		COMB	REFS	25	198	213	218	277	298	303
					307	312	316	321				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	23	30	45				
2153	ITAPEW	INTEGER			DEFINED	45	I/O REFS	198	202	204	205	208
					209	212	213	217	218	276	277	282
					283	285	286	288	289	291	292	294
					296	297	298	302	303	306	307	311
					312	315	316	320	321			
2202	J	INTEGER			REFS	98	100	108	110	111	113	131
					133	140	142	162	164	174	175	177
					178	DEFINED	97	130	161			
2173	K	INTEGER			REFS	82	86	103	111	113	119	136
					140	142	150	156	157	158	159	168
					2*174	2*175	2*177	2*178	2*180	2*181	2*183	2*184
					5*185	3*186	2*187	5*188	3*189	2*190	191	192
					193	3*194	3*196	279	280	6*283	6*286	3*289
					4*292	DEFINED	80	278	283	286	289	292
3	KK	INTEGER		COMC	REFS	26	66	73	74	80	242	278
					283	286	289	292				
2170	KL	INTEGER			REFS	108	110	198	212	217	276	297
					302	306	311	315	320	DEFINED	77	
2175	L	INTEGER			REFS	107	108	110	DEFINED	87	107	
0	LC	INTEGER	ARRAY	COMA	REFS	24	2*61					
2172	LINE	INTEGER			REFS	198	199	201	DEFINED	79	199	201
5	LIRR	INTEGER		COMB	REFS	25						
2160	LL	INTEGER			REFS	98	131	162	193	DEFINED	63	
1	M	INTEGER		COMB	REFS	25						
0	MCC	INTEGER		COMF	REFS	27	90	123	160			
2203	MJ	INTEGER			REFS	99	104	132	137	163	169	170
					DEFINED	98	131	162				
2166	MPTS	INTEGER			REFS	76	299	304	308	313	317	322
					DEFINED	69	76					
6503	MSYM	INTEGER	ARRAY		REFS	18	76	299	304	308	313	317
					322	DEFINED	72	74				
13	M2	INTEGER		COMB	REFS	25						
2176	N	INTEGER			REFS	91	95	108	110	111	113	124
					128	140	142	165	166	169	170	174
					175	177	178	DEFINED	90	123	160	
1	NCL	INTEGER		COMC	REFS	26	155	223				
1	NLRR	INTEGER		COMF	REFS	27	97	130	161			
10	NMOD	INTEGER		COMB	REFS	25	62					
2	NNP	INTEGER		COMF	REFS	27						
6	NO1	INTEGER		COMB	REFS	25						
7	NO2	INTEGER		COMB	REFS	25						
4	NPRD	INTEGER		COMC	REFS	26						

VARIABLES	SN	TYPE	RELOCATION		
3143	AXI	REAL	ARRAY		
2506	B	REAL	ARRAY		
31	BBO	REAL	ARRAY	COMC	
55	BBT	REAL		COMC	
50	BR	REAL		COMA	
2215	CALI	REAL			
2212	CALR	REAL			
2200	CK	REAL			
3117	CL	REAL	ARRAY		
2177	CLFT	REAL			
2361	CLI	REAL	ARRAY		
6623	CLIN	REAL	ARRAY		
2335	CLR	REAL	ARRAY		
6607	CLRN	REAL	ARRAY		
2223	CLTI	REAL			
2220	CLTR	REAL			
2777	CM	REAL	ARRAY		
2405	CMI	REAL	ARRAY		
6653	CMIN	REAL	ARRAY		
2217	CMIX	REAL			
2216	CMIY	REAL			
2563	CMR	REAL	ARRAY		
6637	CMRN	REAL	ARRAY		
2214	CMRX	REAL			
2213	CMRY	REAL			
2455	CPI	REAL	ARRAY		
6703	CPIN	REAL	ARRAY		
2431	CPR	REAL	ARRAY		
6667	CPRN	REAL	ARRAY		
2204	CS	REAL			
2171	ETA	REAL			
6573	ETAN	REAL	ARRAY		
3073	ETAS	REAL	ARRAY		
6243	FTA	REAL	ARRAY		
2205	I	INTEGER			

REFS	14	214	219	DEFINED	85	120	
REFS	9	166	170	DEFINED	56	57	58
59	60						
REFS	26	111	113	140	142	243	245
247	248	256	258	259	260	261	
REFS	26	224					
REFS	24						
REFS	255	272	273	274	DEFINED	239	255
REFS	244	268	269	270	DEFINED	225	244
REFS	95	128	DEFINED	94	127		
REFS	14	260	283	DEFINED	185	260	
REFS	101	104	134	137	DEFINED	92	95
125	128						
REFS	8	177	183	2*185	186	196	236
239	240	255	256	257	258	264	283
DEFINED	158	177	183	258			
REFS	20	304	DEFINED	36			
REFS	7	174	180	2*185	186	194	225
226	230	244	245	246	247	251	283
292	DEFINED	156	174	180	247		
REFS	20	299	DEFINED	35			
REFS	294	DEFINED	272				
REFS	294	296	DEFINED	268			
REFS	13	261	286	DEFINED	188	261	
REFS	8	178	184	2*188	189	196	237
240	256	259	265	286	DEFINED	159	178
184	259						
REFS	21	313	DEFINED	38			
REFS	257	274	DEFINED	241	257		
REFS	256	273	DEFINED	240	256		
REFS	10	175	181	2*188	189	194	226
231	245	248	252	286	292		
DEFINED	157	175	181	248			
REFS	21	308	DEFINED	37			
REFS	246	270	DEFINED	227	246		
REFS	245	269	DEFINED	226	245		
REFS	9	234	238	262	266	289	
DEFINED	192	196	234	262			
REFS	22	322	DEFINED	40			
REFS	8	228	232	249	253	289	292
DEFINED	191	194	228	249			
REFS	21	317	DEFINED	39			
REFS	111	113	140	142	DEFINED	101	104
106	134	137	139				
REFS	81	86	2*96	104	2*129	137	169
170	202	DEFINED	78	81			
REFS	20	299	304	308	313	317	322
DEFINED	34						
REFS	14	283	286	289	292		
DEFINED	280						
REFS	16	246	257	299	304	308	313
317	322	DEFINED	86				
REFS	2*117	2*118	119	120	121	122	2*125
2*127	128	2*140	2*142	5*147	3*148	2*149	150
151	153	6*205	2*209	243	244	4*245	2*246
3*247	3*248	2*249	2*251	2*252	2*253	255	4*256
2*257	3*258	3*259	3*260	3*261	2*262	2*264	2*265

```
                310 FORMAT (//1H ,4X20HSURFACE COEFFICIENTS/5X11HREAL VALUES,/5X       PRESS     341
                   1        5HCL = ,1PE10.3,5X23HXCP(FT FROM LE APEX) = ,1PE10.3,     PRESS     342
345                2        5X10HYCP(FT) = ,1PE10.3/5X16HIMAGINARY VALUES,/5X5HCL = ,  PRESS     343
                   3        1PE10.3,5X23HXCP(FT FROM LE APEX) = ,1PE10.3,5X           PRESS     344
                   4        10HYCP(FT) = ,1PE10.3)                                    PRESS     345
                390 FORMAT (5X,1P3E16.8)                                              PRESS     346
                391 FORMAT (5X,1P2E16.8)                                              PRESS     347
350             392 FORMAT (5X,1P4E16.8)                                              PRESS     348
                418 FORMAT (//1H ,4X20HSURFACE COEFFICIENTS,/5X5HCL = ,1PE10.3,5X     PRESS     349
                   1        23HXCP(FT FROM LE APEX) = ,1PE10.3,5X10HYCP(FT) = ,       PRESS     350
                   2        1PE10.3)                                                  PRESS     351
                421 FORMAT (//36H       CHORDWISE STA       REAL PART//)              PRESS     352
355             422 FORMAT (//62H     SPANWISE STATION       CL                CM      PRESS     353
                   1       CP//)                                                     PRESS     354
                609 FORMAT (1H1,6X6HMODE =,I5,10X20HPRESSURE-REAL VS. XI, //)         PRESS     355
                611 FORMAT (1H1,6X6HMODE =,I5,10X20HPRESSURE-IMAG VS. XI, //)         PRESS     356
                612 FORMAT (1H1,6X6HMODE =,I5,10X15HCL-REAL VS. ETA, //)              PRESS     357
360             613 FORMAT (1H1,6X6HMODE =,I5,10X15HCL-IMAG VS. ETA, //)              PRESS     358
                614 FORMAT (1H1,6X6HMODE =,I5,10X15HCM-REAL VS. ETA, //)              PRESS     359
                615 FORMAT (1H1,6X6HMODE =,I5,10X15HCM-IMAG VS. ETA, //)              PRESS     360
                616 FORMAT (1H1,6X6HMODE =,I5,10X15HCP-REAL VS. ETA, //)              PRESS     361
                617 FORMAT (1H1,6X6HMODE =,I5,10X15HCP-IMAG VS. ETA, //)              PRESS     362
365             650 FORMAT (5X8HSURFACE ,I3,3X9HMACH NO.=,E10.3,3X45HREDUCED FREQUENCY PRESS     363
                   1 BASED ON ROOT SEMI-CHORD = ,E10.3,/)                             PRESS     364
              C                                                                       PRESS     365
                    RETURN                                                            PRESS     366
                    END                                                               PRESS     367
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

3	PRESS	4	368

VARIABLES

		SN	TYPE		RELOCATION							
2501	A		REAL	ARRAY		REFS	9	165	169	DEFINED	51	52	53
							54	55					
11	ABO		REAL		COMB	REFS	25	49	50	269	273		
2253	ACO		REAL	ARRAY		REFS	7	111	140	174	175		
						DEFINED	108						
2304	ACOI		REAL	ARRAY		REFS	7	113	142	177	178		
						DEFINED	110						
0	AI		REAL	ARRAY	F.P.	REFS	6	110	DEFINED	4			
2161	AIII		REAL			REFS	65	DEFINED	64				
2226	AK		REAL			REFS	280	DEFINED	279				
2163	AKK		REAL			REFS	67	DEFINED	66				
2206	AL		REAL			REFS	174	177	DEFINED	165	169	172	
2155	ALBP		REAL			REFS	180	181	183	184	DEFINED	49	
2156	ALBQ		REAL			REFS	111	113	140	142	DEFINED	50	
12	ALO		REAL		COMB	REFS	25	49	50	270	274		
2207	AM		REAL			REFS	175	178	DEFINED	166	170	173	
4603	APRESI		REAL	ARRAY		REFS	15	219	DEFINED	153			
3763	APRESR		REAL	ARRAY		REFS	15	214	DEFINED	151			
0	AR		REAL	ARRAY	F.P.	REFS	6	108	DEFINED	4			

```
                  WRITE (ITAPEW,304)(ETAS(K),CMR(K),CMI(K),CM(K),PHMR(K),          PRESS     284
                 1               PHMD(K),K=1,KK)                                   PRESS     285
                  WRITE (ITAPEW,309)                                               PRESS     286
                  WRITE (ITAPEW,390)(ETAS(K),CPR(K),CPI(K),K=1,KK)                 PRESS     287
290               GO TO 700                                                        PRESS     288
                416 WRITE (ITAPEW,422)                                             PRESS     289
                  WRITE (ITAPEW,392)(ETAS(K),CLR(K),CMR(K),CPR(K),K=1,KK)          PRESS     290
                  GO TO 702                                                        PRESS     291
                700 WRITE (ITAPEW,310)CLTR,XLTR,YLTR,CLTI,XLTI,YLTI                PRESS     292
295               GO TO 703                                                        PRESS     293
                702 WRITE (ITAPEW,418)CLTR,XLTR,YLTR                               PRESS     294
                703 WRITE (ITAPEW,612)KL                                           PRESS     295
                  WRITE (ITAPEW,650)ISI,ZM,ZK                                      PRESS     296
                  CALL PICTUR(XCLR,FTA,MPTS,CLRN,ETAN,-100.0,0.0,1.0,50.0,2.0,1.0, PRESS     297
300              1MSYM,1,IAUX)                                                     PRESS     298
                  IF(ZK)632,633,632                                                PRESS     299
                632 WRITE (ITAPEW,613)KL                                           PRESS     300
                  WRITE (ITAPEW,650)ISI,ZM,ZK                                      PRESS     301
                  CALL PICTUR(XCLI,FTA,MPTS,CLIN,ETAN,-100.0,0.0,1.0,50.0,2.0,1.0, PRESS     302
305              1MSYM,1,IAUX)                                                     PRESS     303
                633 WRITE (ITAPEW,614)KL                                           PRESS     304
                  WRITE (ITAPEW,650)ISI,ZM,ZK                                      PRESS     305
                  CALL PICTUR(XCMR,FTA,MPTS,CMRN,ETAN,-100.0,0.0,1.0,50.0,2.0,1.0, PRESS     306
                 1MSYM,1,IAUX)                                                     PRESS     307
310               IF(ZK)634,635,634                                                PRESS     308
                634 WRITE (ITAPEW,615)KL                                           PRESS     309
                  WRITE (ITAPEW,650)ISI,ZM,ZK                                      PRESS     310
                  CALL PICTUR(XCMI,FTA,MPTS,CMIN,ETAN,-100.0,0.0,1.0,50.0,2.0,1.0, PRESS     311
                 1MSYM,1,IAUX)                                                     PRESS     312
315             635 WRITE (ITAPEW,616)KL                                           PRESS     313
                  WRITE (ITAPEW,650)ISI,ZM,ZK                                      PRESS     314
                  CALL PICTUR(XCPR,FTA,MPTS,CPRN,ETAN,-100.0,0.0,1.0,50.0,2.0,1.0, PRESS     315
                 1MSYM,1,IAUX)                                                     PRESS     316
                  IF(ZK)636,701,636                                                PRESS     317
320             636 WRITE (ITAPEW,617)KL                                           PRESS     318
                  WRITE (ITAPEW,650)ISI,ZM,ZK                                      PRESS     319
                  CALL PICTUR(XCPI,FTA,MPTS,CPIN,ETAN,-100.0,0.0,1.0,50.0,2.0,1.0, PRESS     320
                 1MSYM,1,IAUX)                                                     PRESS     321
                701 CONTINUE                                                       PRESS     322
325           C                                                                    PRESS     323
              C                                                                    PRESS     324
              C FORMATS                                                            PRESS     325
              C                                                                    PRESS     326
                300 FORMAT (1H1,5X8HSURFACE ,I3,3X9HMACH NO.=,E10.3,3X45HREDUCED FREQU PRESS     327
330              1ENCY BASED ON ROOT SEMI-CHORD = ,E10.3,//5X18HPRESSURE VARIATION, PRESS     328
                 210X11HMODE NO. = ,I5)                                            PRESS     329
                301 FORMAT (//1H ,4X18HSPANWISE STATION =,1PE10.3)                 PRESS     330
                303 FORMAT (//97H       CHORDWISE STA    REAL PART        IMAG PART PRESS     331
                 1  AMPLITUDE       PHASE(RAD)      PHASE(DEG)//)                 PRESS     332
335             304 FORMAT (5X,1P6E16.8)                                           PRESS     333
                306 FORMAT (1H1,4X28HLIFT AND MOMENT COEFFICIENTS,10X9HMODE NO.=, I3 PRESS     334
                 1         //5X20HSECTION COEFFICIENTS,/)                        PRESS     335
                307 FORMAT (//97H     SPANWISE STATION    CL(REAL)        CL(IMAG) PRESS     336
                 1    CL(AMPL)       PHASE(RAD)      PHASE(DEG)//)               PRESS     337
340             308 FORMAT (//97H     SPANWISE STATION    CM(REAL)        CM(IMAG) PRESS     338
                 1    CM(AMPL)       PHASE(RAD)      PHASE(DEG)//)               PRESS     339
                309 FORMAT (//49H     SPANWISE STATION    CP(REAL)        CP(IMAG)//) PRESS     340
```

```
      C                                                                 PRESS    227
230           XCLR(1)=CLR(1)                                           PRESS    228
              XCMR(1)=CMR(1)                                           PRESS    229
              XCPR(1)=CPR(1)                                           PRESS    230
              IF(ZK.EQ.0.0)GO TO 413                                   PRESS    231
              CPI(1)=0.5-CPI(1)                                        PRESS    232
235   C                                                                PRESS    233
              XCLI(1)=CLI(1)                                           PRESS    234
              XCMI(1)=CMI(1)                                           PRESS    235
              XCPI(1)=CPI(1)                                           PRESS    236
              CALI = 0.5*CLI(1)                                        PRESS    237
240           CMIY=CMI(1)-CLI(1)/2.0                                   PRESS    238
              CMIX = 0.0                                               PRESS    239
            413 DO 12 I=2,KK                                           PRESS    240
              SURF =SURF+BBO(I)                                        PRESS    241
              CALR =CALR+CLR(I)                                        PRESS    242
245           CMRY=CMRY+2.0*CMR(I)*BBO(I)-(1.0+XM(I))*CLR(I)           PRESS    243
              CMRX=CMRX+FTA(I)*CLR(I)                                  PRESS    244
              CLR(I)=CLR(I)/BBO(I)                                     PRESS    245
              CMR(I)=CMR(I)/BBO(I)                                     PRESS    246
              CPR(I)=0.5-CPR(I)                                        PRESS    247
250   C                                                                PRESS    248
              XCLR(I)=CLR(I)                                           PRESS    249
              XCMR(I)=CMR(I)                                           PRESS    250
              XCPR(I)=CPR(I)                                           PRESS    251
              IF(ZK.EQ.0)GO TO 12                                      PRESS    252
255           CALI =CALI+CLI(I)                                        PRESS    253
              CMIY=CMIY+2.0*CMI(I)*BBO(I)-(1.0+XM(I))*CLI(I)           PRESS    254
              CMIX=CMIX+FTA(I)*CLI(I)                                  PRESS    255
              CLI(I)=CLI(I)/BBO(I)                                     PRESS    256
              CMI(I)=CMI(I)/BBO(I)                                     PRESS    257
260           CL(I)=CL(I)/BBO(I)                                       PRESS    258
              CM(I)=CM(I)/BBO(I)                                       PRESS    259
              CPI(I)=0.5-CPI(I)                                        PRESS    260
      C                                                                PRESS    261
              XCLI(I)=CLI(I)                                           PRESS    262
265           XCMI(I)=CMI(I)                                           PRESS    263
              XCPI(I)=CPI(I)                                           PRESS    264
             12 CONTINUE                                               PRESS    265
              CLTR =CALR/SURF                                          PRESS    266
              XLTR=-CMRY/CALR*ABO                                      PRESS    267
270           YLTR=CMRX/CALR*ALO                                       PRESS    268
              IF(ZK.EQ.0.0)GO TO 414                                   PRESS    269
              CLTI = CALI/SURF                                         PRESS    270
              XLTI=-CMIY/CALI*ABO                                      PRESS    271
              YLTI=CMIX/CALI*ALO                                       PRESS    272
275           414 CONTINUE                                             PRESS    273
              WRITE (ITAPEW,306)KL                                     PRESS    274
              WRITE (ITAPEW,650)ISI,ZM,ZK                              PRESS    275
              DO 305 K =1,KK                                           PRESS    276
              AK = K                                                   PRESS    277
280           305 ETAS(K) = (AK-1.0)*STEPY                             PRESS    278
              IF (ZK) 416,416,415                                      PRESS    279
              415 WRITE (ITAPEW,307)                                   PRESS    280
              WRITE (ITAPEW,304)(ETAS(K),CLR(K),CLI(K),CL(K),PHAR(K),  PRESS    281
             1              PHAD(K),K=1,KK)                           PRESS    282
285           WRITE (ITAPEW,308)                                       PRESS    283
```

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                16 AL = 0.0                                                          PRESS     170
                   AM = 0.0                                                          PRESS     171
                17 CLR(K)=CLR(K)+ACO(N,J)*AL                                         PRESS     172
175                CMR(K)=CMR(K)+ACO(N,J)*AM                                         PRESS     173
                   IF (ZK) 251,251,406                                               PRESS     174
               406 CLI(K)=CLI(K)+ACOI(N,J)*AL                                        PRESS     175
                   CMI(K)=CMI(K)+ACOI(N,J)*AM                                        PRESS     176
               251 CONTINUE                                                          PRESS     177
180                CLR(K) = CLR(K)*ALBP*4.0                                          PRESS     178
                   CMR(K) = CMR(K)*ALBP*2.0                                          PRESS     179
                   IF (ZK) 407,407,408                                               PRESS     180
               408 CLI(K) = CLI(K)*ALBP*4.0                                          PRESS     181
                   CMI(K) = CMI(K)*ALBP*2.0                                          PRESS     182
185                CL(K) = SQRT(CLR(K)*CLR(K)+CLI(K)*CLI(K))                         PRESS     183
                   PHAR(K) = FATAN(CLI(K),CLR(K))                                    PRESS     184
                   PHAD(K) = PHAR(K)*RTD                                             PRESS     185
                   CM(K) = SQRT(CMR(K)*CMR(K)+CMI(K)*CMI(K))                         PRESS     186
                   PHMR(K) = FATAN(CMI(K),CMR(K))                                    PRESS     187
190                PHMD(K) = PHMR(K)*RTD                                             PRESS     188
               407 CPR(K) = 0.0                                                      PRESS     189
                   CPI(K) = 0.0                                                      PRESS     190
                   IF(K.EQ.1.AND.LL.EQ.0)GO TO 600                                   PRESS     191
                   CPR(K)=CMR(K)/CLR(K)                                              PRESS     192
195                IF(ZK)600,600,410                                                 PRESS     193
               410 CPI(K)=CMI(K)/CLI(K)                                              PRESS     194
               600 IF (NPRES)409,200,409                                             PRESS     195
               409 IF(LINE.EQ.0)WRITE (ITAPEW,300)ISI,ZM,ZK,KL                       PRESS     196
                   LINE=LINE+10+III                                                  PRESS     197
200                NZL=50-III                                                        PRESS     198
                   IF(LINE.GT.NZL)LINE=0                                             PRESS     199
                   WRITE (ITAPEW,301)ETA                                             PRESS     200
                   IF (ZK) 412,412,411                                               PRESS     201
               411 WRITE (ITAPEW,303)                                                PRESS     202
205                WRITE (ITAPEW,304)(XJ(I),PRESR(I),PRESI(I),PRES(I),PHRP(I),       PRESS     203
                  1         PHDP(I),I=1,III)                                        PRESS     204
                   GO TO 200                                                         PRESS     205
               412 WRITE (ITAPEW,421)                                                PRESS     206
                   WRITE (ITAPEW,391)(XJ(I),PRESR(I),I=1,III)                        PRESS     207
210            200 CONTINUE                                                          PRESS     208
                   IF(NPRES.EQ.0)GO TO 900                                           PRESS     209
                   WRITE (ITAPEW,609)KL                                              PRESS     210
                   WRITE (ITAPEW,650)ISI,ZM,ZK                                       PRESS     211
                   CALL PICTUR(APRESR,AXI,NPTS,PREAL,XINA,-100.0,0.0,1.0,50.0,2.0,1.0 PRESS     212
215               1,NSYM,1,IAUX)                                                     PRESS     213
                   IF(ZK)630,900,630                                                 PRESS     214
               630 WRITE (ITAPEW,611)KL                                              PRESS     215
                   WRITE (ITAPEW,650)ISI,ZM,ZK                                       PRESS     216
                   CALL PICTUR(APRESI,AXI,NPTS,PRIMA,XINA,-100.0,0.0,1.0,50.0,2.0,1.0 PRESS     217
220               1,NSYM,1,IAUX)                                                     PRESS     218
               900 CONTINUE                                                          PRESS     219
             C     TOTAL LIFT AND C.P. CALCULATION                                   PRESS     220
                   IF(NCL)602,701,602                                                PRESS     221
               602 SURF = 0.5*(1.0+BBT)                                              PRESS     222
225                CALR = 0.5*CLR(1)                                                 PRESS     223
                   CMRY=CMR(1)-CLR(1)/2.0                                            PRESS     224
                   CMRX = 0.0                                                        PRESS     225
                   CPR(1)=0.5-CPR(1)                                                 PRESS     226
```

```
      IF(NPRES.EQ.0)GO TO 404                                          PRESS  113
      DO 250 I =2,III                                                  PRESS  114
      XI(I) = XI(I-1) - STEPX                                          PRESS  115
      XJ(I)=0.5*(1.0+XI(I))                                            PRESS  116
      IPR=I+(K-1)*III                                                  PRESS  117
      AXI(IPR)= XJ(I)                                                  PRESS  118
      PRESR(I) = 0.0                                                   PRESS  119
      PRESI(I) = 0.0                                                   PRESS  120
      DO 250 N =1,MCC                                                  PRESS  121
      IF(N-1)170,170,171                                               PRESS  122
  170 CLFT=SQRT((1.0-XI(I))/(1.0+XI(I)))                               PRESS  123
      GO TO 172                                                        PRESS  124
  171 CK=SQRT(1.0-XI(I)*XI(I))                                         PRESS  125
      CLFT=CK*XI(I)**(N-2)                                             PRESS  126
  172 SLFT=SQRT(1.0-ETA*ETA)                                           PRESS  127
      DO 250 J =1,NLRR                                                 PRESS  128
      MJ=2*J-1-LL                                                      PRESS  129
      IF (MJ) 7,7,8                                                    PRESS  130
    7 GO TO (9,10,10,10,10),J                                          PRESS  131
    9 CS = CLFT*SLFT                                                   PRESS  132
      GO TO 11                                                         PRESS  133
    8 IF (K-1) 10,10,32                                                PRESS  134
   32 CS = CLFT*SLFT*ETA**MJ                                           PRESS  135
      GO TO 11                                                         PRESS  136
   10 CS = 0.0                                                         PRESS  137
   11 PRESR(I)=PRESR(I)+ACO(N,J)*CS*ALBQ/BBO(K)                        PRESS  138
      IF (ZK) 250,250,403                                              PRESS  139
  403 PRESI(I)=PRESI(I)+ACOI(N,J)*CS*ALBQ/BBO(K)                       PRESS  140
  250 CONTINUE                                                         PRESS  141
      DO 201 I=1,III                                                   PRESS  142
      IF(ZK)670,670,671                                                PRESS  143
  671 CONTINUE                                                         PRESS  144
      PRES(I) = SQRT(PRESR(I)*PRESR(I)+PRESI(I)*PRESI(I))              PRESS  145
      PHRP(I) = FATAN(PRESI(I),PRESR(I))                               PRESS  146
      PHDP(I)=PHRP(I)*RTD                                              PRESS  147
  670 IPR=I+(K-1)*III                                                  PRESS  148
      APRESR(IPR)=PRESR(I)                                             PRESS  149
      IF(ZK.EQ.0.0)GO TO 201                                           PRESS  150
      APRESI(IPR)=PRESI(I)                                             PRESS  151
  201 CONTINUE                                                         PRESS  152
  404 IF(NCL)601,600,601                                               PRESS  153
  601 CLR(K)=0                                                         PRESS  154
      CMR(K)=0                                                         PRESS  155
      CLI(K)=0                                                         PRESS  156
      CMI(K)=0                                                         PRESS  157
      DO 251 N =1,MCC                                                  PRESS  158
      DO 251 J =1,NLRR                                                 PRESS  159
      MJ=2*J-1-LL                                                      PRESS  160
      IF (MJ) 13,13,14                                                 PRESS  161
   13 GO TO (15,14,14,14,14),J                                         PRESS  162
   15 AL = A(N)*SLFT                                                   PRESS  163
      AM = B(N)*SLFT                                                   PRESS  164
      GO TO 17                                                         PRESS  165
   14 IF (K-1) 16,16,18                                                PRESS  166
   18 AL = A(N)*SLFT*ETA**MJ                                           PRESS  167
      AM = B(N)*SLFT*ETA**MJ                                           PRESS  168
      GO TO 17                                                         PRESS  169
```

```
                B(3) =-0.125                                                    PRESS      56
                B(4)=0                                                          PRESS      57
   60           B(5) =-0.0625                                                   PRESS      58
                IF (LC(33).NE.0.OR.LC(1).EQ.2)  ZK = 0.                         PRESS      59
                NS=NMOD                                                         PRESS      60
                LL = 1 - IND                                                    PRESS      61
                AIII=III                                                        PRESS      62
   65           STEPX=2.0/AIII                                                  PRESS      63
                AKK=KK                                                          PRESS      64
                STEPY=1.0/AKK                                                   PRESS      65
                NPTS=0                                                          PRESS      66
                MPTS=0                                                          PRESS      67
   70           DO 651 IP=1,20                                                  PRESS      68
                NSYM(IP)=0                                                      PRESS      69
                MSYM(IP)=0                                                      PRESS      70
                IF(IP.LE.KK)NSYM(IP)=III                                        PRESS      71
                IF(IP.LE.1)MSYM(IP)=KK                                          PRESS      72
   75           NPTS=NPTS+NSYM(IP)                                              PRESS      73
              651 MPTS=MPTS+MSYM(IP)                                            PRESS      74
                DO 701 KL=1,NS                                                  PRESS      75
                ETA = -STEPY                                                    PRESS      76
                LINE=0                                                          PRESS      77
   80           DO 200 K=1,KK                                                   PRESS      78
                ETA=ETA+STEPY                                                   PRESS      79
                IPR=1+(K-1)*III                                                 PRESS      80
                XI(1)=1.0-STEPX/2.0                                             PRESS      81
                XJ(1)=0.5*(1.0+XI(1))                                           PRESS      82
   85           AXI(IPR)=XJ(1)                                                  PRESS      83
                FTA(K)=ETA                                                      PRESS      84
                L=0                                                             PRESS      85
                PRESR(1)=0                                                      PRESS      86
                PRESI(1)=0                                                      PRESS      87
   90           DO 150 N =1,MCC                                                 PRESS      88
                IF(N-1)160,160,161                                              PRESS      89
              160 CLFT=SQRT((1.0-XI(1))/(1.0+XI(1)))                            PRESS      90
                GO TO 162                                                       PRESS      91
              161 CK=SQRT(1.0-XI(1)*XI(1))                                      PRESS      92
   95           CLFT=CK*XI(1)**(N-2)                                            PRESS      93
              162 SLFT=SQRT(1.0-ETA*ETA)                                        PRESS      94
                DO 150 J=1,NLRR                                                 PRESS      95
                MJ=2*J-1-LL                                                     PRESS      96
                IF (MJ) 1,1,2                                                   PRESS      97
  100             1 GO TO (3,4,4,4,4),J                                         PRESS      98
                  3 CS = CLFT*SLFT                                              PRESS      99
                GO TO 5                                                         PRESS     100
                  2 IF (K-1) 4,4,6                                              PRESS     101
                  6 CS = CLFT*SLFT*ETA**MJ                                      PRESS     102
  105           GO TO 5                                                         PRESS     103
                  4 CS = 0.0                                                    PRESS     104
                  5 L = L + 1                                                   PRESS     105
                ACO(N,J)=AR(L,KL)                                               PRESS     106
                IF (ZK) 400,400,401                                             PRESS     107
  110           401 ACOI(N,J)=AI(L,KL)                                          PRESS     108
              400 PRESR(1)=PRESR(1)+ACO(N,J)*CS*ALBQ/BBO(K)                     PRESS     109
                IF (ZK) 150,150,402                                             PRESS     110
              402 PRESI(1)=PRESI(1)+ACOI(N,J)*CS*ALBQ/BBO(K)                    PRESS     111
              150 CONTINUE                                                      PRESS     112
```

```
                                                                                UNISLV     59
                                                                                UNISLV     60
                                                                                UNISLV     61
      SUBROUTINE PRESS (AR,AI,IND)                                              PRESS       2
C                                                                               PRESS       3
      DIMENSION         XI(20) ,    AR(25,20) ,    AI(25,20)                    PRESS       4
      DIMENSION        ACO(5,5) ,   ACOI(5,5) ,      CLR(20)                   PRESS       5
      DIMENSION        CLI(20) ,      CMI(20) ,      CPR(20)                   PRESS       6
      DIMENSION        CPI(20) ,        A(5) ,         B(5)                    PRESS       7
      DIMENSION      PRESR(20) ,   PRESI(20) ,      CMR(20)                   PRESS       8
      DIMENSION         XJ(20) ,    PHAR(20) ,     PHAD(20)                   PRESS       9
      DIMENSION       PRES(20) ,    PHRP(20) ,     PHDP(20)                   PRESS      10
      DIMENSION         CM(20) ,    PHMR(20) ,     PHMD(20)                   PRESS      11
      DIMENSION       ETAS(20) ,      CL(20) ,     AXI(400)                   PRESS      12
      DIMENSION    APRESR(400) , APRESI(400) ,    IAUX(400)                   PRESS      13
      DIMENSION        FTA(20) ,   XCLR(20) ,     XCLI(20)                   PRESS      14
      DIMENSION       XCMR(20) ,   XCMI(20) ,     NSYM(20)                   PRESS      15
      DIMENSION       XCPR(20) ,   XCPI(20) ,     MSYM(20)                   PRESS      16
      DIMENSION      PREAL(12) ,  PRIMA(12) ,     XINA(12)                   PRESS      17
      DIMENSION       ETAN(12) ,   CLRN(12) ,     CLIN(12)                   PRESS      18
      DIMENSION       CMRN(12) ,   CMIN(12) ,     CPRN(12)                   PRESS      19
      DIMENSION       CPIN(12)                                                PRESS      20
      DIMENSION ITAPES(50)                                                    PRESS      21
      COMMON /COMA/ LC(40) , BR                                               PRESS      22
      COMMON /COMB  / ISI,M,IRR,NZ,IS,LIRR,NO1,NO2,NMOD,ABO,ALO,M2            PRESS      23
      COMMON/COMC/NPRES,NCL,III,KK,NPRD,XM(20),BBO(20),BBT                    PRESS      24
      COMMON/COMF/MCC,NLRR,NNP,Z3A                                            PRESS      25
      COMMON/COMI/ZK,ZKX,YOE,YOEX                                             PRESS      26
      COMMON/COMJ/ZM                                                          PRESS      27
      COMMON / CTAPES / ITAPES                                                PRESS      28
      DATA     PREAL/1H ,1HP,1HR,1HE,1HS,1HS,1H-,1HR,1HE,1HA,1HL,1H /         PRESS      29
      DATA     PRIMA/1H ,1HP,1HR,1HE,1HS,1HS,1H-,1HI,1HM,1HA,1HG,1H /         PRESS      30
      DATA      XINA/1H ,1H ,1H ,1H ,1HX,1HI,1H ,1H ,1H ,1H ,1H ,1H /         PRESS      31
      DATA      ETAN/1H ,1H ,1H ,1H ,1HE,1HT,1HA,1H ,1H ,1H ,1H ,1H /         PRESS      32
      DATA      CLRN/1H ,1H ,1HC,1HL,1H-,1HR,1HE,1HA,1HL,1H ,1H ,1H /         PRESS      33
      DATA      CLIN/1H ,1H ,1HC,1HL,1H-,1HI,1HM,1HA,1HG,1H ,1H ,1H /         PRESS      34
      DATA      CMRN/1H ,1H ,1HC,1HM,1H-,1HR,1HE,1HA,1HL,1H ,1H ,1H /         PRESS      35
      DATA      CMIN/1H ,1H ,1HC,1HM,1H-,1HI,1HM,1HA,1HG,1H ,1H ,1H /         PRESS      36
      DATA      CPRN/1H ,1H ,1HC,1HP,1H-,1HR,1HE,1HA,1HL,1H ,1H ,1H /         PRESS      37
      DATA      CPIN/1H ,1H ,1HC,1HP,1H-,1HI,1HM,1HA,1HG,1H ,1H ,1H /         PRESS      38
C     STEPX=INC ALONG CHORD                                                     PRESS      39
C     STEPY=INC ALONG SPAN                                                      PRESS      40
C                                                                               PRESS      41
C                                                                               PRESS      42
      ITAPEW = ITAPES(6)                                                        PRESS      43
C                                                                               PRESS      44
C                                                                               PRESS      45
      RTD = 180.0/3.1415927                                                     PRESS      46
      ALBP = ALO/ABO*3.1415927                                                  PRESS      47
      ALBQ = ALO/ABO*8.0                                                        PRESS      48
      A(1) = 1.0                                                                PRESS      49
      A(2) = 0.5                                                                PRESS      50
      A(3)=0                                                                    PRESS      51
      A(4) = 0.125                                                              PRESS      52
      A(5)=0                                                                    PRESS      53
      B(1) = 0.5                                                                PRESS      54
      B(2)=0                                                                    PRESS      55
```

```
EQUIV CLASSES   LENGTH      MEMBERS - BIAS NAME(LENGTH)
      CALF           2              0 ALF     (2)

STATISTICS
  PROGRAM LENGTH                 227B      151
        520000B CM USED
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	UNISLV	1	56

VARIABLES	SN	TYPE		RELOCATION							
0	A	REAL	ARRAY	F.P.	REFS	5	22	2*30	2*31	2*37	2*38	2*39
					49	2*52	2*53	2*54	DEFINED	1		
200	ALF	REAL	ARRAY		REFS	5	6	23	24	25	26	2*30
					2*31	38	39	40	50	51	2*53	2*54
					DEFINED	23	24	37	38	50	51	
0	BETA	REAL	ARRAY	F.P.	REFS	5	23	24	DEFINED	1		
200	CALF	COMPLEX			REFS	4	6	DEFINED	22	49		
171	I	INTEGER			REFS	21	22	23	24	DEFINED	20	
166	IB	INTEGER			REFS	21	22	33	DEFINED	14	33	
175	II	INTEGER			REFS	2*37	2*38	2*39	48	49	2*52	2*53
					2*54	DEFINED	36	48				
170	IKY	INTEGER			REFS	23	24	2*25	2*26	27	32	2*38
					3*39	40	47	49	50	51	53	54
					DEFINED	16	32	35	47			
172	I1I	INTEGER			REFS	28	36	DEFINED	21			
174	JI	INTEGER			REFS	2*30	2*31	DEFINED	28			
173	JKY	INTEGER			REFS	29	2*30	2*31	DEFINED	27	29	
165	K	* INTEGER			DEFINED	13						
164	KBY	INTEGER			REFS	16	22	35	55	DEFINED	9	55
176	KOUNT	INTEGER			REFS	49	DEFINED	46				
0	L	INTEGER		F.P.	REFS	15	22	DEFINED	1			
163	LEAP	INTEGER			REFS	35	41	DEFINED	8			
167	LI	INTEGER			REFS	28	34	DEFINED	15	34		
0	M	INTEGER		F.P.	REFS	8	20	46	DEFINED	1		
0	MID	INTEGER		F.P.	REFS	7	33	34	49	55		
					DEFINED	1						
162	MID1	INTEGER			REFS	48	DEFINED	7				
0	N	INTEGER		F.P.	REFS	13	DEFINED	1				
177	TEMP	REAL			REFS	53	54	DEFINED	52			
0	Y	REAL	ARRAY	F.P.	REFS	5	22	23	24	25	26	30
					31	2*38	2*39	49	50	51		
					DEFINED	1	25	26	30	31	39	40
					53	54						

EXTERNALS	TYPE	ARGS	REFERENCES		
DUPER	COMPLEX	5	4	22	49

STATEMENT LABELS			DEF LINE	REFERENCES	
0	100		31	28	
0	110		34	20	
0	120	INACTIVE	46	41	
0	130		54	46	
136	140		55	13	2*41

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
13	140	K	13 55	127B		EXT REFS	NOT INNER
20	110	I	20 34	52B		EXT REFS	NOT INNER
51	100	JI	28 31	11B	OPT		
107	130	KOUNT	46 54	27B		EXT REFS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
		3	NZ	(1)	4	IS	(1)	5	LIRR	(1)	
		6	NO1	(1)	7	NO2	(1)	8	NMOD	(1)	
		9	ABO	(1)	10	ALO	(1)	11	M2	(1)	
COMC	46	0	NPRES	(1)	1	NCL	(1)	2	III	(1)	
		3	KK	(1)	4	NPRD	(1)	5	XM	(20)	
		25	BBO	(20)	45	BBT	(1)				
COMF	4	0	MCC	(1)	1	NLRR	(1)	2	NNP	(1)	
		3	Z3A	(1)							
COMI	4	0	ZK	(1)	1	ZKX	(1)	2	YOE	(1)	
		3	YOEX	(1)							
COMJ	1	0	ZM	(1)							
CTAPES	50	0	ITAPES	(50)							

STATISTICS

PROGRAM LENGTH	6722B	3538
CM LABELED COMMON LENGTH	236B	158

520000B CM USED

```
      SUBROUTINE SOLFLT (ISAVFO)                                        SOLFLT     2
C                                                                       SOLFLT     3
C     CALLING PROGRAM FOR FLUTTER ROUTINES                              SOLFLT     4
C                                                                       SOLFLT     5
      INTEGER YES                                                       SOLFLT     6
C                                                                       SOLFLT     7
CIBM                                                                    SOLFLT     8
C     DIMENSION TITLE(18)                                               SOLFLT     9
CIBM                                                                    SOLFLT    10
CCDC                                                                    SOLFLT    11
      DIMENSION TITLE(8)                                                SOLFLT    12
CCDC                                                                    SOLFLT    13
      DIMENSION BB(40,40), OMGA(40), NIND(40)                           SOLFLT    14
      DIMENSION ITAPES(50)                                              SOLFLT    15
      DIMENSION VBO(30), RVBO(15)                                       SOLFLT    16
      DIMENSION   NAME1(2),  NAME2(2)                                   SOLFLT    17
      DIMENSION TSHF(1)            ,SRATIO(21)                          SOLFLT    18
      DIMENSION OMGC(40)                                                SOLFLT    19
      DIMENSION TFH(1)                                                  SOLFLT    20
C                                                                       SOLFLT    21
      COMMON /COMA/ LC(40) , BR                                         SOLFLT    22
      COMMON /MODD/ B(40,40), DETAD(40,40), WW(40,40), OMG(40), NC      SOLFLT    23
      COMMON /FLUTAN/ FMACH ,BETA  ,VBO   ,RVBO  ,NRVBO                 SOLFLT    24
      COMMON /FLUTC/ RHOR(10), NOTI(25), NINZ(40,25), RATOM(20)         SOLFLT    25
      COMMON /FLUTV / VL,VH, FLO,FHI, IE, NQZ, NVTOT                    SOLFLT    26
      COMMON /FLEXT / BB,OMGA, RHO, VB                                  SOLFLT    27
      COMMON / FITR / NOMI, NIND                                        SOLFLT    28
      COMMON / CTAPES / ITAPES                                          SOLFLT    29
      COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE   SOLFLT    30
     1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                      SOLFLT    31
      COMMON /REPORT/ KREPOR                                            SOLFLT    32
      COMMON /CHEAD / KHEAD ,KRETUR,KOLUMN,IR,JCL,JCU,LSUB,LSKIP        SOLFLT    33
      COMMON /CTSHF / LTSHF ,TSHF                                       SOLFLT    34
      COMMON /CONSTS/ NO    ,YES                                        SOLFLT    35
      COMMON /CTFH  / KTFH  ,LTFH  ,TFH                                 SOLFLT    36
      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                              SOLFLT    37
      COMMON /CTABLE/ KTABLE,NPASS ,NROWS, NCOLS , NCOLST,KTABLO,NPAGEA SOLFLT    38
     1               ,ITAPET                                            SOLFLT    39
      COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUMD,KLUBAL,MSADD,NPAS, IDNOPT,  SOLFLT    40
     1              VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND, SOLFLT    41
     2              IFIN,KLUB,KLUQ,MORBAL,DBAL                          SOLFLT    42
      COMMON/PLACES/ IUIN1,IUIN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4, SOLFLT    43
     1               IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,         SOLFLT    44
     2               IUA,IFA,IUY,IFY,IUMEMN,IFMEMN,IUSTFN,IFSTFN,       SOLFLT    45
     3               IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,                   SOLFLT    46
     4               IUMDBI,IFMDBI,IUADDI,IFADDI,IUBALI,IFBALI,         SOLFLT    47
     5               IUDESI,IFDESI,IUWTI,IFWTI,                         SOLFLT    48
     6               IUMEMO,IFMEMO,IUBT,IFBT,                           SOLFLT    49
     7               IUDESN,IFDESN,IUMD,IFMD,                           SOLFLT    50
     8               IUMEMF,IFMEMF,                                     SOLFLT    51
     9               IUSTFO,IFSTFO,IUMDB,IFMDB,IUADD,IFADD,IUBAL,IFBAL, SOLFLT    52
     A               IUDESF,IFDESF,IUWT,IFWT,                           SOLFLT    53
     B               IUDUM1,IFDUM1,IUDUM2,IFDUM2,IUDUM3,IFDUM3,         SOLFLT    54
     C               IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IULR,IFLR,     SOLFLT    55
     D               IUBR,IFBR,                                         SOLFLT    56
     E               IUPHTF,IFPHTF,IUMODM,IFMODM,                       SOLFLT    57
     F               IUMODK,IFMODK,IUPHT,IFPHT,IUQT,IFQT,IUQ,IFQ,       SOLFLT    58
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```
      G              IUPH,IFPH,IUINCM,IFINCM,IUINCK,IFINCK                SOLFLT     59
C                                                                          SOLFLT     60
60          COMPLEX   B, DETAD, BB                                         SOLFLT     61
C                                                                          SOLFLT     62
C INITIAL CONDITIONS                                                       SOLFLT     63
C                                                                          SOLFLT     64
      CALL PROGNA (4H(SOL, 4HFLT))                                         SOLFLT     65
65    LSKIP  =  1                                                          SOLFLT     66
      LSUB   =  4                                                          SOLFLT     67
      KRETUR =  0                                                          SOLFLT     68
      SRATIO(1) =  1.0                                                     SOLFLT     69
      DO 50 I=1,20                                                         SOLFLT     70
70    I1     =  I + 1                                                      SOLFLT     71
   50 SRATIO(I1)=  RATOM(I)                                                SOLFLT     72
      KOLUMN =  8                                                          SOLFLT     73
      IF (KREPOR .EQ. YES) KOLUMN = 4                                      SOLFLT     74
      TWOPI  =  6.283184                                                   SOLFLT     75
75    ITAP18 =  ITAPES(18)                                                 SOLFLT     76
      NMODES =  LC(2)                                                      SOLFLT     77
      NRHOV =  LC(5)                                                       SOLFLT     78
      NMODV  =  LC(25) + 1                                                 SOLFLT     79
      NSTIV  =  LC(26) + 1                                                 SOLFLT     80
80    MTAP1  =  ITAPES(37)                                                 SOLFLT     81
      MTAP2  =  ITAPES(22)                                                 SOLFLT     82
      ITAPE  =  ITAPES(50)                                                 SOLFLT     83
      KFIRST =  YES                                                        SOLFLT     84
C                                                                          SOLFLT     85
85    C                                                                    SOLFLT     86
C PRINT PLOT LOOP FOR NUMBER OF DENSITY VARIATIONS                         SOLFLT     87
C                                                                          SOLFLT     88
C NOTE THAT ADDITIONAL INFORMATION HAS BEEN ADDED ON UNIT MTAP1 IN         SOLFLT     89
C PROGRAM FLINFO                                                           SOLFLT     90
90    KTFH   =  YES                                                        SOLFLT     91
      DO 300 IRHOV=1,NRHOV                                                 SOLFLT     92
      RHOP   =  RHOR(IRHOV)                                                SOLFLT     93
      IF (LC(14) .EQ. 0)  GOTO 25                                          SOLFLT     94
      WRITE (MTAP1)  RHOP,FMACH                                            SOLFLT     95
95    25 CONTINUE                                                          SOLFLT     96
      RHO      =  RHOP * 0.076474                                          SOLFLT     97
C                                                                          SOLFLT     98
C                                                                          SOLFLT     99
C PRINT PLOT LOOP FOR NUMBER OF STIFFNESS VARIATION CYCLES                 SOLFLT    100
100   C                                                                    SOLFLT    101
      DO 200 ISTIV=1,NSTIV                                                 SOLFLT    102
      REWIND ITAP18                                                        SOLFLT    103
      WRITE (ITAP18,900) NPASS, FMACH, RHOP, SRATIO(ISTIV)                 SOLFLT    104
      REWIND ITAP18                                                        SOLFLT    105
105   READ  (ITAP18,910) (TFH(L), L=1,LTFH)                                SOLFLT    106
      REWIND ITAP18                                                        SOLFLT    107
      READ (ITAP18,3000) TITLE                                             SOLFLT    108
      KOUNT  =  LINES                                                      SOLFLT    109
      CALL TITLES (2)                                                      SOLFLT    110
110   IF (KFIRST .EQ. NO) GO TO 80                                         SOLFLT    111
      KFIRST =  NO                                                         SOLFLT    112
      NROWS  =  1                                                          SOLFLT    113
      NCOLS  =  0                                                          SOLFLT    114
      KTABLE =  2                                                          SOLFLT    115
```

```
115                IF (LC(1) .NE. 1) GO TO 60                                    SOLFLT  116
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  117
                   WRITE (ITAPEW,1500)                                           SOLFLT  118
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  119
                   KOUNT  =  KOUNT + 4                                           SOLFLT  120
120                CALL PTABLE (2,35,35HFLUTTER ANALYSIS USING THE K METHOD)     SOLFLT  121
                   GO TO 70                                                      SOLFLT  122
                60 IF (LC(1) .NE.-1) GO TO 70                                    SOLFLT  123
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  124
                   WRITE (ITAPEW,1510)                                           SOLFLT  125
125                CALL PLB (1,1,ITAPEW)                                         SOLFLT  126
                   KOUNT  =  KOUNT + 4                                           SOLFLT  127
                   CALL PTABLE (2,37,37HFLUTTER ANALYSIS USING THE P-K METHOD)   SOLFLT  128
                70 CONTINUE                                                      SOLFLT  129
                80 CONTINUE                                                      SOLFLT  130
130                IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES                       SOLFLT  131
                   CALL TITLES (2)                                               SOLFLT  132
                   NROWS  =  1                                                   SOLFLT  133
                   NCOLS  =  0                                                   SOLFLT  134
                   KTABLE =  2                                                   SOLFLT  135
135                CALL PTABLE (2,60,TITLE)                                      SOLFLT  136
                   CALL TITLES (2)                                               SOLFLT  137
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  138
                   WRITE (ITAPEW,4010)                                           SOLFLT  139
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  140
140                KOUNT  =  KOUNT + 4                                           SOLFLT  141
                   WRITE (ITAPEW,1100) RHO                                       SOLFLT  142
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  143
                   KOUNT  =  KOUNT + 2                                           SOLFLT  144
                   NROWS  =  1                                                   SOLFLT  145
145                NCOLS  =  2                                                   SOLFLT  146
                   KTABLE =  2                                                   SOLFLT  147
                   CALL PTABLE (2,18,18                                          SOLFLT  148
                  1   HDENSITY VARIATIONS)                                       SOLFLT  149
                   IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES                       SOLFLT  150
150                CALL TITLES (2)                                               SOLFLT  151
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  152
                   WRITE (ITAPEW,4020)                                           SOLFLT  153
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  154
                   KOUNT  =  KOUNT + 4                                           SOLFLT  155
155                NROWS  =  1                                                   SOLFLT  156
                   NCOLS  =  2                                                   SOLFLT  157
                   KTABLE =  2                                                   SOLFLT  158
                   CALL PTABLE (2,20,20                                          SOLFLT  159
                  1   HFREQUENCY VARIATIONS)                                     SOLFLT  160
160             C                                                                SOLFLT  161
                C                                                                SOLFLT  162
                   DO 3 I=1,NMODES                                               SOLFLT  163
                   OMGA(I)  = OMG(I)                                             SOLFLT  164
                   DO 3 J=1,NMODES                                               SOLFLT  165
165                3 BB(I,J)  =  B(I,J)                                          SOLFLT  166
                   MELIM  =  LC(27)                                              SOLFLT  167
                   IF (ISTIV .EQ. 1) MELIM = 0                                   SOLFLT  168
                   IF ((LINES-KOUNT) .LT. 2) KOUNT = LINES                       SOLFLT  169
                   CALL TITLES (2)                                               SOLFLT  170
170                WRITE (ITAPEW,100) MELIM                                      SOLFLT  171
                   CALL PLB (1,1,ITAPEW)                                         SOLFLT  172
```

```
                  KOUNT  =  KOUNT + 2                                                SOLFLT   173
                  INMD   =  LC(27)                                                  SOLFLT   174
                  IF (INMD.EQ.O)  GO TO 8                                           SOLFLT   175
175               OMGA(INMD) = OMG(INMD)*SRATIO(ISTIV)                              SOLFLT   176
                8 CONTINUE                                                          SOLFLT   177
                  IF ( LC(1) .EQ. -1 .OR. ( LC(1) .GT. O .AND. INMD .NE. LC(11) ) ) SOLFLT   178
                 1          GO TO 5                                                 SOLFLT   179
                  DO 6 I=1,NMODES                                                   SOLFLT   180
180               IF ( I .EQ. INMD )      GO TO 6                                   SOLFLT   181
                  BB(I,I)=  BB(I,I)/(SRATIO(ISTIV)**2)                              SOLFLT   182
                6 CONTINUE                                                          SOLFLT   183
                  GO TO 7                                                           SOLFLT   184
                5 CONTINUE                                                          SOLFLT   185
185               IF (INMD.EQ.O)  GO TO 7                                           SOLFLT   186
                  BB(INMD,INMD) = BB(INMD,INMD) * (SRATIO(ISTIV)*SRATIO(ISTIV))     SOLFLT   187
                7 CONTINUE                                                          SOLFLT   188
            C                                                                       SOLFLT   189
            C                                                                       SOLFLT   190
190         C LIST GENERALIZED MASSES, FREQUENCIES, DAMPING, AND COMPLEX STIFFNESS  SOLFLT   191
            C                                                                       SOLFLT   192
            C                                                                       SOLFLT   193
                  IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES                           SOLFLT   194
                  CALL TITLES (2)                                                   SOLFLT   195
195               CALL PLB (1,1,ITAPEW)                                             SOLFLT   196
                  WRITE (ITAPEW,1610)                                               SOLFLT   197
                  CALL PLB (1,1,ITAPEW)                                             SOLFLT   198
                  KOUNT  =  KOUNT + 4                                               SOLFLT   199
                  NCOLS  =  4                                                       SOLFLT   200
200               NROWS  =  O                                                       SOLFLT   201
                  KTABLE =  2                                                       SOLFLT   202
                  CALL PTABLE (2,48,48                                              SOLFLT   203
                 1   HGENERALIZED MASS, FREQUENCY, AND MODAL STIFFNESS)            SOLFLT   204
                  LSKIP  =  1                                                       SOLFLT   205
205               LSUB   =  4                                                       SOLFLT   206
                  KRETUR =  O                                                       SOLFLT   207
              215 CALL HEAD (LTSHF,TSHF,NMODES,NMODES)                              SOLFLT   208
                  GO TO (216, 217, 218), KHEAD                                      SOLFLT   209
              216 WRITE (ITAPEW,1010)                                               SOLFLT   210
210           217 CALL PLB (1,1,ITAPEW)                                             SOLFLT   211
                  WRITE (ITAPEW,1011) (JC, JC=JCL,JCU)                              SOLFLT   212
              218 WRITE (ITAPEW,1012)  IR, (WW(IR,JC), JC=JCL,JCU)                  SOLFLT   213
                  IF (KRETUR .LT. 3) GO TO 215                                      SOLFLT   214
            C                                                                       SOLFLT   215
215               LSUB   =  5                                                       SOLFLT   216
              235 CALL HEAD (LTSHF,TSHF,NMODES,2)                                   SOLFLT   217
                  GO TO (236, 237, 238), KHEAD                                      SOLFLT   218
              236 WRITE (ITAPEW,2010)                                               SOLFLT   219
              237 CALL PLB (1,1,ITAPEW)                                             SOLFLT   220
220           238 OMGC(IR) =  OMGA(IR)/TWOPI                                        SOLFLT   221
                  WRITE (ITAPEW,1012) IR, OMGC(IR), OMGA(IR)                        SOLFLT   222
                  IF (KRETUR .LT. 3) GO TO 235                                      SOLFLT   223
            C                                                                       SOLFLT   224
                  KSAVE  =  KOLUMN                                                  SOLFLT   225
225               KOLUMN =  KOLUMN/2                                                SOLFLT   226
                  LSUB   =  4                                                       SOLFLT   227
              315 CALL HEAD (LTSHF,TSHF,NMODES,NMODES)                              SOLFLT   228
                  GO TO (316, 317, 318), KHEAD                                      SOLFLT   229
```

```
                316 WRITE (ITAPEW,3010)                                          SOLFLT   230
230             317 CALL PLB (1,1,ITAPEW)                                        SOLFLT   231
                    WRITE (ITAPEW,3011) (JC, JC=JCL,JCU)                         SOLFLT   232
                318 WRITE (ITAPEW,3012)  IR, (BB(IR,JC), JC=JCL,JCU)             SOLFLT   233
                    IF (KRETUR .LT. 3) GO TO 315                                 SOLFLT   234
                    KOLUMN =  KSAVE                                              SOLFLT   235
235             C                                                                SOLFLT   236
                C                                                                SOLFLT   237
                C PRINT PLOT LOOP FOR NUMBER OF MODAL ELIMINATION CYCLES         SOLFLT   238
                C                                                                SOLFLT   239
                  4 CONTINUE                                                     SOLFLT   240
240               DO 105 IMODV=1,NMODV                                           SOLFLT   241
                  IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES                        SOLFLT   242
                  CALL TITLES (2)                                                SOLFLT   243
                  CALL PLB (1,2,ITAPEW)                                          SOLFLT   244
                  WRITE (ITAPEW,4030)                                            SOLFLT   245
245               CALL PLB (1,1,ITAPEW)                                          SOLFLT   246
                  KOUNT  =  KOUNT + 5                                            SOLFLT   247
                  NROWS  =  1                                                    SOLFLT   248
                  NCOLS  =  2                                                    SOLFLT   249
                  KTABLE =  2                                                    SOLFLT   250
250               CALL PTABLE (2,28,28                                           SOLFLT   251
                 1   HMODAL ELIMINATION VARIATIONS)                              SOLFLT   252
                  IE     =  IMODV                                                SOLFLT   253
                  REWIND MTAP2                                                   SOLFLT   254
                  IF (IMODV .EQ. 1) GO TO 11                                     SOLFLT   255
255               ITRA     =  IE - 1                                             SOLFLT   256
                  NOMI     =  NOTI(ITRA)                                         SOLFLT   257
                  DO 12  ITC = 1,NOMI                                            SOLFLT   258
                 12 NIND(ITC)  =  NINZ(ITC,ITRA)                                 SOLFLT   259
                  IF ((LINES-KOUNT) .LT. 4) KOUNT = LINES                        SOLFLT   260
260               CALL TITLES (2)                                                SOLFLT   261
                  WRITE (ITAPEW,140) NOMI, (NIND(I), I=1,NOMI)                   SOLFLT   262
                  CALL PLB (1,1,ITAPEW)                                          SOLFLT   263
                  KOUNT  =  KOUNT + 4                                            SOLFLT   264
                  GO TO 40                                                       SOLFLT   265
265               11 CONTINUE                                                    SOLFLT   266
                  IF ((LINES-KOUNT) .LT. 2) KOUNT = LINES                        SOLFLT   267
                  CALL TITLES (2)                                                SOLFLT   268
                  WRITE (ITAPEW,145)                                             SOLFLT   269
                  CALL PLB (1,1,ITAPEW)                                          SOLFLT   270
270               KOUNT  =  KOUNT + 2                                            SOLFLT   271
                 40 CONTINUE                                                     SOLFLT   272
                  IF (LC(1) .NE. -1) GO TO 13                                    SOLFLT   273
                  CALL FLOP (FMACH,RHOP,SRATIO,ISAVFO,KFIRST)                    SOLFLT   274
                  GOTO 20                                                        SOLFLT   275
275               13 CONTINUE                                                    SOLFLT   276
                  CALL EIGM (RHOP,IRHOV,ISTIV)                                   SOLFLT   277
                  IF (LC(1).EQ.2) GOTO 10                                        SOLFLT   278
                 20 REWIND MTAP2                                                 SOLFLT   279
                  CALL PRPLT (FMACH, RHOP, ISAVFO)                               SOLFLT   280
280               10 CONTINUE                                                    SOLFLT   281
                 105 CONTINUE                                                    SOLFLT   282
                 200 CONTINUE                                                    SOLFLT   283
                 300 CONTINUE                                                    SOLFLT   284
                  KTFH   =  NO                                                   SOLFLT   285
285             C                                                                SOLFLT   286
```

```
                C     FORMATS                                                          SOLFLT    287
                C                                                                      SOLFLT    288
                  100 FORMAT (10X,35HVARIATION IN FREQUENCY FOR MODE NO.,I3)           SOLFLT    289
                  140 FORMAT (10X,30HNUMBER OF MODES ELIMINATED ARE, I3                SOLFLT    290
      290            1    ,//,10X,28HELIMINATED MODAL INDICES ARE, /,10X,20I4)        SOLFLT    291
                  145 FORMAT (10X,35HNUMBER OF MODES ELIMINATED ARE ZERO)              SOLFLT    292
                  900 FORMAT (     5HPASS= ,I2, 9H,  MACH =,F5.2, 14H,  DEN RATIO =,F5.2 SOLFLT  293
                     1           ,15H,  FREQ RATIO =,F5.2,12X)                        SOLFLT    294
                  910 FORMAT (18A4)                                                    SOLFLT    295
      295         920 FORMAT (10X, 5HPASS= ,I2, 9H,  MACH =,F5.2, 14H,  DEN RATIO =,F5.2 SOLFLT  296
                     1           ,15H,  FREQ RATIO =,F5.2,/,10X,60(1H-))              SOLFLT    297
                 1010 FORMAT ( 10X, 20HGENERALIZED MASS, LB)                           SOLFLT    298
                 1011 FORMAT (10X,1X,4HMODE,2X,5HMODE=,1(  1I3,1X, 3(1H-))            SOLFLT    299
                     1                                 ,7(  1I4,1X, 9(1H-)))          SOLFLT    300
      300        1012 FORMAT ( 10X, I5, 1P8E14.6)                                     SOLFLT    301
                 1100 FORMAT (10X, 9HDENSITY =,2X, 1P1E14.6, 11H,  LB/FT**3)          SOLFLT    302
                 1500 FORMAT (10X,35HFLUTTER ANALYSIS USING THE K METHOD              SOLFLT    303
                     1      ,/10X,35(1H-))                                           SOLFLT    304
                 1510 FORMAT (10X,37HFLUTTER ANALYSIS USING THE P-K METHOD            SOLFLT    305
      305            1      ,/10X,37(1H-))                                           SOLFLT    306
                 1610 FORMAT (10X,48                                                  SOLFLT    307
                     1   HGENERALIZED MASS, FREQUENCY, AND MODAL STIFFNESS            SOLFLT    308
                     2      ,/10X,48(1H-))                                           SOLFLT    309
                 2010 FORMAT (10X,1X,4HMODE,2X,9HFREQUENCY,5X,9HFREQUENCY             SOLFLT    310
      310            1      ,/,10X,5X       ,2X,9HCYC/SEC  ,5X,7HRAD/SEC)            SOLFLT    311
                C     CIBM                                                           SOLFLT    312
                C     C3000 FORMAT (18A4)                                            SOLFLT    313
                C     CIBM                                                           SOLFLT    314
                C     CCDC                                                           SOLFLT    315
      315        3000 FORMAT (7A10,1A2)                                              SOLFLT    316
                C     CCDC                                                           SOLFLT    317
                 3010 FORMAT (10X,56HCOMPLEX GENERALIZED MODAL STIFFNESS, (REAL, IMAG), SOLFLT  318
                     1LB/IN)                                                         SOLFLT    319
                 3011 FORMAT (10X,1X,4HMODE,2X,5HMODE=,1(  1I3,1X,17(1H-))           SOLFLT    320
      320            1                                 ,3(  1I4,1X,23(1H-)))          SOLFLT    321
                 3012 FORMAT (10X,I5,4(2X,1H(,1P1E11.4,1H,1X,1P1E11.4,1H)))          SOLFLT    322
                 4010 FORMAT (10X,18                                                 SOLFLT    323
                     1   HDENSITY VARIATIONS                                         SOLFLT    324
                     2      ,/,10X,18(1H-))                                          SOLFLT    325
      325        4020 FORMAT (10X,20                                                 SOLFLT    326
                     1   HFREQUENCY VARIATIONS                                       SOLFLT    327
                     2      ,/,10X,20(1H-))                                          SOLFLT    328
                 4030 FORMAT (10X,38                                                 SOLFLT    329
                     1   HMODAL ELIMINATION VARIATIONS BASED ON ,35                  SOLFLT    330
      330            2   HDIRECT SPECIFICATION VIA INPUT DATA                        SOLFLT    331
                     3      ,/,10X,73(1H-))                                          SOLFLT    332
                C                                                                    SOLFLT    333
                      RETURN                                                         SOLFLT    334
                      END                                                            SOLFLT    335
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CARD NR. SEVERITY  DETAILS    DIAGNOSIS OF PROBLEM

     208    I              AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
     217    I              AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
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CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM
228 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	SOLFLT	1	333

VARIABLES	SN	TYPE		RELOCATION								
0	B	COMPLEX	ARRAY	MODD	REFS	22	60	165				
0	BB	COMPLEX	ARRAY	FLEXT	REFS	13	26	60	181	186	232	
					DEFINED	165	181	186				
1	BETA	REAL		FLUTAN	REFS	23						
50	BR	REAL		COMA	REFS	21						
15	D	REAL		KLUES	REFS	39						
27	DBAL	REAL		KLUES	REFS	39						
16	DEL	REAL		KLUES	REFS	39						
6200	DETAD	COMPLEX	ARRAY	MODD	REFS	22	60					
12	DWMAX	REAL		KLUES	REFS	39						
11	EPS1	REAL		KLUES	REFS	39						
17	EPS2	REAL		KLUES	REFS	39						
3	FHI	REAL		FLUTV	REFS	25						
2	FLO	REAL		FLUTV	REFS	25						
0	FMACH	REAL		FLUTAN	REFS	23	94	103	273	279		
1325	I	INTEGER			REFS	70	71	2*163	2*165	180	4*181	261
					DEFINED	69	162	179	261			
22	IBAND	INTEGER		KLUES	REFS	39						
7	IDNOPT	INTEGER		KLUES	REFS	39						
4	IE	INTEGER		FLUTV	REFS	25	255	DEFINED	252			
21	IFA	INTEGER		PLACES	REFS	42						
67	IFADD	INTEGER		PLACES	REFS	42						
41	IFADDI	INTEGER		PLACES	REFS	42						
33	IFB	INTEGER		PLACES	REFS	42						
71	IFBAL	INTEGER		PLACES	REFS	42						
43	IFBALI	INTEGER		PLACES	REFS	42						
117	IFBR	INTEGER		PLACES	REFS	42						
53	IFBT	INTEGER		PLACES	REFS	42						
73	IFDESF	INTEGER		PLACES	REFS	42						
45	IFDESI	INTEGER		PLACES	REFS	42						
55	IFDESN	INTEGER		PLACES	REFS	42						
35	IFDESO	INTEGER		PLACES	REFS	42						
77	IFDUM1	INTEGER		PLACES	REFS	42						
101	IFDUM2	INTEGER		PLACES	REFS	42						
103	IFDUM3	INTEGER		PLACES	REFS	42						
23	IFIN	INTEGER		KLUES	REFS	39						
141	IFINCK	INTEGER		PLACES	REFS	42						
137	IFINCM	INTEGER		PLACES	REFS	42						
31	IFKS	INTEGER		PLACES	REFS	42						
105	IFL	INTEGER		PLACES	REFS	42						
115	IFLR	INTEGER		PLACES	REFS	42						
57	IFMD	INTEGER		PLACES	REFS	42						
65	IFMDB	INTEGER		PLACES	REFS	42						
37	IFMDBI	INTEGER		PLACES	REFS	42						
61	IFMEMF	INTEGER		PLACES	REFS	42						

VARIABLES		SN	TYPE		RELOCATION							
25	IFMEMN		INTEGER		PLACES	REFS	42					
51	IFMEMO		INTEGER		PLACES	REFS	42					
125	IFMODK		INTEGER		PLACES	REFS	42					
123	IFMODM		INTEGER		PLACES	REFS	42					
135	IFPH		INTEGER		PLACES	REFS	42					
127	IFPHT		INTEGER		PLACES	REFS	42					
121	IFPHTF		INTEGER		PLACES	REFS	42					
133	IFQ		INTEGER		PLACES	REFS	42					
131	IFQT		INTEGER		PLACES	REFS	42					
11	IFSCR		INTEGER		PLACES	REFS	42					
27	IFSTFN		INTEGER		PLACES	REFS	42					
63	IFSTFO		INTEGER		PLACES	REFS	42					
12	IFS1		INTEGER		PLACES	REFS	42					
13	IFS2		INTEGER		PLACES	REFS	42					
14	IFS3		INTEGER		PLACES	REFS	42					
15	IFS4		INTEGER		PLACES	REFS	42					
75	IFWT		INTEGER		PLACES	REFS	42					
47	IFWTI		INTEGER		PLACES	REFS	42					
23	IFY		INTEGER		PLACES	REFS	42					
107	IFYT		INTEGER		PLACES	REFS	42					
111	IFZ		INTEGER		PLACES	REFS	42					
113	IFZR		INTEGER		PLACES	REFS	42					
1352	IMODV		INTEGER			REFS	252	254	DEFINED	240		
1347	INMD		INTEGER			REFS	174	2*175	177	180	185	4*186
						DEFINED	173					
3	IR		INTEGER		CHEAD	REFS	32	2*212	2*220	3*221	2*232	
2	IRED		INTEGER		KLUES	REFS	39					
1341	IRHOV		INTEGER			REFS	92	276	DEFINED	91		
0	ISAVFO		INTEGER		F.P.	REFS	273	279	DEFINED	1		
1343	ISTIV		INTEGER			REFS	103	167	175	181	2*186	276
						DEFINED	101					
1337	ITAPE	*	INTEGER			DEFINED	82					
2	ITAPEP		INTEGER		COMRWP	REFS	36					
0	ITAPER		INTEGER		COMRWP	REFS	36					
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	14	28	75	80	81	82
7	ITAPET		INTEGER		CTABLE	REFS	37					
1	ITAPEW		INTEGER		COMRWP	REFS	36	116	118	123	125	137	139
							142	151	153	171	195	197	210	219
							230	243	245	262	269	I/O REFS	117	124
							138	141	152	170	196	209	211	212
							218	221	229	231	232	244	261	268
1330	ITAP18		INTEGER			DEFINED	75	I/O REFS	102	103	104	105	106
							107						
1354	ITC		INTEGER			REFS	2*258	DEFINED	257				
1353	ITRA		INTEGER			REFS	256	258	DEFINED	255			
20	IUA		INTEGER		PLACES	REFS	42					
66	IUADD		INTEGER		PLACES	REFS	42					
40	IUADDI		INTEGER		PLACES	REFS	42					
32	IUB		INTEGER		PLACES	REFS	42					
70	IUBAL		INTEGER		PLACES	REFS	42					
42	IUBALI		INTEGER		PLACES	REFS	42					
116	IUBR		INTEGER		PLACES	REFS	42					
52	IUBT		INTEGER		PLACES	REFS	42					
16	IUCD		INTEGER		PLACES	REFS	42					
72	IUDESF		INTEGER		PLACES	REFS	42					
44	IUDESI		INTEGER		PLACES	REFS	42					
54	IUDESN		INTEGER		PLACES	REFS	42					

VARIABLES	SN	TYPE	RELOCATION								
34	IUDESO	INTEGER	PLACES	REFS	42						
76	IUDUM1	INTEGER	PLACES	REFS	42						
100	IUDUM2	INTEGER	PLACES	REFS	42						
102	IUDUM3	INTEGER	PLACES	REFS	42						
4	IUGO1	INTEGER	PLACES	REFS	42						
5	IUGO2	INTEGER	PLACES	REFS	42						
6	IUGO3	INTEGER	PLACES	REFS	42						
7	IUGO4	INTEGER	PLACES	REFS	42						
140	IUINCK	INTEGER	PLACES	REFS	42						
136	IUINCM	INTEGER	PLACES	REFS	42						
0	IUIN1	INTEGER	PLACES	REFS	42						
1	IUIN2	INTEGER	PLACES	REFS	42						
30	IUKS	INTEGER	PLACES	REFS	42						
104	IUL	INTEGER	PLACES	REFS	42						
114	IULR	INTEGER	PLACES	REFS	42						
56	IUMD	INTEGER	PLACES	REFS	42						
64	IUMDB	INTEGER	PLACES	REFS	42						
36	IUMDBI	INTEGER	PLACES	REFS	42						
60	IUMEMF	INTEGER	PLACES	REFS	42						
24	IUMEMN	INTEGER	PLACES	REFS	42						
50	IUMEMO	INTEGER	PLACES	REFS	42						
124	IUMODK	INTEGER	PLACES	REFS	42						
122	IUMODM	INTEGER	PLACES	REFS	42						
2	IUOUT1	INTEGER	PLACES	REFS	42						
3	IUOUT2	INTEGER	PLACES	REFS	42						
134	IUPH	INTEGER	PLACES	REFS	42						
126	IUPHT	INTEGER	PLACES	REFS	42						
120	IUPHTF	INTEGER	PLACES	REFS	42						
17	IUPR	INTEGER	PLACES	REFS	42						
132	IUQ	INTEGER	PLACES	REFS	42						
130	IUQT	INTEGER	PLACES	REFS	42						
10	IUSCR	INTEGER	PLACES	REFS	42						
26	IUSTFN	INTEGER	PLACES	REFS	42						
62	IUSTFO	INTEGER	PLACES	REFS	42						
74	IUWT	INTEGER	PLACES	REFS	42						
46	IUWTI	INTEGER	PLACES	REFS	42						
22	IUY	INTEGER	PLACES	REFS	42						
106	IUYT	INTEGER	PLACES	REFS	42						
110	IUZ	INTEGER	PLACES	REFS	42						
112	IUZR	INTEGER	PLACES	REFS	42						
1326	I1	INTEGER		REFS	71	DEFINED	70				
1345	J	INTEGER		REFS	2*165	DEFINED	164				
1350	JC	INTEGER		REFS	211	212	231	232	DEFINED	211	212
					231	232					
4	JCL	INTEGER	CHEAD	REFS	32	211	212	231	232		
5	JCU	INTEGER	CHEAD	REFS	32	211	212	231	232		
7	KBPAGE	INTEGER	CLIST	REFS	29						
1340	KFIRST	INTEGER		REFS	110	273	DEFINED	83	111		
0	KHEAD	INTEGER	CHEAD	REFS	32	208	217	228			
4	KLABEL	INTEGER	CLIST	REFS	29						
24	KLUB	INTEGER	KLUES	REFS	39						
4	KLUBAL	INTEGER	KLUES	REFS	39						
3	KLUMD	INTEGER	KLUES	REFS	39						
1	KLUNAL	INTEGER	KLUES	REFS	39						
25	KLUQ	INTEGER	KLUES	REFS	39						
0	KLUSE	INTEGER	KLUES	REFS	39						
2	KOLUMN	INTEGER	CHEAD	REFS	32	224	225	DEFINED	72	73	225

VARIABLES	SN	TYPE		RELOCATION							
					234						
0	KOUNT	INTEGER		CLIST	REFS	29	119	126	130	140	143	149
					154	168	172	193	198	241	246	259
					263	266	270	DEFINED	108	119	126	130
					140	143	149	154	168	172	193	198
					241	246	259	263	266	270		
11	KOUNTH	INTEGER		CLIST	REFS	29						
12	KOUNTI	INTEGER		CLIST	REFS	29						
1	KPAGE	INTEGER		CLIST	REFS	29						
0	KREPOR	INTEGER		REPORT	REFS	31	73					
1	KRETUR	INTEGER		CHEAD	REFS	32	213	222	233	DEFINED	67	206
1351	KSAVE	INTEGER			REFS	234	DEFINED	224				
0	KTABLE	INTEGER		CTABLE	REFS	37	DEFINED	114	134	146	157	201
					249							
5	KTABLO	INTEGER		CTABLE	REFS	37						
0	KTFH	INTEGER		CTFH	REFS	35	DEFINED	90	284			
5	KTPAGE	INTEGER		CLIST	REFS	29						
1344	L	INTEGER			REFS	105	DEFINED	105				
0	LC	INTEGER	ARRAY	COMA	REFS	21	76	77	78	79	93	115
					122	166	173	3*177	272	277		
2	LINES	INTEGER		CLIST	REFS	29	108	2*130	2*149	2*168	2*193	2*241
					2*259	2*266						
10	LINESG	INTEGER		CLIST	REFS	29						
3	LINEST	INTEGER		CLIST	REFS	29						
7	LSKIP	INTEGER		CHEAD	REFS	32	DEFINED	65	204			
6	LSUB	INTEGER		CHEAD	REFS	32	DEFINED	66	205	215	226	
1	LTFH	INTEGER		CTFH	REFS	35	105					
0	LTSHF	INTEGER		CTSHF	REFS	33	207	216	227			
1346	MELIM	INTEGER			REFS	170	DEFINED	166	167			
26	MORBAL	INTEGER		KLUES	REFS	39						
5	MSADD	INTEGER		KLUES	REFS	39						
1335	MTAP1	INTEGER			DEFINED	80	I/O REFS	94				
1336	MTAP2	INTEGER			DEFINED	81	I/O REFS	253	278			
1365	NAME1	INTEGER	*UNDEF		REFS	16						
1367	NAME2	INTEGER	*UNDEF		REFS	16						
13	NBAR	INTEGER		KLUES	REFS	39						
17550	NC	INTEGER		MODD	REFS	22						
3	NCOLS	INTEGER		CTABLE	REFS	37	DEFINED	113	133	145	156	199
					248							
4	NCOLST	INTEGER		CTABLE	REFS	37						
20	NCYC	INTEGER		KLUES	REFS	39						
14	NFIX	INTEGER		KLUES	REFS	39						
1	NIND	INTEGER	ARRAY	FITR	REFS	13	27	261	DEFINED	258		
43	NINZ	INTEGER	ARRAY	FLUTC	REFS	24	258					
1331	NMODES	INTEGER			REFS	162	164	179	2*207	216	2*227	
					DEFINED	76						
1333	NMODV	INTEGER			REFS	240	DEFINED	78				
21	NNN	INTEGER		KLUES	REFS	39						
0	NO	INTEGER		CONSTS	REFS	34	110	111	284			
0	NOMI	INTEGER		FITR	REFS	27	257	2*261	DEFINED	256		
12	NOTI	INTEGER	ARRAY	FLUTC	REFS	24	256					
6	NPAGE	INTEGER		CLIST	REFS	29						
6	NPAGEA	INTEGER		CTABLE	REFS	37						
6	NPAS	INTEGER		KLUES	REFS	39						
1	NPASS	INTEGER		CTABLE	REFS	37	103					
5	NQZ	INTEGER		FLUTV	REFS	25						
1332	NRHOV	INTEGER			REFS	91	DEFINED	77				

VARIABLES	SN	TYPE		RELOCATION								
2	NROWS	INTEGER		CTABLE	REFS	37	DEFINED	112	132	144	155	200
					247							
57	NRVBO	INTEGER		FLUTAN	REFS	23						
1334	NSTIV	INTEGER			REFS	101	DEFINED	79				
6	NVTOT	INTEGER		FLUTV	REFS	25						
17500	OMG	REAL	ARRAY	MODD	REFS	22	163	175				
6200	OMGA	REAL	ARRAY	FLEXT	REFS	13	26	220	221	DEFINED	163	175
1416	OMGC	REAL	ARRAY		REFS	18	221	DEFINED	220			
2013	RATOM	REAL	ARRAY	FLUTC	REFS	24	71					
6250	RHO	REAL		FLEXT	REFS	26	141	DEFINED	96			
1342	RHOP	REAL			REFS	94	96	103	273	276	279	
					DEFINED	92						
0	RHOR	REAL	ARRAY	FLUTC	REFS	24	92					
40	RVBO	REAL	ARRAY	FLUTAN	REFS	15	23					
1371	SRATIO	REAL	ARRAY		REFS	17	103	175	181	2*186	273	
					DEFINED	68	71					
2	TFH	REAL	ARRAY	CTFH	REFS	19	35	DEFINED	105			
1355	TITLE	REAL	ARRAY		REFS	11	135	DEFINED	107			
1	TSHF	REAL	ARRAY	CTSHF	REFS	17	33	207	216	227		
1327	TWOPI	REAL			REFS	220	DEFINED	74				
6251	VB	REAL		FLEXT	REFS	26						
2	VBO	REAL	ARRAY	FLUTAN	REFS	15	23					
10	VDFS	REAL		KLUES	REFS	39						
1	VH	REAL		FLUTV	REFS	25						
0	VL	REAL		FLUTV	REFS	25						
14400	WW	REAL	ARRAY	MODD	REFS	22	212					
1	YES	INTEGER		CONSTS	REFS	5	34	73	83	90		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES							
EIGM		3	276							
FLOP		5	273							
HEAD		4	207	216	227					
PLB		3	116	118	123	125	137	139	142	151	153
			171	195	197	210	219	230	243	245	262
			269							
PROGNA		2	64							
PRPLT		3	279							
PTABLE		3	120	127	135	147	158	202	250	
TITLES		1	109	131	136	150	169	194	242	260	267

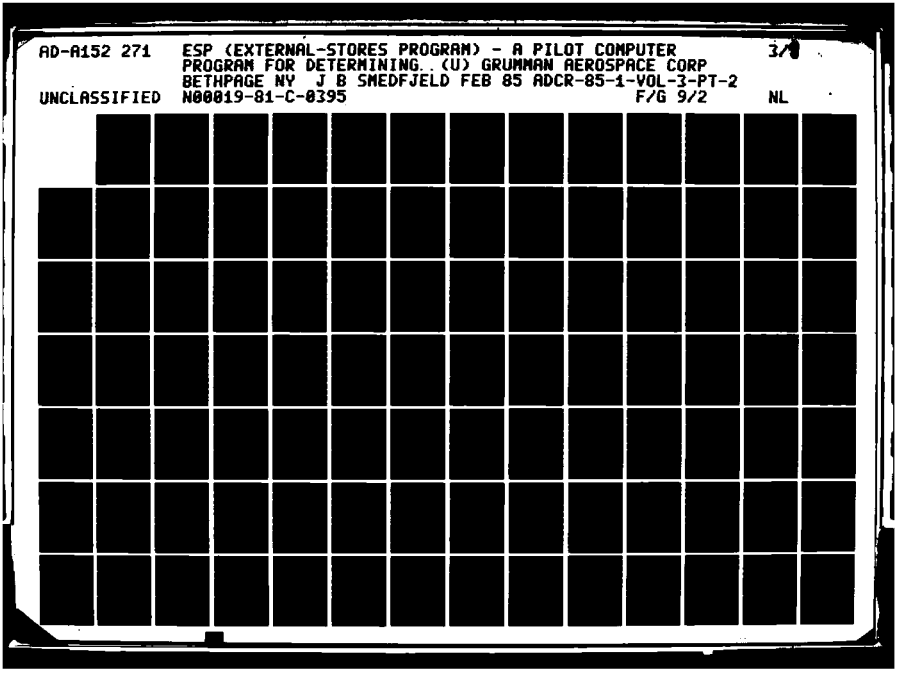
STATEMENT LABELS			DEF LINE	REFERENCES	
0	3		165	162	164
0	4	INACTIVE	239		
303	5		184	177	
300	6		182	179	180
310	7		187	183	185
261	8		176	174	
622	10		280	277	
571	11		265	254	
0	12		258	257	
611	13		275	272	
615	20		278	274	
56	25		95	93	
604	40		271	264	
0	50		71	69	
126	60		122	115	

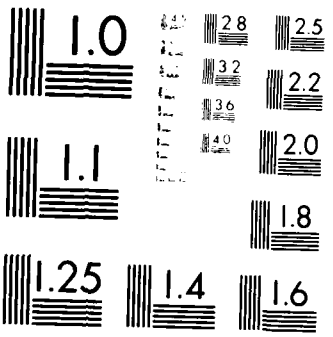
```
STATEMENT LABELS                    DEF LINE    REFERENCES
  140  70                              128         121        122
  140  80                              129         110
 1100  100       FMT                   288         170
    0  105                             281         240
 1106  140       FMT                   289         261
 1120  145       FMT                   291         268
    0  200                             282         101
  334  215                             207         213
  346  216                             209         208
  350  217                             210         208
  363  218                             212         208
  404  235                             216         222
  416  236                             218         217
  420  237                             219         217
  422  238                             220         217
    0  300                             283          91
  437  315                             227         233
  451  316                             229         228
  453  317                             230         228
  466  318                             232         228
 1126  900       FMT                   292         103
 1137  910       FMT                   294         105
 1141  920       FMT   NO REFS         295
 1153  1010      FMT                   297         209
 1157  1011      FMT                   298         211
 1166  1012      FMT                   300         212        221
 1171  1100      FMT                   301         141
 1177  1500      FMT                   302         117
 1206  1510      FMT                   304         124
 1215  1610      FMT                   306         196
 1225  2010      FMT                   309         218
 1235  3000      FMT                   315         107
 1237  3010      FMT                   317         229
 1247  3011      FMT                   319         231
 1256  3012      FMT                   321         232
 1264  4010      FMT                   322         138
 1271  4020      FMT                   325         152
 1276  4030      FMT                   328         244

LOOPS  LABEL    INDEX      FROM-TO     LENGTH    PROPERTIES
   17  50       I            69 71        4B     INSTACK
   51  300      IRHOV        91 283     561B              EXT REFS  NOT INNER
   61  200      ISTIV       101 282     546B              EXT REFS  NOT INNER
  216  3        I           162 165      21B              NOT INNER
  230  3        J           164 165       3B     INSTACK
  274  6        I           179 182       6B     INSTACK
  356           JC          211 211       4B              EXT REFS
  367           JC          212 212      11B              EXT REFS
  461           JC          231 231       4B              EXT REFS
  472           JC          232 232      11B              EXT REFS
  511  105      IMODV       240 281     114B              EXT REFS  NOT INNER
  547  12       ITC         257 258       3B     INSTACK

COMMON BLOCKS   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       COMA         41              0 LC      (40)          40 BR      (1)
       MODD       8041              0 B       (3200)      3200 DETAD   (3200)      6400 WW      (1600)
                                 8000 OMG     (40)         8040 NC      (1)
```

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
FLUTAN	48	0 FMACH (1)	1 BETA (1)	2 VBO (30)			
		32 RVBO (15)	47 NRVBO (1)				
FLUTC	1055	0 RHOR (10)	10 NOTI (25)	35 NINZ (1000)			
		1035 RATOM (20)					
FLUTV	7	0 VL (1)	1 VH (1)	2 FLO (1)			
		3 FHI (1)	4 IE (1)	5 NQZ (1)			
		6 NVTOT (1)					
FLEXT	3242	0 BB (3200)	3200 OMGA (40)	3240 RHO (1)			
		3241 VB (1)					
FITR	41	0 NOMI (1)	1 NIND (40)				
CTAPES	50	0 ITAPES (50)					
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)			
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)			
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)			
		9 KOUNTH (1)	10 KOUNTI (1)				
REPORT	1	0 KREPOR (1)					
CHEAD	8	0 KHEAD (1)	1 KRETUR (1)	2 KOLUMN (1)			
		3 IR (1)	4 JCL (1)	5 JCU (1)			
		6 LSUB (1)	7 LSKIP (1)				
CTSHF	2	0 LTSHF (1)	1 TSHF (1)				
CONSTS	2	0 NO (1)	1 YES (1)				
CTFH	3	0 KTFH (1)	1 LTFH (1)	2 TFH (1)			
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)			
CTABLE	8	0 KTABLE (1)	1 NPASS (1)	2 NROWS (1)			
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLO (1)			
		6 NPAGEA (1)	7 ITAPET (1)				
KLUES	24	0 KLUSE (1)	1 KLUNAL (1)	2 IRED (1)			
		3 KLUMD (1)	4 KLUBAL (1)	5 MSADD (1)			
		6 NPAS (1)	7 IDNOPT (1)	8 VDES (1)			
		9 EPS1 (1)	10 DWMAX (1)	11 NBAR (1)			
		12 NFIX (1)	13 D (1)	14 DEL (1)			
		15 EPS2 (1)	16 NCYC (1)	17 NNN (1)			
		18 IBAND (1)	19 IFIN (1)	20 KLUB (1)			
		21 KLUQ (1)	22 MORBAL (1)	23 DBAL (1)			
PLACES	98	0 IUIN1 (1)	1 IUIN2 (1)	2 IUOUT1 (1)			
		3 IUOUT2 (1)	4 IUGO1 (1)	5 IUGO2 (1)			
		6 IUGO3 (1)	7 IUGO4 (1)	8 IUSCR (1)			
		9 IFSCR (1)	10 IFS1 (1)	11 IFS2 (1)			
		12 IFS3 (1)	13 IFS4 (1)	14 IUCD (1)			
		15 IUPR (1)	16 IUA (1)	17 IFA (1)			
		18 IUY (1)	19 IFY (1)	20 IUMEMN (1)			
		21 IFMEMN (1)	22 IUSTFN (1)	23 IFSTFN (1)			
		24 IUKS (1)	25 IFKS (1)	26 IUB (1)			
		27 IFB (1)	28 IUDESO (1)	29 IFDESO (1)			
		30 IUMDBI (1)	31 IFMDBI (1)	32 IUADDI (1)			
		33 IFADDI (1)	34 IUBALI (1)	35 IFBALI (1)			
		36 IUDESI (1)	37 IFDESI (1)	38 IUWTI (1)			
		39 IFWTI (1)	40 IUMEMO (1)	41 IFMEMO (1)			
		42 IUBT (1)	43 IFBT (1)	44 IUDESN (1)			
		45 IFDESN (1)	46 IUMD (1)	47 IFMD (1)			
		48 IUMEMF (1)	49 IFMEMF (1)	50 IUSTFO (1)			
		51 IFSTFO (1)	52 IUMDB (1)	53 IFMDB (1)			
		54 IUADD (1)	55 IFADD (1)	56 IUBAL (1)			
		57 IFBAL (1)	58 IUDESF (1)	59 IFDESF (1)			
		60 IUWT (1)	61 IFWT (1)	62 IUDUM1 (1)			
		63 IFDUM1 (1)	64 IUDUM2 (1)	65 IFDUM2 (1)			
		66 IUDUM3 (1)	67 IFDUM3 (1)	68 IUL (1)			


AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING..(U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2
UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

69 IFL (1)	70 IUYT (1)	71 IFYT (1)
72 IUZ (1)	73 IFZ (1)	74 IUZR (1)
75 IFZR (1)	76 IULR (1)	77 IFLR (1)
78 IUBR (1)	79 IFBR (1)	80 IUPHTF (1)
81 IFPHTF (1)	82 IUMODM (1)	83 IFMODM (1)
84 IUMODK (1)	85 IFMODK (1)	86 IUPHT (1)
87 IFPHT (1)	88 IUQT (1)	89 IFQT (1)
90 IUQ (1)	91 IFQ (1)	92 IUPH (1)
93 IFPH (1)	94 IUINCM (1)	95 IFINCM (1)
96 IUINCK (1)	97 IFINCK (1)	

STATISTICS

PROGRAM LENGTH	1527B	855
CM LABELED COMMON LENGTH	30615B	12685

520000B CM USED

```
      SUBROUTINE QFLIN (ITAPE,ARG,QRS,RHO,IFLUT,MID)                    QFLIN      2
C                                                                       QFLIN      3
C     INTERPOLATION ROUTINE FOR P-K PROGRAM                             QFLIN      4
C                                                                       QFLIN      5
      INTEGER YES                                                       QFLIN      6
C                                                                       QFLIN      7
      DIMENSION QR(2,2), Q(15,2), X(15)                                 QFLIN      8
      DIMENSION QK(15,2), XK(15)                                        QFLIN      9
      DIMENSION         LC(40)                                          QFLIN     10
C                                                                       QFLIN     11
      COMPLEX       QRS(MID,1)                                          QFLIN     12
C                                                                       QFLIN     13
      COMMON /KZERO / KZ, XK                                            QFLIN     14
      COMMON /COMA  / LC, BR                                            QFLIN     15
      COMMON /CONSTS/ NO    ,YES                                        QFLIN     16
      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                              QFLIN     17
      COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE   QFLIN     18
     1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                       QFLIN     19
      COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLO,NPAGEA  QFLIN     20
     1               ,ITAPET                                            QFLIN     21
      COMMON /REPORT/ KREPOR                                            QFLIN     22
      COMMON /CHEAD / KHEAD ,KRETUR,KOLUMN,IR,JCL,JCU,LSUB,LSKIP        QFLIN     23
C                                                                       QFLIN     24
      CALL PROGNA (4H(QFL, 4HIN ))                                      QFLIN     25
      LSKIP  =  1                                                       QFLIN     26
      LSUB   =  4                                                       QFLIN     27
      KRETUR =  0                                                       QFLIN     28
      KOLUMN =  8                                                       QFLIN     29
      IF (KREPOR .EQ. YES) KOLUMN = 4                                   QFLIN     30
      REWIND ITAPE                                                      QFLIN     31
      READ (ITAPE) NX, NXMAX, LL, X, NQR                                QFLIN     32
      IF (KZ.EQ.1)  GO TO 105                                           QFLIN     33
      DO 100 I=1,NX                                                     QFLIN     34
      J = NX - I + 1                                                    QFLIN     35
      XK(J) = 1.0 / X(I)                                                QFLIN     36
  100 CONTINUE                                                          QFLIN     37
      KZ = 1                                                            QFLIN     38
  105 CONTINUE                                                          QFLIN     39
      NM       =  LC(2)                                                 QFLIN     40
      LLL      =  LL                                                    QFLIN     41
      IF (ARG.LT.X(1) .OR. ARG.GT.X(NX)) LLL = MINO(3,LL)               QFLIN     42
      KLUE   =  0                                                       QFLIN     43
      IF ( IFLUT .NE. 0 )     KLUE = 1                                  QFLIN     44
      DO 1  K = 1,NQR                                                   QFLIN     45
      DO 3 I=1,2                                                        QFLIN     46
      READ (ITAPE) (Q(K1,I),K1=1,NX)                                    QFLIN     47
      IF (ARG.LT.10.0)  GO TO 3                                         QFLIN     48
      DO 110 K1=1,NX                                                    QFLIN     49
      K2 = NX - K1 + 1                                                  QFLIN     50
      QK(K2,I) = Q(K1,I) * XK(K2) * XK(K2)                              QFLIN     51
  110 CONTINUE                                                          QFLIN     52
    3 CONTINUE                                                          QFLIN     53
      IF (ARG.LT.10.0)  GO TO 115                                       QFLIN     54
      ARGK = 1.0 / ARG                                                  QFLIN     55
      CALL HELGX (ARGK,QR,XK,QK,NX,2,LLL,2,NXMAX,0,KLUE)                QFLIN     56
      GO TO 120                                                         QFLIN     57
  115 CONTINUE                                                          QFLIN     58
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```
                  CALL HELGX (ARG,QR,X,Q,NX,2,LLL,2,NXMAX,0,KLUE)                QFLIN      59
                120 CONTINUE                                                     QFLIN      60
60                  I    =  (K-1) / NM + 1                                       QFLIN      61
                    J    =  K - (I-1) * NM                                       QFLIN      62
                    QRS(I,J) = CMPLX (QR(1,1),QR(2,1))                           QFLIN      63
                    IF (ARG.LT.10.0)  GO TO 1                                    QFLIN      64
                    QRS(I,J) = QRS(I,J) * ARG * ARG                              QFLIN      65
65                1 CONTINUE                                                     QFLIN      66
                    IF (IFLUT .EQ. 0) GO TO 1000                                 QFLIN      67
                    IF ( IFLUT .EQ. 2 )     GO TO 7                              QFLIN      68
              C                                                                  QFLIN      69
              C GENERALIZED AIR FORCES AND ASSOCIATED RESULTS                    QFLIN      70
70            C                                                                  QFLIN      71
                    DO 5 I=1,NM                                                  QFLIN      72
                    DO 5 J=1,NM                                                  QFLIN      73
                  5 QRS(I,J) =  RHO * QRS(I,J)                                   QFLIN      74
                    KOUNT   =  LINES                                             QFLIN      75
75                  CALL TITLES (2)                                              QFLIN      76
                    CALL PLB (1,1,ITAPEW)                                        QFLIN      77
                    WRITE (ITAPEW,1630)                                          QFLIN      78
                    CALL PLB (1,1,ITAPEW)                                        QFLIN      79
                    KOUNT   =  KOUNT + 4                                         QFLIN      80
80                  NCOLS   =  4                                                 QFLIN      81
                    NROWS   =  0                                                 QFLIN      82
                    KTABLE  =  2                                                 QFLIN      83
                    CALL PTABLE (2,30,30                                         QFLIN      84
                   1   HGENERALIZED AERODYNAMIC FORCES)                          QFLIN      85
85                  CALL PLB (1,1,ITAPEW)                                        QFLIN      86
                    WRITE (ITAPEW,2) RHO, ARG, NM                                QFLIN      87
                    CALL PLB (1,1,ITAPEW)                                        QFLIN      88
                    KOUNT   =  KOUNT +3                                          QFLIN      89
              C                                                                  QFLIN      90
90                  KSAVE   =  KOLUMN                                            QFLIN      91
                    KOLUMN  =  KOLUMN/2                                          QFLIN      92
                    LSUB    =  4                                                 QFLIN      93
                    NMODES  =  NM                                                QFLIN      94
                  315 CALL HEAD (LTSHF,TSHF,NMODES,NMODES)                       QFLIN      95
95                  GO TO (316, 317, 318), KHEAD                                 QFLIN      96
                  316 WRITE (ITAPEW,3010)                                        QFLIN      97
                  317 CALL PLB (1,1,ITAPEW)                                      QFLIN      98
                    WRITE (ITAPEW,3011) (JC, JC=JCL,JCU)                         QFLIN      99
                  318 WRITE (ITAPEW,3012)  IR, (QRS(IR,JC), JC=JCL,JCU)          QFLIN     100
100                 IF (KRETUR .LT. 3) GO TO 315                                 QFLIN     101
                    KOLUMN =  KSAVE                                              QFLIN     102
                    GO TO 1000                                                   QFLIN     103
              C                                                                  QFLIN     104
              C GRADIENT OF GENERALIZED AIR FORCES                               QFLIN     105
105           C                                                                  QFLIN     106
                  7 REWIND ITAPE                                                 QFLIN     107
                    READ (ITAPE) NX, NXMAX, LL, X, NQR                           QFLIN     108
                    DO 8 K=1,NQR                                                 QFLIN     109
                    DO 9 I=1,2                                                   QFLIN     110
110                 READ (ITAPE) (Q(K1,I),K1=1,NX)                               QFLIN     111
                    IF (ARG.LT.10.0)  GO TO 9                                    QFLIN     112
                    DO 150 K1=1,NX                                               QFLIN     113
                    K2 = NX - K1 + 1                                             QFLIN     114
                    QK(K2,I) = Q(K1,I) * XK(K2) * XK(K2)                         QFLIN     115
```

```
115           150 CONTINUE                                                    QFLIN     116
                9 CONTINUE                                                    QFLIN     117
                  IF (ARG.LT 10.0)  GO TO 155                                 QFLIN     118
                  ARGK = 1.0 / ARG                                            QFLIN     119
                  CALL HELGX (ARGK,QR,XK,QK,NX,2,LLL,2,NXMAX,0,KLUE)          QFLIN     120
120               GO TO 160                                                   QFLIN     121
              155 CONTINUE                                                    QFLIN     122
                  CALL HELGX (ARG,QR,X,Q,NX,2,LLL,2,NXMAX,0,KLUE)             QFLIN     123
              160 CONTINUE                                                    QFLIN     124
                  I   =  (K-1) / NM + 1                                       QFLIN     125
125               J   =  K - (I-1) * NM                                       QFLIN     126
                  QRS(I,J) = CMPLX (QR(1,2),QR(2,2))                          QFLIN     127
                  IF (ARG.LT.10.0)  GO TO 8                                   QFLIN     128
                  QRS(I,J) = QRS(I,J) * ARG * ARG                             QFLIN     129
                8 QRS(I,J)  =  - RHO * ARG * ARG * QRS(I,J)                   QFLIN     130
130               KOUNT  =  LINES                                             QFLIN     131
                  CALL TITLES (2)                                             QFLIN     132
                  CALL PLB (1,1,ITAPEW)                                       QFLIN     133
                  WRITE (ITAPEW,1650)                                         QFLIN     134
                  CALL PLB (1,1,ITAPEW)                                       QFLIN     135
135               KOUNT  =  KOUNT + 4                                         QFLIN     136
                  NCOLS  =  4                                                 QFLIN     137
                  NROWS  =  0                                                 QFLIN     138
                  KTABLE =  2                                                 QFLIN     139
                  CALL PTABLE (2,42,42                                        QFLIN     140
140               1   HGRADIENT OF GENERALIZED AERODYNAMIC FORCES)             QFLIN     141
                  CALL PLB (1,1,ITAPEW)                                       QFLIN     142
                  WRITE (ITAPEW,2) RHO, ARG, NM                               QFLIN     143
                  CALL PLB (1,1,ITAPEW)                                       QFLIN     144
                  KOUNT  =  KOUNT +3                                          QFLIN     145
145           C                                                               QFLIN     146
                  KSAVE  =  KOLUMN                                            QFLIN     147
                  KOLUMN =  KOLUMN/2                                          QFLIN     148
                  LSUB   =  4                                                 QFLIN     149
                  NMODES =  NM                                                QFLIN     150
150             415 CALL HEAD (LTSHF,TSHF,NMODES,NMODES)                      QFLIN     151
                  GO TO (416, 417, 418), KHEAD                                QFLIN     152
                416 WRITE (ITAPEW,3010)                                       QFLIN     153
                417 CALL PLB (1,1,ITAPEW)                                     QFLIN     154
                  WRITE (ITAPEW,3011) (JC, JC=JCL,JCU)                        QFLIN     155
155             418 WRITE (ITAPEW,3012)  IR, (QRS(IR,JC), JC=JCL,JCU)         QFLIN     156
                  IF (KRETUR .LT. 3) GO TO 415                                QFLIN     157
                  KOLUMN =  KSAVE                                             QFLIN     158
               1000 CONTINUE                                                  QFLIN     159
              C                                                               QFLIN     160
160           C FORMATS                                                       QFLIN     161
              C                                                               QFLIN     162
                  2 FORMAT (10X,4HRHO=,1P1E14.7,2X,10HLBS/CU.FT.,             QFLIN     163
                   1          3X,4HVBO=,1P1E14.7,3X,4HFOR ,I2,3X, 5HMODES)    QFLIN     164
                1630 FORMAT (10X,30                                           QFLIN     165
165                 1   HGENERALIZED AERODYNAMIC FORCES                       QFLIN     166
                    2       ,/10X,30(1H-))                                    QFLIN     167
                1650 FORMAT (10X,42                                           QFLIN     168
                    1   HGRADIENT OF GENERALIZED AERODYNAMIC FORCES           QFLIN     169
                    2       ,/10X,42(1H-))                                    QFLIN     170
170             3010 FORMAT (10X,24H(REAL, IMAGINARY)        )                QFLIN     171
                3011 FORMAT (10X,1X,4HMODE,2X,5HMODE=,1(   1I3,1X,17(1H-))    QFLIN     172
```

```
                1                                          ,3(  1I4,1X,23(1H-)))          QFLIN     173
             3012 FORMAT (10X,I5,4(2X,1H(,1P1E11.4,1H,1X,1P1E11.4,1H)))                   QFLIN     174
            C                                                                             QFLIN     175
      175         RETURN                                                                  QFLIN     176
                  END                                                                     QFLIN     177
```

CARD NR.	SEVERITY	DETAILS	DIAGNOSIS OF PROBLEM
95	I		AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
151	I		AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	QFLIN	1	175

VARIABLES	SN	TYPE	RELOCATION							
0	ARG	REAL	F.P.	REFS	2*41	47	53	54	58	63	2*64
				86	111	117	118	122	127	2*128	2*129
				142	DEFINED	1					
770	ARGK	REAL		REFS	55	119	DEFINED	54	118		
50	BR	REAL	COMA	REFS	14						
760	I	INTEGER		REFS	34	35	46	2*50	61	62	2*64
				2*73	110	2*114	125	126	2*128	2*129	
				DEFINED	33	45	60	71	109	124	
0	IFLUT	INTEGER	F.P.	REFS	43	66	67	DEFINED	1		
3	IR	INTEGER	CHEAD	REFS	22	2*99	2*155				
0	ITAPE	INTEGER	F.P.	DEFINED	1	I/O REFS	30	31	46	106	107
				110							
2	ITAPEP	INTEGER	COMRWP	REFS	16						
0	ITAPER	INTEGER	COMRWP	REFS	16						
7	ITAPET	INTEGER	CTABLE	REFS	19						
1	ITAPEW	INTEGER	COMRWP	REFS	16	76	78	85	87	97	132
				134	141	143	153	I/O REFS	77	86	96
				98	99	133	142	152	154	155	
761	J	INTEGER		REFS	35	62	2*64	2*73	126	2*128	2*129
				DEFINED	34	61	72	125			
775	JC	INTEGER		REFS	98	99	154	155	DEFINED	98	99
				154	155						
4	JCL	INTEGER	CHEAD	REFS	22	98	99	154	155		
5	JCU	INTEGER	CHEAD	REFS	22	98	99	154	155		
765	K	INTEGER		REFS	60	61	124	125	DEFINED	44	108
7	KBPAGE	INTEGER	CLIST	REFS	17						
0	KHEAD	INTEGER	CHEAD	REFS	22	95	151				
4	KLABEL	INTEGER	CLIST	REFS	17						
764	KLUE	INTEGER		REFS	55	58	119	122	DEFINED	42	43
2	KOLUMN	INTEGER	CHEAD	REFS	22	90	91	146	147		
				DEFINED	28	29	91	101	147	157	
0	KOUNT	INTEGER	CLIST	REFS	17	79	88	135	144		
				DEFINED	74	79	88	130	135	144	

VARIABLES	SN	TYPE		RELOCATION								
11	KOUNTH	INTEGER		CLIST	REFS	17						
12	KOUNTI	INTEGER		CLIST	REFS	17						
1	KPAGE	INTEGER		CLIST	REFS	17						
0	KREPOR	INTEGER		REPORT	REFS	21	29					
1	KRETUR	INTEGER		CHEAD	REFS	22	100	156	DEFINED	27		
771	KSAVE	INTEGER			REFS	101	157	DEFINED	90	146		
0	KTABLE	INTEGER		CTABLE	REFS	19	DEFINED	82	138			
5	KTABLO	INTEGER		CTABLE	REFS	19						
5	KTPAGE	INTEGER		CLIST	REFS	17						
0	KZ	INTEGER		KZERO	REFS	13	32	DEFINED	37			
766	K1	INTEGER			REFS	46	49	50	110	113	114	
					DEFINED	46	48	110	112			
767	K2	INTEGER			REFS	3*50	3*114	DEFINED	49	113		
0	LC	INTEGER	ARRAY	COMA	REFS	9	14	39				
2	LINES	INTEGER		CLIST	REFS	17	74	130				
10	LINESG	INTEGER		CLIST	REFS	17						
3	LINEST	INTEGER		CLIST	REFS	17						
756	LL	INTEGER			REFS	40	41	DEFINED	31	107		
763	LLL	INTEGER			REFS	55	58	119	122	DEFINED	40	41
7	LSKIP	INTEGER		CHEAD	REFS	22	DEFINED	25				
6	LSUB	INTEGER		CHEAD	REFS	22	DEFINED	26	92	148		
773	LTSHF	INTEGER			REFS	94	150					
0	MID	INTEGER		F.P.	REFS	11	DEFINED	1				
3	NCOLS	INTEGER		CTABLE	REFS	19	DEFINED	80	136			
4	NCOLST	INTEGER		CTABLE	REFS	19						
762	NM	INTEGER			REFS	60	61	71	72	86	93	124
						125	142	149	DEFINED	39		
772	NMODES	INTEGER			REFS	2*94	2*150	DEFINED	93	149		
0	NO	INTEGER		CONSTS	REFS	15						
6	NPAGE	INTEGER		CLIST	REFS	17						
6	NPAGEA	INTEGER		CTABLE	REFS	19						
1	NPASS	INTEGER		CTABLE	REFS	19						
757	NQR	INTEGER			REFS	44	108	DEFINED	31	107		
2	NROWS	INTEGER		CTABLE	REFS	19	DEFINED	81	137			
754	NX	INTEGER			REFS	33	34	41	46	48	49	55
						58	110	112	113	119	122	
					DEFINED	31	107					
755	NXMAX	INTEGER			REFS	55	58	119	122	DEFINED	31	107
1002	Q	REAL	ARRAY		REFS	7	50	58	114	122		
					DEFINED	46	110					
1057	QK	REAL	ARRAY		REFS	8	55	119	DEFINED	50	114	
776	QR	REAL	ARRAY		REFS	7	55	58	2*62	119	122	2*126
0	QRS	COMPLEX	ARRAY	F.P.	REFS	11	64	73	99	128	129	155
					DEFINED	1	62	64	73	126	128	129
0	RHO	REAL		F.P.	REFS	73	86	129	142	DEFINED	1	
774	TSHF	REAL			REFS	94	150					
1040	X	REAL	ARRAY		REFS	7	35	2*41	58	122		
					DEFINED	31	107					
1	XK	REAL	ARRAY	KZERO	REFS	8	13	2*50	55	2*114	119	
					DEFINED	35						
1	YES	INTEGER		CONSTS	REFS	5	15	29				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES								
HEAD		4	94	150							
HELGX		11	55	58	119	122					
PLB		3	76	78	85	87	97	132	134	141	143

EXTERNALS	TYPE	ARGS	REFERENCES		
			153		
PROGNA		2	24		
PTABLE		3	83	139	
TITLES		1	75	131	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
CMPLX	COMPLEX	2	INTRIN		62	126
MINO	INTEGER	0	INTRIN		41	

STATEMENT LABELS			DEF LINE	REFERENCES	
141	1		65	44	63
674	2	FMT	162	86	142
106	3		52	45	47
0	5		73	71	72
271	7		106	67	
362	8		129	108	127
327	9		116	109	111
0	100		36	33	
40	105		38	32	
0	110		51	48	
117	115		57	53	
122	120		59	56	
0	150		115	112	
340	155		121	117	
343	160		123	120	
220	315		94	100	
232	316		96	95	
234	317		97	95	
247	318		99	95	
427	415		150	156	
441	416		152	151	
443	417		153	151	
456	418		155	151	
500	1000		158	66	102
705	1630	FMT	164	77	
713	1650	FMT	167	133	
723	3010	FMT	170	96	152
730	3011	FMT	171	98	154
737	3012	FMT	173	99	155

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
31	100	I	33 36	5B	INSTACK		
55	1	K	44 65	67B		EXT REFS	NOT INNER
56	3	I	45 52	33B		EXT REFS	NOT INNER
101	110	K1	48 51	4B	INSTACK		
150	5	I	71 73	15B		NOT INNER	
156	5	J	72 73	3B	INSTACK		
242		JC	98 98	4B		EXT REFS	
253		JC	99 99	11B		EXT REFS	
276	8	K	108 129	76B		EXT REFS	NOT INNER
277	9	I	109 116	33B		EXT REFS	NOT INNER
322	150	K1	112 115	4B	INSTACK		
451		JC	154 154	4B		EXT REFS	
462		JC	155 155	11B		EXT REFS	

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

KZERO	16	0	KZ (1)	1	XK (15)			
COMA	41	0	LC (40)	40	BR (1)			
CONSTS	2	0	NO (1)	1	YES (1)			
COMRWP	3	0	ITAPER (1)	1	ITAPEW (1)	2	ITAPEP (1)	
CLIST	11	0	KOUNT (1)	1	KPAGE (1)	2	LINES (1)	
		3	LINEST (1)	4	KLABEL (1)	5	KTPAGE (1)	
		6	NPAGE (1)	7	KBPAGE (1)	8	LINESG (1)	
		9	KOUNTH (1)	10	KOUNTI (1)			
CTABLE	8	0	KTABLE (1)	1	NPASS (1)	2	NROWS (1)	
		3	NCOLS (1)	4	NCOLST (1)	5	KTABLO (1)	
		6	NPAGEA (1)	7	ITAPET (1)			
REPORT	1	0	KREPOR (1)					
CHEAD	8	0	KHEAD (1)	1	KRETUR (1)	2	KOLUMN (1)	
		3	IR (1)	4	JCL (1)	5	JCU (1)	
		6	LSUB (1)	7	LSKIP (1)			

STATISTICS

PROGRAM LENGTH	1155B	621
CM LABELED COMMON LENGTH	132B	90
52000B CM USED		

```
      C                                                                       FLOP        2
            SUBROUTINE FLOP (ACH,RHOP,SRATIO,ISAVFO,KFIRST)                   FLOP        3
      C                                                                       FLOP        4
            INTEGER YES                                                       FLOP        5
      C     FLUTTER SOLUTION BY P-K METHOD                                    FLOP        6
      C                                                                       FLOP        7
      CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     FLOP        8
      C     COMPLEX*16            SUM                                         FLOP        9
      CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        FLOP       10
      C                                                                       FLOP       11
      CCDC  BEGINNING OF TYPE STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS FLOP       12
            COMPLEX SUM                                                       FLOP       13
            COMPLEX GKECS(40,40),AECS(40,40),SOLECS(40,100)                   FLOP       14
            COMMON /FLPCOM/ GKECS,SOLECS,AECS                                 FLOP       15
      CCDC  ENDING OF TYPE STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS   FLOP       16
      C                                                                       FLOP       17
            DIMENSION XK(15)                                                  FLOP       18
            DIMENSION         LC(40) ,        V(25)                           FLOP       19
            DIMENSION        NEL(20) ,   IPERM(100) ,      VV(100)            FLOP       20
            DIMENSION       DAMP(100) ,    FREQ(100) ,   CFREQ(100)           FLOP       21
            DIMENSION        VZA(20) ,      VQ(100) ,     VT(100)            FLOP       22
            DIMENSION         IT(80) ,       JT(80) ,     VEQ(100)           FLOP       23
            DIMENSION        OMG(40) ,     NIND(40) ,     DMPP(40)           FLOP       24
            DIMENSION      WW(40,40) ,      OMM(40)                          FLOP       25
            DIMENSION ITAPES(50)                                              FLOP       26
            DIMENSION STOR(9600)                                              FLOP       27
      C                                                                       FLOP       28
            COMPLEX     SOLTMP(40,1)                                          FLOP       29
            COMPLEX         ROOT(80) , SOLV(40,100) ,  SOL(40,100)            FLOP       30
            COMPLEX       SOLL(40,10) ,  SOLT(40,10) ,         F            FLOP       31
            COMPLEX         B(40,40) , DETAD(40,40) ,     Q(40,40)           FLOP       32
            COMPLEX       QRS(40,40) ,        VLAMB ,       S(40)           FLOP       33
            COMPLEX         VECC(40) ,     VECR(40) ,  IDMODE(40)           FLOP       34
            COMPLEX         FF(40,40) ,        H(40) ,        CMT            FLOP       35
            COMPLEX         AA(40,40) ,        VLAMA                         FLOP       36
            COMPLEX          A(40,40) ,   GK(40,40) ,         GKK            FLOP       37
            COMPLEX           COMSCA                                          FLOP       38
      C                                                                       FLOP       39
            COMMON /KZERO / KO, XK                                            FLOP       40
            COMMON / COMA  / LC, BR                                           FLOP       41
            COMMON /FLEXT / GK,OMG,RHO,VB                                     FLOP       42
            COMMON /MODD  / Q, DETAD, WW, OMM, NC                             FLOP       43
            COMMON /FITR  / NOMI, NIND                                        FLOP       44
            COMMON /FLUTB/ V,NV,DV                                            FLOP       45
            COMMON /FLUTV / V1    ,V2     ,FLO   ,FHI   ,IE     ,NQZ   ,NVTOT FLOP       46
            COMMON /FACE/ SCALE , FACT , PROD , EM , ROWS , VELOC             FLOP       47
            COMMON  /DETAIL/ EPS , LVEC                                       FLOP       48
            COMMON / CTAPES / ITAPES                                          FLOP       49
            COMMON /FLUT/ VECC,VECR,VELEQ,FRQSQ,C,NMODE,IDMODE                FLOP       50
            COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUMD,KLUBAL,MSADD,NPAS, IDNOPT,  FLOP       51
           1              VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND, FLOP       52
           2              IFIN,KLUB,KLUQ,MORBAL,DBAL                          FLOP       53
            COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE   FLOP       54
           1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                       FLOP       55
            COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLO,NPAGEA  FLOP       56
           1               ,ITAPET                                            FLOP       57
            COMMON /CONSTS/ NO    ,YES                                        FLOP       58
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      COMMON /STORES/ NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)      FLOP       59
     A               ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)    FLOP       60
60   B               ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)         FLOP       61
     C               ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)         FLOP       62
     D               ,STRRDO(5,3),STRRDN(5,3),SCAALE(5,7)                 FLOP       63
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD        FLOP       64
      COMMON / VSAVE / VNSAVE, VOSAVE                                     FLOP       65
65    C                                                                   FLOP       66
      EQUIVALENCE (STOR(1),SOL(1,1),SOLV(1,1),A(1,1),AA(1,1))             FLOP       67
      EQUIVALENCE (STOR(3201),                B(1,1))                     FLOP       68
      EQUIVALENCE (STOR(6401),               FF(1,1))                     FLOP       69
      C                                                                   FLOP       70
70    CCDC                                                                FLOP       71
      LEVEL 3, GKECS,SOLECS,AECS                                          FLOP       72
      CCDC                                                                FLOP       73
      C                                                                   FLOP       74
      C INITIAL CONDITIONS                                                FLOP       75
75    C                                                                   FLOP       76
      CALL PROGNA (4H(FLO, 4HP   ))                                       FLOP       77
      ITAPEW = ITAPES(6)                                                  FLOP       78
      MTAP2  =  ITAPES(22)                                                FLOP       79
      MTAP1  =  ITAPES(37)                                                FLOP       80
80    ITAPE = ITAPES(50)                                                  FLOP       81
      C                                                                   FLOP       82
      CIBM                                                                FLOP       83
      C     ITAPSL = 58                                                   FLOP       84
      C     ITAPRM = 59                                                   FLOP       85
85    CIBM                                                                FLOP       86
      C                                                                   FLOP       87
      KO = 0                                                              FLOP       88
      MID = 40                                                            FLOP       89
      C                                                                   FLOP       90
90    C AUTOMATIC EXCLUSION OF MODES BASED ON RATIOS OF                   FLOP       91
      C GENERALZED FORCES TO GENERALIZED MASSES                           FLOP       92
      C                                                                   FLOP       93
      IF (LC(38).NE.1)  GO TO 105                                         FLOP       94
      C                                                                   FLOP       95
95    CIBM                                                                FLOP       96
      C     REWIND ITAPRM                                                 FLOP       97
      CIBM                                                                FLOP       98
      C                                                                   FLOP       99
      C                                                                   FLOP      100
100   C     TEMPORARILY MOVE GK ONTO I/O UNIT TO HAVE THIS SPACE          FLOP      101
      C     AVAILABLE FOR REDUCED-MODE VERSION                            FLOP      102
      C                                                                   FLOP      103
      CIBM                                                                FLOP      104
      C     WRITE (ITAPRM) GK                                             FLOP      105
105   CIBM                                                                FLOP      106
      C                                                                   FLOP      107
      CCDC                                                                FLOP      108
      MIDSQ2 = MID * MID * 2                                              FLOP      109
      CALL WRITEC(GK(1,1),GKECS(1,1),MIDSQ2)                              FLOP      110
110   CCDC                                                                FLOP      111
      C                                                                   FLOP      112
      C     PERFORM REDUCTION                                             FLOP      113
      C                                                                   FLOP      114
      CALL REDMOD (NLEFT)                                                 FLOP      115
```

```
115                GO TO 110                                                FLOP      116
             C                                                              FLOP      117
             C                                                              FLOP      118
               105 CONTINUE                                                 FLOP      119
                   NLEFT = LC(2)                                            FLOP      120
120          C                                                              FLOP      121
               110 CONTINUE                                                 FLOP      122
             C                                                              FLOP      123
                   IF( ISTEP.LE.1) GO TO 2                                  FLOP      124
                   ICT = 0                                                  FLOP      125
125                VTEST = VNEW/SQRT(RHOP)                                  FLOP      126
                 1 VTEST2= DV                                               FLOP      127
                   IF( VTEST2.GT.200.0) VTEST2 = 200.0                      FLOP      128
                   VXL = VTEST - VTEST2                                     FLOP      129
                   VXP = ALOG10(VXL)                                        FLOP      130
130                IEXP = IFIX(VXP)                                         FLOP      131
                   VXL = VXL * 10.0 ** ( -IEXP)                             FLOP      132
                   IXN = IFIX(VXL)                                          FLOP      133
                   VXL = IXN * ( 10.0 ** ( IEXP))                           FLOP      134
                   IF(VXL.LT.100.0) VXL = 100.0                             FLOP      135
135                V(1) = VXL                                               FLOP      136
                   V(2)  = VXL + DV                                         FLOP      137
                   V(3)  = VXL + DV*2.                                      FLOP      138
                   NV = 3                                                   FLOP      139
                 2 CONTINUE                                                 FLOP      140
140          C                                                              FLOP      141
                   ITER = IE                                                FLOP      142
                   NORIG = LC(2)                                            FLOP      143
                   NQ = NLEFT                                               FLOP      144
                   IVEC  =  LC(28)                                          FLOP      145
145                LRTL = LC(20)                                            FLOP      146
                   LVTP = LC(19)                                            FLOP      147
                   IPLOT = LC(15)                                           FLOP      148
                   PLOTG = LC(14)                                           FLOP      149
                   LVEC     =  0                                            FLOP      150
150                EPS      =  1.E-5                                        FLOP      151
                   NSIG     =  5                                            FLOP      152
                   ITMAX    =  200                                          FLOP      153
                   DFL1     = -.005                                         FLOP      154
                   DFL2     = -.003                                         FLOP      155
155                IF ( LRTL .GT. 1 )      LVEC = 1                         FLOP      156
                   IJK      =  0                                            FLOP      157
                   NVTOT  =  NV                                             FLOP      158
                   DO 4 J = 1,NV                                            FLOP      159
                   KLUE     =  0                                            FLOP      160
160                KJI      =  J + 4*IJK                                    FLOP      161
                   IF ( KJI .GT. 100 )     GO TO 64                         FLOP      162
                   VQ(KJI)  =  V(J)                                         FLOP      163
                   VB = V(J) * 1.6878 / BR                                  FLOP      164
                   IF (J.NE.1) GO TO 5                                      FLOP      165
165                L = 0                                                    FLOP      166
                   DO 6  II = 1,NQ                                          FLOP      167
                   IF (ITER.EQ.1) GO TO 7                                   FLOP      168
                   DO 8 JJ = 1,NOMI                                         FLOP      169
                   IF (NIND(JJ).EQ II) GO TO 6                              FLOP      170
170                8 CONTINUE                                               FLOP      171
                   7 L = L + 1                                              FLOP      172
```

```
                  RIMP     =  OMG(II) / VB                                    FLOP      173
                  ROOT(2*L-1)  =  CMPLX (-.05*RIMP,RIMP)                      FLOP      174
                  ROOT(2*L)=CONJG(ROOT(2*L-1))                                FLOP      175
175             6 CONTINUE                                                    FLOP      176
                  NQZ      =  L                                               FLOP      177
                  EM = L                                                      FLOP      178
                5 IF ( J  EQ.  1 )          GO TO 30                          FLOP      179
                  NQZ1     =  2 * NQZ                                         FLOP      180
180       C           PREDICT NEXT ROOTS                                      FLOP      181
                  CALL RTIN (NQZ,SOLV,ROOT,KJI,VQ,MID,LC(18))                 FLOP      182
          C                                                                   FLOP      183
              30 NQU       = NQZ                                            FLOP      184
                 WWF       =  1.0                                           FLOP      185
185              ANQZ      =  1.0 / NQZ                                     FLOP      186
                 DO 33  II = 1,NQ                                           FLOP      187
                 IF ( ITER  EQ.  1 )       GO TO 66                         FLOP      188
                 DO 67  JJ = 1,NOMI                                         FLOP      189
                 IF ( NIND(JJ) .EQ. II )       GO TO 33                     FLOP      190
190           67 CONTINUE                                                   FLOP      191
              66 WWF       =  WWF * (WW(II,II)*OMG(II)*OMG(II))**ANQZ       FLOP      192
              33 CONTINUE                                                   FLOP      193
                 ROWS      =  1.0 / WWF                                     FLOP      194
                 IF ( LRTL .GT. 0 ) NQU =-NQZ                               FLOP      195
195              NQZ1=NQZ*2                                                 FLOP      196
                 NQU1=NQU*2                                                 FLOP      197
                 VELOC     =  VQ(KJI)                                       FLOP      198
                 CALL ZANLYN (F,EPS,NSIG,NQZ1,NQU1,ROOT,ITMAX,JT,IER)       FLOP      199
                 IF ( LC(17) .EQ. 0 )    GO TO 9                            FLOP      200
200              IF ( J .EQ. 1 .AND. IJK .EQ. 0 .AND. NQU1 .GT. 0 )         FLOP      201
                1WRITE (ITAPEW,77)                                          FLOP      202
                 WRITE (ITAPEW,78)  VELOC, (JT(III), III=1,NQZ1,2)          FLOP      203
                9 IF ( J .EQ. 1 )          GO TO 4000                       FLOP      204
                  IF ( J .EQ. 2 )          KLUE = 1                         FLOP      205
205               DO 41  K = 1,NQZ                                          FLOP      206
                  RL        =  REAL(SOLV(K,KJI-1))                          FLOP      207
                  RT        =  REAL(ROOT(2*K-1))                            FLOP      208
                  IF ( SIGN(1.0,RL) .NE. SIGN(1.0,RT) )       KLUE=1        FLOP      209
                  IF ( KLUE .EQ. 1 .OR. KJI .LE. 2 )     GO TO 49           FLOP      210
210               RA        =  REAL(SOLV(K,KJI-2)) / AIMAG(SOLV(K,KJI-2))   FLOP      211
                  RB        =  REAL(SOLV(K,KJI-1)) / AIMAG(SOLV(K,KJI-1))   FLOP      212
                  RD        =  REAL(ROOT(2*K-1)) / AIMAG(ROOT(2*K-1))       FLOP      213
                  DELL      =  RB - RA                                      FLOP      214
                  DELR      =  RD - RB                                      FLOP      215
215               IF ( SIGN(1.0,DELL) .NE. SIGN(1.0,DELR) )   KLUE = 1      FLOP      216
                  IF ( KLUE .EQ. 1 )       GO TO 41                         FLOP      217
                  IF ( SIGN(1.0,DELR) .GT. 0.0 )          KLUE = 1         FLOP      218
                  IF ( KLUE .EQ. 1 )       GO TO 41                         FLOP      219
                  OM1       =  VQ(KJI-2) * ABS(AIMAG(SOLV(K,KJI-2)))       FLOP      220
220           49 IF ( KLUE  EQ.  1 )       GO TO 41                         FLOP      221
                  OM2       =  VQ(KJI-1) * ABS(AIMAG(SOLV(K,KJI-1)))       FLOP      222
                  OM3       =  VQ(KJI)   * ABS(AIMAG(ROOT(2*K-1)))         FLOP      223
                  IF ( KJI  GT.  2 )       GO TO 52                         FLOP      224
                  FRTST     =  ABS ( (OM3 - OM2) / OM2 )                    FLOP      225
225               IF ( FRTST .GT. 0.1 )   KLUE = 1                          FLOP      226
                  GO TO 41                                                  FLOP      227
              52 DIFIA     =  OM2 - OM1                                     FLOP      228
                 DIFIB     =  OM3 - OM2                                     FLOP      229
```

VARIABLES	SN	TYPE		RELOCATION							
					387	DEFINED	348				
3277	LRTL	INTEGER			REFS	155	194	DEFINED	145		
1	LVEC	INTEGER		DETAIL	REFS	47	619	624	DEFINED	149	155
3300	LVTP	INTEGER			REFS	448	DEFINED	146			
3261	MID	INTEGER			REFS	2*108	181	239	249	261	310	449
					467	587	617	620	625	626	701	
					DEFINED	88					
3262	MIDSQ2	INTEGER			REFS	109	727	DEFINED	108		
26	MONBAL	INTEGER		KLUES	REFS	50					
5	MSADD	INTEGER		KLUES	REFS	50					
3257	MTAP1	INTEGER			DEFINED	79	I/O REFS	475	500		
3256	MTAP2	INTEGER			DEFINED	78	I/O REFS	498			
2	M1	INTEGER		STRCLU	REFS	63					
3	M2	INTEGER		STRCLU	REFS	63					
4	M3	INTEGER		STRCLU	REFS	63					
5	M4	INTEGER		STRCLU	REFS	63					
13	NBAR	INTEGER		KLUES	REFS	50					
17550	NC	INTEGER		MODD	REFS	42					
3	NCOLS	INTEGER		CTABLE	REFS	55	DEFINED	511	640		
4	NCOLST	INTEGER		CTABLE	REFS	55					
20	NCYC	INTEGER		KLUES	REFS	50					
26220	NEL	INTEGER	ARRAY		REFS	19	349	369	DEFINED	341	
14	NFIX	INTEGER		KLUES	REFS	50					
1	NIND	INTEGER	ARRAY	FITR	REFS	23	43	169	189	598	615	683
					702							
3263	NLEFT	INTEGER			REFS	114	143	DEFINED	119		
243	NMODE	INTEGER		FLUT	REFS	49					
21	NNN	INTEGER		KLUES	REFS	50					
0	NO	INTEGER		CONSTS	REFS	57	505	506			
3406	NODD	INTEGER			REFS	494	495	DEFINED	489		
0	NOMI	INTEGER		FITR	REFS	43	168	188	598	615	683	702
3274	NORIG	INTEGER			REFS	591	592	2*598	612	613	2*615	2*683
					2*702	DEFINED	142					
6	NPAGE	INTEGER		CLIST	REFS	53					
6	NPAGEA	INTEGER		CTABLE	REFS	55					
6	NPAS	INTEGER		KLUES	REFS	50					
1	NPASS	INTEGER		CTABLE	REFS	55					
3275	NQ	INTEGER			REFS	166	186	DEFINED	143		
3320	NQU	INTEGER			REFS	196	DEFINED	183	194		
3323	NQU1	INTEGER			REFS	198	200	252	366	DEFINED	196	
5	NQZ	INTEGER		FLUTV	REFS	45	179	181	183	185	194	195
					205	233	239	249	255	261	278	306
					310	317	322	342	360	381	386	395
					416	444	449	459	475	485	558	2*598
					606	2*615	617	620	622	625	626	627
					645	660	669	674	676	679	681	2*683
					684	686	689	694	2*702	703	705	707
					710	DEFINED	176					
3317	NQZ1	INTEGER			REFS	198	202	252	254	287	303	366
					368	425	441	607	670	DEFINED	179	195
2	NROWS	INTEGER		CTABLE	REFS	55	DEFINED	512	641		
3303	NSIG	INTEGER			REFS	198	252	366	DEFINED	151		
0	NUMSTR	INTEGER		STORES	REFS	58					
31	NV	INTEGER		FLUTB	REFS	44	157	158	266	DEFINED	138	
6	NVTOT	INTEGER		FLUTV	REFS	45	239	261	267	269	275	296
					310	311	392	393	394	396	402	407
					413	434	449	454	467	475	486	498

VARIABLES		SN	TYPE		RELOCATION							
27712	JT		INTEGER	ARRAY		REFS	22	198	202	252	254	366	368
							617	626					
3326	K		INTEGER			REFS	206	207	2*210	2*211	2*212	219	221
							222	2*234	3*235	276	277	287	2*303	3*307
							2*312	324	325	326	2*327	2*328	329	335
							341	414	415	425	2*441	3*445	2*490	492
							522	675	3*677	2*680	2*682	685	3*687	2*690
							2*695	DEFINED	205	233	275	296	311	323
							413	434	485	674	679	681	684	689
							694							
7	KBPAGE		INTEGER		CLIST	REFS	53							
1	KCONST		INTEGER		STORES	REFS	58							
3346	KCR		INTEGER			REFS	239	261	310	336	449	467		
						DEFINED	335	400	465	571				
0	KFIRST		INTEGER		F.P.	REFS	505	DEFINED	2	482	506			
3400	KINC		INTEGER			REFS	550	DEFINED	468	542				
3312	KJI		INTEGER			REFS	161	162	181	197	206	209	2*210	
							2*211	2*219	2*221	222	223	234	3*235	239
							2*242	DEFINED	160					
3353	KK		INTEGER			REFS	2*279	3*307	2*417	3*445	DEFINED	278	306	
							416	444						
3351	KL		INTEGER			REFS	2*256	3*257	DEFINED	255				
4	KLABEL		INTEGER		CLIST	REFS	53							
24	KLUB		INTEGER		KLUES	REFS	50							
4	KLUBAL		INTEGER		KLUES	REFS	50							
3311	KLUE		INTEGER			REFS	209	216	218	220	232			
						DEFINED	159	204	208	215	217	225	229	
							263							
3	KLUMD		INTEGER		KLUES	REFS	50							
1	KLUNAL		INTEGER		KLUES	REFS	50							
25	KLUQ		INTEGER		KLUES	REFS	50							
0	KLUSE		INTEGER		KLUES	REFS	50	584	657					
3354	KNV		INTEGER			REFS	339	340	341	343	344	346	348	
						DEFINED	321	339						
0	KOUNT		INTEGER		CLIST	REFS	53	504	510	519	521	525	639	
						DEFINED	483	510	519	521	525	634	639	
11	KOUNTH		INTEGER		CLIST	REFS	53	504						
12	KOUNTI		INTEGER		CLIST	REFS	53							
1	KPAGE		INTEGER		CLIST	REFS	53							
3344	KPNT		INTEGER			REFS	239	261	310	332	333	397	398	
							449	452	473	497	526	556	712	713
						DEFINED	316	332	397	573				
0	KTABLE		INTEGER		CTABLE	REFS	55	DEFINED	513	642				
5	KTABLO		INTEGER		CTABLE	REFS	55							
5	KTPAGE		INTEGER		CLIST	REFS	53							
3355	KZ		INTEGER			REFS	323	DEFINED	322					
0	KO		INTEGER		KZERO	REFS	39	DEFINED	87					
3313	L		INTEGER			REFS	171	173	2*174	176	177	2*677	2*687	
						DEFINED	165	171	676	686				
0	LC		INTEGER	ARRAY	COMA	REFS	18	40	93	119	142	144	145	
							146	147	148	181	199	235	238	249
							253	257	260	367	474	499	584	657
							719							
2	LINES		INTEGER		CLIST	REFS	53	483	634					
10	LINESG		INTEGER		CLIST	REFS	53							
3	LINEST		INTEGER		CLIST	REFS	53							
3361	LL		INTEGER			REFS	349	350	352	354	361	369	382	

VARIABLES		SN	TYPE		RELOCATION							
244	IDMODE		COMPLEX	ARRAY	FLUT	REFS	33	49				
7	IDNOPT		INTEGER		KLUES	REFS	50					
76	IDSTR		INTEGER	ARRAY	STORES	REFS	58					
40	IDYDOF		INTEGER	ARRAY	STORES	REFS	58					
4	IE		INTEGER		FLUTV	REFS	45	141	475			
3324	IER		INTEGER			REFS	198	252	366			
3271	IEXP		INTEGER			REFS	131	133	DEFINED	130		
23	IFIN		INTEGER		KLUES	REFS	50	DEFINED	713			
3314	II		INTEGER			REFS	169	172	189	4*191	277	279
						2*343	2*344	2*361	2*362	2*382	2*387	2*396
						415	417	455	458	460	461	465
						3*593	4*594	597	2*614	2*661	2*705	DEFINED
						166	186	276	342	360	381	386
						395	414	454	459	591	612	660
						703						
3325	III		INTEGER			REFS	202	254	368	DEFINED	202	254
						368						
3307	IJK		INTEGER			REFS	160	200	241	244	266	
						DEFINED	156	241				
3371	INDX		INTEGER			REFS	370	2*371	DEFINED	369		
26252	IPERM		INTEGER	ARRAY		REFS	19	269	276	407	414	
3301	IPLOT		INTEGER			REFS	494	495	DEFINED	147		
2	IRED		INTEGER		KLUES	REFS	50					
0	ISAVFO		INTEGER	*UNUSED	F.P.	DEFINED	2					
2	ISTDOF		INTEGER	ARRAY	STORES	REFS	58					
1	ISTEP		INTEGER		STRCLU	REFS	63	123				
27572	IT		INTEGER	ARRAY		REFS	22	620	625			
3260	ITAPE		INTEGER			REFS	587	701	DEFINED	80		
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	25	48	77	78	79	80
7	ITAPET		INTEGER		CTABLE	REFS	55					
3255	ITAPEW		INTEGER			REFS	507	509	518	524	636	638
						646	DEFINED	77	I/O REFS	200	202	254
						368	508	517	522	550	562	566
						576	580	619	624	637	645	651
						658	659	661	692	693	695	696
						710	712	734				
3360	ITEN		INTEGER			REFS	355	357	373	DEFINED	347	355
3273	ITER		INTEGER			REFS	167	187	451	555	DEFINED	141
3421	ITER8		INTEGER			REFS	620	625				
3304	ITMAX		INTEGER			REFS	198	252	366	DEFINED	152	
3407	IV		INTEGER			REFS	6*522	DEFINED	502			
3276	IVEC		INTEGER			REFS	453	DEFINED	144			
3272	IXN		INTEGER			REFS	133	DEFINED	132			
3362	IZ		INTEGER			REFS	350	352	400	402	DEFINED	349
3412	I1		INTEGER			REFS	559	DEFINED	558			
3310	J		INTEGER			REFS	160	162	163	164	178	200
						203	204	244	245	3*318	320	329
						487	2*488	489	3*490	2*491	3*492	2*493
						494	495	3*498	3*500	532	536	4*537
						539	3*540	541	543	544	545	546
						DEFINED	158	317	319	486	498	500
						531	535					
3401	JINC		INTEGER			REFS	550	DEFINED	469	543		
3315	JJ		INTEGER			REFS	169	189	244	245	324	325
						326	2*327	334	336	3*340	343	344
						351	353	3*593	4*594	597	2*614	DEFINED
						168	188	243	320	592	613	
3420	JJJ		INTEGER			REFS	2*607	2*670	DEFINED	606	669	
3405	JK	*	INTEGER			DEFINED	487					
3350	JL		INTEGER			REFS	245	247	249	251	256	3*257
						261	DEFINED	244				

VARIABLES	SN	TYPE		RELOCATION								
25700	AECS	COMPLEX	ARRAY	FLPCOM	REFS	13	14	71	607	670		
3322	ANQZ	REAL			REFS	191	DEFINED	185				
11626	B	COMPLEX	ARRAY		REFS	31	67	617	620	625		
					DEFINED	597						
50	BR	REAL		COMA	REFS	40	163	239	247	261	310	364
					449	492	588	589	590	649		
242	C	REAL		FLUT	REFS	49	710	DEFINED	709			
27072	CFREQ	REAL	ARRAY		REFS	20	498	500	522	546		
					DEFINED	493						
3424	CFRQCR	REAL			REFS	651	DEFINED	650				
3247	CMT	COMPLEX			REFS	34	680	682	690	696		
					DEFINED	678	680	688	690			
15	D	REAL		KLUES	REFS	50						
26562	DAMP	REAL	ARRAY		REFS	20	491	498	500	522	532	536
					4*537	539	3*540	545	DEFINED	490	491	
3422	DAMPCR	REAL			REFS	651	DEFINED	648				
27	DBAL	REAL		KLUES	REFS	50						
16	DEL	REAL		KLUES	REFS	50						
3334	DELL	REAL			REFS	215	DEFINED	213				
3335	DELR	REAL			REFS	215	217	DEFINED	214			
3347	DELV	REAL			REFS	245	DEFINED	242				
6200	DETAD	COMPLEX	ARRAY	MODD	REFS	31	42	2*594				
3305	DFL1	REAL			REFS	539	DEFINED	153				
3306	DFL2	REAL			REFS	540	DEFINED	154				
3373	DIFF	REAL			REFS	375	DEFINED	374				
3342	DIFIA	REAL			REFS	229	DEFINED	227				
3343	DIFIB	REAL			REFS	229	DEFINED	228				
3374	DIFV	REAL			REFS	390	DEFINED	389				
3403	DINC	REAL			REFS	550	DEFINED	471	545			
3410	DMM	REAL			REFS	532	533	DEFINED	530	532		
3357	DMP	REAL			REFS	328	330	DEFINED	327			
30176	DMPP	REAL	ARRAY		REFS	23	328	329	DEFINED	318	328	
32	DV	REAL		FLUTB	REFS	44	126	136	137	568		
12	DWMAX	REAL		KLUES	REFS	50						
3	EM	REAL		FACE	REFS	46	DEFINED	177				
0	EPS	REAL		DETAIL	REFS	47	198	252	366	DEFINED	150	
11	EPS1	REAL		KLUES	REFS	50						
17	EPS2	REAL		KLUES	REFS	50						
3243	F	COMPLEX			REFS	30	198	252	366			
1	FACT	REAL		FACE	REFS	46						
20026	FF	COMPLEX	ARRAY		REFS	34	68	620	625			
3	FHI	REAL		FLUTV	REFS	45	475					
3404	FINC	REAL			REFS	550	DEFINED	472	546			
2	FLO	REAL		FLUTV	REFS	45	475					
26726	FREQ	REAL	ARRAY		REFS	20	493	522	DEFINED	492		
3423	FRQCR	REAL			REFS	650	651	2*656	DEFINED	649		
241	FRQSQ	REAL		FLUT	REFS	49	DEFINED	656				
3341	FRTST	REAL			REFS	225	DEFINED	224				
0	GK	COMPLEX	ARRAY	FLEXT	REFS	36	41	109	614	683	687	727
0	GKECS	COMPLEX	ARRAY	FLPCOM	REFS	13	14	71	109	727		
3253	GKK	COMPLEX			REFS	36	708	2*709	DEFINED	707	708	
42246	H	COMPLEX	ARRAY		REFS	34	625					
22	IBAND	INTEGER		KLUES	REFS	50						
3375	ICR	INTEGER			REFS	460	461	DEFINED	458			
3264	ICT	INTEGER			REFS	473	497	526	557	567	581	
					DEFINED	124	557					
0	ICYCLE	INTEGER		STRCLU	REFS	63						

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                3,5H MODE,5H   NO,4X,22H EQUIVALENT       TRUE,2X,9H    RATIO       FLOP      743
                4       ,2X,20H   CYC/SEC   RAD/SEC)                                FLOP      744
               28 FORMAT (10X,2I5,4X,2F11.4,1F11.6,2F11 4)                          FLOP      745
745            53 FORMAT (10X, 4HRHO=,1P1E14.7,2X,11HLBS/CU.FT.,2X,4HFOR ,1I2       FLOP      746
                1       ,2X, 5HMODES)                                             FLOP      747
               54 FORMAT (10X,15HVELOCITY(KNOTS),12X,7HDAMPING,14X,9HFREQUENCY, /   FLOP      748
                1       7X,6HEQUIV.,10X4HTRUE,11X5HRATIO,10X6HC.P.S.,8X9HRAD./SEC. FLOP      749
                2       //5X,2(F11.4,4X),F11.6,2(4X,F11 4))                       FLOP      750
750            55 FORMAT (//20X10HROOT IS ( ,E14.7,3H , ,E14.7,2H ),/)              FLOP      751
               56 FORMAT (/21X, 11HCOL. VECTOR,34X 10HROW VECTOR//)                 FLOP      752
               58 FORMAT (10X,2H( ,E14.7,2H, ,E14.7,2H ),11X,2H( ,E14.7,2H, ,E14.7, FLOP      753
                1       3H  ),)                                                   FLOP      754
               63 FORMAT (//20X,53HROOT AND VECTORS FOR RUDISILL OPTIMIZATION FOR RO FLOP      755
755             1OT= ,G14.6//)                                                     FLOP      756
               65 FORMAT (1H1,/20X, 32HNUMBER OF VELOCITIES EXCEEDS 100, //       FLOP      757
                1          25X, 20HEXECUTION TERMINATED,//)                       FLOP      758
               69 FORMAT (//20X, 19HV(TRAN) * K * U  = ,2G14.6)                   FLOP      759
               70 FORMAT (1H1)                                                    FLOP      760
760            77 FORMAT (1H1/)                                                   FLOP      761
               78 FORMAT (/,10X,15HFOR VELOCITY = ,F12.3,                         FLOP      762
                1        5X,30HNO. OF ITERATIONS PER ROOT ARE//                  FLOP      763
                2       (10X,20I5)//)                                           FLOP      764
               81 FORMAT (1H1,10X,31HINCIPIENT FLUTTER CONDI ION FOR/             FLOP      765
765             1          15X,8HMODE    ,I5/                                    FLOP      766
                2          15X,25HVELOCITY (KNOTS-EQUIV) = ,F14.6/                 FLOP      767
                3          15X,25HDAMPING VALUE          = ,F14.6/                 FLOP      768
                4          15X,25HFREQUENCY (CPS)        = ,F14.6//)               FLOP      769
               83 FORMAT ( 1H , ////                                              FLOP      770
770             1       10X,45H(REAL(LAM*VTRANS*GRAD*U)+2*LAM/K) DIVIDED BY //     FLOP      771
                2       15X,26HIMAG(LAM*VTRANS*GRAD*U) = ,E16.7,                   FLOP      772
                3       8H    FOR ,I2,6H MODES///)                                FLOP      773
               90 FORMAT(1HO,10X,47HTHERE IS NO FLUTTER IN SPECIFIED VELOCITY RANGE) FLOP      774
               91 FORMAT(1HO,15X,F10.1,9H KNOTS TO,F10.1,6H KNOTS)                 FLOP      775
775          1620 FORMAT (10X,43                                                   FLOP      776
                1   HVELOCITY, DAMPING, AND FREQUENCY VARIATIONS                   FLOP      777
                2      ,/10X,43(1H-))                                            FLOP      778
             1640 FORMAT (10X,47                                                   FLOP      779
                1   HCRITIAL FLUTTER SPEED AND ASSOCIATED PARAMETERS               FLOP      780
780             2      ,/10X,47(1H-))                                             FLOP      781
             C                                                                     FLOP      782
                  STOP                                                           FLOP      783
                  END                                                            FLOP      784
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SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	FLOP	2	733

VARIABLES	SN	TYPE			RELOCATION							
3426	A	COMPLEX	ARRAY		REFS	36	66	594	598	607	617	626
					DEFINED	593	594					
3426	AA	COMPLEX	ARRAY		REFS	35	66	670	677			
0	ACH	REAL	*UNUSED	F.P.	DEFINED	2						

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                  S(K)      =  0.0                                                FLOP      686
                  DO 61  L = 1,NQZ                                                FLOP      687
               61 S(K)      =  VECR(L) * GK(L,K) + S(K)                           FLOP      688
                  CMT       =  0.0                                                FLOP      689
                  DO 62  K = 1,NQZ                                                FLOP      690
               62 CMT       =  VECC(K) * S(K) + CMT                               FLOP      691
                  VLAM      =  AIMAG(VLAMA)**2                                    FLOP      692
                  WRITE (ITAPEW,63)  VLAM                                         FLOP      693
                  WRITE (ITAPEW,56)                                               FLOP      694
                  DO 68  K = 1,NQZ                                                FLOP      695
               68 WRITE (ITAPEW,58)  VECC(K) , VECR(K)                            FLOP      696
                  WRITE (ITAPEW,69) CMT                                           FLOP      697
            C                                                                     FLOP      698
            C                                                                     FLOP      699
            C GRADIENT OF GENERALIZED AIR FORCES                                  FLOP      700
            C                                                                     FLOP      701
                  CALL QFLIN (ITAPE,VBO,QRS,RHO,2,MID)                            FLOP      702
                  IF (NQZ.LT.NORIG)  CALL CONV (NORIG,NQZ,NOMI,NIND,QRS)          FLOP      703
                  DO 82  II = 1,NQZ                                               FLOP      704
                  SUM   =  0.0                                                    FLOP      705
               82 S(II)  =  COMSCA (VECR(1),QRS(1,II),SUM,NQZ,1,1)                FLOP      706
                  SUM   =  0.0                                                    FLOP      707
                  GKK   =   COMSCA (S(1),VECC(1),SUM,NQZ,1,1)                     FLOP      708
                  GKK   =   VLAM * GKK                                            FLOP      709
                  C     =   ( REAL(GKK) + 2.0*VLAM*VBO ) / AIMAG(GKK)             FLOP      710
                  WRITE (ITAPEW,83) C, NQZ                                        FLOP      711
            C        IF NO FLUTTER, NO REDESIGN IS WANTED. HENCE, SET IFIN TO ZERO. FLOP      712
                3 IF (KPNT .EQ. 0) WRITE(ITAPEW,90)                               FLOP      713
                  IF (KPNT .EQ. 0) IFIN= 0                                        FLOP      714
            C                                                                     FLOP      715
            C IF NUMBER OF MODES WAS REDUCED PREVIOUSLY BASED ON                  FLOP      716
            C RATIOS OF GENERALIZED FORCES TO GENERALIZED MASSES,                 FLOP      717
            C RESET GK TO ORIGINAL VALUES TO PREPARE FOR NEXT PASS                FLOP      718
            C                                                                     FLOP      719
                  IF (LC(38).NE.1)  GO TO 101                                     FLOP      720
            C                                                                     FLOP      721
            CIBM                                                                  FLOP      722
            C     REWIND ITAPRM                                                   FLOP      723
            C     READ (ITAPRM) GK                                                FLOP      724
            CIBM                                                                  FLOP      725
            C                                                                     FLOP      726
            CCDC                                                                  FLOP      727
                  CALL READEC(GK(1,1),GKECS(1,1),MIDSQ2)                          FLOP      728
            CCDC                                                                  FLOP      729
            C                                                                     FLOP      730
              101 CONTINUE                                                        FLOP      731
            C                                                                     FLOP      732
            C                                                                     FLOP      733
                  RETURN                                                          FLOP      734
               64 WRITE (ITAPEW,65)                                               FLOP      735
            C                                                                     FLOP      736
            C                                                                     FLOP      737
            C FORMATS                                                             FLOP      738
            C                                                                     FLOP      739
               26 FORMAT (10X                                                     FLOP      740
                 1,5H      ,5H      ,4X,22H    VELOCITY, KNOTS    ,2X,9H  DAMPING FLOP      741
                 2         ,2X,20H        FREQUENCY       ,/,10X,                FLOP      742
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                C                                                                FLOP      629
                C                                                                FLOP      630
630             C CRITICAL FLUTTER SPEED AND ASSOCIATED RESULTS                  FLOP      631
                C                                                                FLOP      632
                  100 CONTINUE                                                   FLOP      633
                      CALL PROGNA (4H(FLO, 4HP   ))                              FLOP      634
                      KOUNT  =  LINES                                            FLOP      635
635                   CALL TITLES (2)                                            FLOP      636
                      CALL PLB (1,1,ITAPEW)                                      FLOP      637
                      WRITE (ITAPEW,1640)                                        FLOP      638
                      CALL PLB (1,1,ITAPEW)                                      FLOP      639
                      KOUNT  =  KOUNT + 4                                        FLOP      640
640                   NCOLS  =  4                                                FLOP      641
                      NROWS  =  0                                                FLOP      642
                      KTABLE =  2                                                FLOP      643
                      CALL PTABLE (2,47,47                                       FLOP      644
                     1   HCRITIAL FLUTTER SPEED AND ASSOCIATED PARAMETERS)       FLOP      645
645                   WRITE (ITAPEW,53) RHO, NQZ                                 FLOP      646
                      CALL PLB (1,1,ITAPEW)                                      FLOP      647
                      VELEQ  =  VELCR * SQRT (RHOP)                              FLOP      648
                      DAMPCR   =  2.0 * REAL(VLAMB) / AIMAG(VLAMB)               FLOP      649
                      FRQCR    =  VELCR * 1.6878/BR * AIMAG(VLAMB)               FLOP      650
650                   CFRQCR   =  FRQCR / 6.2832                                 FLOP      651
                      WRITE (ITAPEW,54) VELEQ , VELCR , DAMPCR , CFRQCR , FRQCR  FLOP      652
                      VOLD = VNEW                                                FLOP      653
                      VNEW = VELEQ                                               FLOP      654
                      VOSAVE = VNSAVE                                            FLOP      655
655                   VNSAVE = VELEQ                                             FLOP      656
                      FRQSQ  = FRQCR*FRQCR                                       FLOP      657
                      IF(LC(36).EQ.0.AND.KLUSE.LT.1) GO TO 3                     FLOP      658
                      WRITE (ITAPEW,55) VLAMA                                    FLOP      659
                      WRITE (ITAPEW,56)                                          FLOP      660
660                   DO 57  II = 1,NQZ                                          FLOP      661
                   57 WRITE (ITAPEW,58)  VECC(II) , VECR(II)                     FLOP      662
                C                                                                FLOP      663
                CIBM                                                             FLOP      664
                C     REWIND ITAPSL                                              FLOP      665
665             C     READ (ITAPSL) AA                                           FLOP      666
                CIBM                                                             FLOP      667
                C                                                                FLOP      668
                CCDC                                                             FLOP      669
                      DO 906 JJJ=1,NQZ                                           FLOP      670
670                   CALL READEC(AA(1,JJJ),AECS(1,JJJ),NQZ1)                    FLOP      671
                  906 CONTINUE                                                   FLOP      672
                CCDC                                                             FLOP      673
                C                                                                FLOP      674
                      DO 45  K = 1,NQZ                                           FLOP      675
675                   S(K)     =  0.0                                            FLOP      676
                      DO 45  L = 1,NQZ                                           FLOP      677
                   45 S(K)     =  S(K) + VECR(L) * AA(L,K)                       FLOP      678
                      CMT      =  0.0                                            FLOP      679
                      DO 59  K = 1,NQZ                                           FLOP      680
680                59 CMT      =  CMT + S(K) * VECC(K)                           FLOP      681
                      DO 60  K = 1,NQZ                                           FLOP      682
                   60 VECR(K)  =  VECR(K)   CMT                                  FLOP      683
                      IF (NQZ.LT.NORIG)  CALL CONV (NORIG,NQZ,NOMI,NIND,GK)      FLOP      684
                      DO 61  K = 1,NQZ                                           FLOP      685
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                  KCR = 1                                                          FLOP      572
                  VLAMB = SOL(1,NVTOT)                                             FLOP      573
                  KPNT = 1                                                         FLOP      574
                  GO TO 99                                                         FLOP      575
575            98 CONTINUE                                                         FLOP      576
                  WRITE(ITAPEW,90)                                                 FLOP      577
                  VTEST = VV(1)                                                    FLOP      578
                  X = VTEST                                                        FLOP      579
                  Y = VV(NVTOT)                                                    FLOP      580
580               WRITE(ITAPEW,91) X,Y                                             FLOP      581
                  IF( ICT .GE. 4 ) GO TO 99                                        FLOP      582
                  GO TO 1                                                          FLOP      583
               99 CONTINUE                                                         FLOP      584
                  IF(LC(36).EQ.0.AND.KLUSE.LT.1) GO TO 100                         FLOP      585
585            C     VECTOR CALCULATION FOR CRITICAL FLUTTER SPEED                 FLOP      586
                  VBO       =  ABS (1.0/AIMAG(VLAMB))                            FLOP      587
                  CALL QFLIN (ITAPE,VBO,QRS,RHO,1,MID)                             FLOP      588
                  VB        =   VELCR * 1.6878 / BR                              FLOP      589
                  XX        =  RHO * VBO * BR                                    FLOP      590
590               XXX       =   XX * VBO * BR                                    FLOP      591
                  DO 50 II=1,NORIG                                                 FLOP      592
                  DO 50 JJ=1,NORIG                                                 FLOP      593
                  A(II,JJ)  =  WW(II,JJ) + QRS(II,JJ)                              FLOP      594
                  A(II,JJ)  =  A(II,JJ)                                            FLOP      595
595              1          + CMPLX(REAL(DETAD(II,JJ))*XXX,AIMAG(DETAD(II,JJ))*XX) FLOP      596
               C     AA(II,JJ) = A(II,JJ)                                        FLOP      597
                  50 B(II,JJ)  =  CMPLX (0.0,0.0)                                  FLOP      598
                  IF (NQZ.LT.NORIG)  CALL CONV (NORIG,NQZ,NOMI,NIND,A)             FLOP      599
               C                                                                   FLOP      600
600            CIBM                                                                FLOP      601
               C     REWIND ITAPSL                                                FLOP      602
               C     WRITE (ITAPSL) A                                             FLOP      603
               CIBM                                                                FLOP      604
               C                                                                   FLOP      605
605            CCDC                                                                FLOP      606
                  DO 905 JJJ=1,NQZ                                                 FLOP      607
                  CALL WRITEC(A(1,JJJ),AECS(1,JJJ),NQZ1)                           FLOP      608
                905 CONTINUE                                                       FLOP      609
               CCDC                                                                FLOP      610
610            C                                                                   FLOP      611
                  VLAMA     =  VLAMB * VB                                        FLOP      612
                  DO 51 II=1,NORIG                                                 FLOP      613
                  DO 51 JJ=1,NORIG                                                 FLOP      614
                  51 QRS(II,JJ)  =  GK(II,JJ)                                      FLOP      615
615               IF (NQZ.LT.NORIG)  CALL CONV (NORIG,NQZ,NOMI,NIND,QRS)           FLOP      616
               C     CHANGE TO FORM FOR LAM**2*I + LAM*B + C                      FLOP      617
                  CALL ADIV (A,B,QRS,NQZ,MID,JT)                                   FLOP      618
               C     COLUMN EIGENVECTOR CALCULATION                               FLOP      619
                  IF ( LVEC .NE. 0 )       WRITE (ITAPEW,70)                       FLOP      620
620               CALL GCVEC (B,QRS,VLAMA,NQZ,MID,IT,VECC,S,FF,ITER8)              FLOP      621
               C     NORMALIZE VECTOR                                             FLOP      622
                  CALL ORIENT (VECC,NQZ)                                           FLOP      623
               C     ROW VECTOR CALCULATION                                       FLOP      624
                  IF ( LVEC .NE. 0 )       WRITE (ITAPEW,70)                       FLOP      625
625               CALL GRVEC (B,VLAMA,NQZ,MID,IT,VECR,H,FF,ITER8)                  FLOP      626
                  CALL CLUTSL (A,VECR,NQZ,MID,JT,0)                                FLOP      627
                  CALL ORIENT (VECR,NQZ)                                           FLOP      628
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                  CALL PTABLE (2,43,43                                                  FLOP      515
515               1   HVELOCITY, DAMPING, AND FREQUENCY VARIATIONS)                     FLOP      516
                150 CONTINUE                                                            FLOP      517
                  WRITE (ITAPEW,26)                                                     FLOP      518
                  CALL PLB (1,1,ITAPEW)                                                 FLOP      519
                  KOUNT  =  KOUNT + 3                                                   FLOP      520
520             200 CONTINUE                                                            FLOP      521
                  KOUNT  =  KOUNT +1                                                    FLOP      522
                  WRITE (ITAPEW,28) K,IV,VT(IV),VV(IV),DAMP(IV),CFREQ(IV),FREQ(IV)      FLOP      523
                300 CONTINUE                                                            FLOP      524
                  CALL PLB (1,1,ITAPEW)                                                 FLOP      525
525               KOUNT  =  KOUNT + 2                                                   FLOP      526
                  IF( KPNT .EQ. 0 .AND. ICT .LT. 3 ) GO TO 24                           FLOP      527
                C                                                                       FLOP      528
                C INVESTIGATE INCIPIENT FLUTTER                                         FLOP      529
                C                                                                       FLOP      530
530               DMM   =  0.0                                                          FLOP      531
                  DO 79  J = 1,NVTOT                                                    FLOP      532
                 79 DMM   =  DMM + ABS(DAMP(J))                                         FLOP      533
                  IF ( ABS(DMM/FLOAT(NVTOT)) .LE. 3.E-4)      GO TO 24                  FLOP      534
                  NVTT  =  NVTOT - 1                                                    FLOP      535
535               DO 80  J = 2,NVTT                                                     FLOP      536
                  IF ( DAMP(J) .GT. 0.0 )       GO TO 80                              FLOP      537
                  IF ( DAMP(J-1) .GT. DAMP(J) .OR. DAMP(J+1) .GT. DAMP(J) )             FLOP      538
                 1          GO TO 80                                                   FLOP      539
                  IF ( DAMP(J) .LT. DFL1 )      GO TO 80                              FLOP      540
540               IF ( DAMP(J-1)+DAMP(J)+DAMP(J+1) .LE. DFL2 )      GO TO 80          FLOP      541
                  IF ( VT(J) .GT. VINC )        GO TO 80                              FLOP      542
                  KINC     =  1                                                       FLOP      543
                  JINC     =  J                                                       FLOP      544
                  VINC     =  VT(J)                                                   FLOP      545
545               DINC     =  DAMP(J)                                                 FLOP      546
                  FINC     =  CFREQ(J)                                                FLOP      547
                  GO TO 24                                                           FLOP      548
                 80 CONTINUE                                                        FLOP      549
                 24 CONTINUE                                                        FLOP      550
550               IF (KINC .NE. 0) WRITE (ITAPEW,81) JINC, VINC, DINC, FINC          FLOP      551
                C                                                                   FLOP      552
                C                                                                   FLOP      553
                C GENERALIZED AIR FORCES AND ASSOCIATED PARAMETERS                  FLOP      554
                C                                                                   FLOP      555
555               IF ( ITER .NE. 1 )       GO TO 3                                  FLOP      556
                  IF(KPNT.NE.0) GO TO 99                                            FLOP      557
                  ICT = ICT + 1                                                     FLOP      558
                  DO 97 I1 = 1,NQZ                                                  FLOP      559
                  X = REAL( SOL(I1,1))                                              FLOP      560
560               IF(X.GE.0.0) GO TO 98                                             FLOP      561
                 97 CONTINUE                                                        FLOP      562
                  WRITE(ITAPEW,90)                                                  FLOP      563
                  VTEST = VV(NVTOT)                                                 FLOP      564
                  X = VV(1)                                                         FLOP      565
565               Y = VTEST                                                         FLOP      566
                  WRITE(ITAPEW,91) X,Y                                              FLOP      567
                  IF( ICT .GE. 4 ) GO TO 96                                         FLOP      568
                  VTEST = VTEST + DV                                                FLOP      569
                  GO TO 1                                                           FLOP      570
570               96 VELCR = VV(NVTOT)                                              FLOP      571
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                  GO TO 74                                                    FLOP      458
               73 ICR      =  II                                              FLOP      459
                  DO 75  II = 1,NQZ                                           FLOP      460
460               VLR      =   REAL (SOL(II,ICR)) -  REAL (VLAMB)             FLOP      461
                  VLI      =  AIMAG (SOL(II,ICR)) -  AIMAG(VLAMB)             FLOP      462
                  IF ( VLR .EQ. 0.0 .AND. VLI .EQ. 0.0 )      GO TO 76        FLOP      463
               75 CONTINUE                                                    FLOP      464
                  GO TO 74                                                    FLOP      465
465            76 KCR      =  II                                              FLOP      466
               74 CONTINUE                                                    FLOP      467
                  CALL VECP (NVTOT,VV,SOL,KCR,V1,V2,MID)                      FLOP      468
               29 KINC   =  0                                                 FLOP      469
                  JINC   =  1                                                 FLOP      470
470               VINC   =  0.0                                               FLOP      471
                  DINC   =  0.0                                               FLOP      472
                  FINC   =  0.0                                               FLOP      473
                  IF( KPNT .EQ. 0 .AND. ICT .LT. 3 ) GO TO 86                 FLOP      474
                  IF (LC(14) .EQ. 0)  GOTO 86                                 FLOP      475
475               WRITE (MTAP1) V1,V2,FLO,FHI,IE,NQZ,NVTOT                    FLOP      476
               86 CONTINUE                                                    FLOP      477
            C                                                                 FLOP      478
            C                                                                 FLOP      479
            C FLUTTER SOLUTION RESULTS                                        FLOP      480
480         C VELOCITY, DAMPING, AND FREQUENCY VARIATIONS                     FLOP      481
            C                                                                 FLOP      482
                  KFIRST =  YES                                               FLOP      483
                  KOUNT  =  LINES                                             FLOP      484
                  CALL PROGNA (4H(FLO, 4HP   ))                               FLOP      485
485               DO 24 K = 1,NQZ                                             FLOP      486
                  DO 25 J = 1,NVTOT                                           FLOP      487
                  JK      =  J                                                FLOP      488
                  VT(J)   =  VV(J) * SQRT (RHOP)                              FLOP      489
                  NODD    =  J                                                FLOP      490
490               DAMP(J)   =  REAL(SOL(K,J)) / AIMAG(SOL(K,J))               FLOP      491
                  DAMP(J)   =  2.0 * DAMP(J)                                  FLOP      492
                  FREQ(J)   =  VV(J) * 1.6878/BR * AIMAG(SOL(K,J))            FLOP      493
                  CFREQ(J) = FREQ(J) / 6.2832                                 FLOP      494
                  IF ( IPLOT .EQ. 0 )      VEQ(NODD) = VT(J)                  FLOP      495
495               IF ( IPLOT .NE. 0 )      VEQ(NODD) = VV(J)                  FLOP      496
               25 CONTINUE                                                    FLOP      497
                  IF( KPNT .EQ. 0 .AND. ICT .LT. 3 ) GO TO 87                 FLOP      498
                  WRITE(MTAP2) (CFREQ(J),DAMP(J),VEQ(J),J=1,NVTOT)            FLOP      499
                  IF(LC(14).EQ.0) GO TO 87                                    FLOP      500
500               WRITE (MTAP1)  (CFREQ(J),DAMP(J),VEQ(J),J=1,NVTOT)          FLOP      501
               87 CONTINUE                                                    FLOP      502
                  DO 300 IV=1,NVTOT                                           FLOP      503
                  CALL TITLES (2)                                             FLOP      504
                  IF (KOUNT .GT. KOUNTH) GO TO 200                            FLOP      505
505               IF (KFIRST .EQ. NO) GO TO 150                               FLOP      506
                  KFIRST =  NO                                                FLOP      507
                  CALL PLB (1,1,ITAPEW)                                       FLOP      508
                  WRITE (ITAPEW,1620)                                         FLOP      509
                  CALL PLB (1,1,ITAPEW)                                       FLOP      510
510               KOUNT  =  KOUNT + 4                                         FLOP      511
                  NCOLS  =  4                                                 FLOP      512
                  NROWS  =  0                                                 FLOP      513
                  KTABLE =  2                                                 FLOP      514
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400                KCR      =  IZ                                                    FLOP      401
                C     ------------------------------------------------------------- FLOP      402
                      VLAMB    =  SOLV (IZ,NVTOT)                                    FLOP      403
                   14 CONTINUE                                                      FLOP      404
                   12 CONTINUE                                                      FLOP      405
405             C     COLLECT TERMS AND REORDER ------------------                  FLOP      406
                C                                                                  FLOP      407
                      CALL AORDER (VQ,NVTOT,IPERM,1)                               FLOP      408
                C                                                                  FLOP      409
                CIBM                                                               FLOP      410
410             C     REWIND ITAPSL                                                FLOP      411
                CIBM                                                               FLOP      412
                C                                                                  FLOP      413
                      DO 19 K = 1,NVTOT                                            FLOP      414
                      II = IPERM (K)                                               FLOP      415
415                   VV(K)       =  VQ(II)                                        FLOP      416
                      DO 20 KK = 1,NQZ                                             FLOP      417
                      SOLTMP(KK,1) = SOLV(KK,II)                                   FLOP      418
                   20 CONTINUE                                                     FLOP      419
                C                                                                  FLOP      420
420             CIBM                                                               FLOP      421
                C     WRITE (ITAPSL) SOLTMP                                        FLOP      422
                CIBM                                                               FLOP      423
                C                                                                  FLOP      424
                CCDC                                                               FLOP      425
425                   CALL WRITEC(SOLTMP(1,1),SOLECS(1,K),NQZ1)                    FLOP      426
                CCDC                                                               FLOP      427
                C                                                                  FLOP      428
                   19 CONTINUE                                                     FLOP      429
                C                                                                  FLOP      430
430             CIBM                                                               FLOP      431
                C     REWIND ITAPSL                                                FLOP      432
                CIBM                                                               FLOP      433
                C                                                                  FLOP      434
                      DO 21 K = 1,NVTOT                                            FLOP      435
435             C                                                                  FLOP      436
                CIBM                                                               FLOP      437
                C     READ (ITAPSL) (SOL(KK,K),KK=1,NQZ)                           FLOP      438
                CIBM                                                               FLOP      439
                C                                                                  FLOP      440
440             CCDC                                                               FLOP      441
                      CALL READEC(SOL(1,K),SOLECS(1,K),NQZ1)                       FLOP      442
                CCDC                                                               FLOP      443
                C                                                                  FLOP      444
                      DO 22 KK = 1,NQZ                                             FLOP      445
445                   IF ( AIMAG(SOL(KK,K)) .LT. 0.0 )  SOL(KK,K) = CONJG(SOL(KK,K))  FLOP      446
                   22 CONTINUE                                                     FLOP      447
                   21 CONTINUE                                                     FLOP      448
                      IF ( LVTP .EQ. 0 )       GO TO 71                          FLOP      449
                      CALL FRORD (NVTOT,NQZ,VV,SOL,BR,KPNT,VELCR,KCR,MID,0,1)      FLOP      450
450                71 CONTINUE                                                     FLOP      451
                      IF ( ITER .NE. 1 )       GO TO 29                          FLOP      452
                      IF ( KPNT .EQ. 0 )       GO TO 29                          FLOP      453
                      IF ( IVEC .EQ.0 )        GO TO 29                          FLOP      454
                      DO 72  II =1,NVTOT                                           FLOP      455
455                   IF ( VV(II) .EQ. VELCR )      GO TO 73                     FLOP      456
                   72 CONTINUE                                                     FLOP      457
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                  SOLL(II,KNV)  =  SOLV(II,JJ)                                  FLOP      344
                34 SOLT(II,KNV)  =  SOLV(II,JJ-1)                               FLOP      345
345             13 CONTINUE                                                     FLOP      346
                   IF ( KNV .EQ. 0 )        GO TO 12                            FLOP      347
                   ITEN     =  0                                               FLOP      348
                   DO 14 LL = 1,KNV                                            FLOP      349
                   IZ       =  NEL(LL)                                         FLOP      350
350                RL       =  REAL (SOLL(IZ,LL))                              FLOP      351
                   VL       =  VQ(JJ)                                          FLOP      352
                   RT       =  REAL (SOLT(IZ,LL))                              FLOP      353
                   VTT      =  VQ(JJ-1)                                        FLOP      354
                   VC       =  VZA(LL)                                         FLOP      355
355             15 ITEN     =  ITEN + 1                                        FLOP      356
                   VCC      =  VC                                              FLOP      357
                   IF ( ITEN .EQ. 1 )       GO TO 39                           FLOP      358
                   VCC      =  VC                                              FLOP      359
                   RCP      =  RCC                                             FLOP      360
360             39 DO 16  II = 1,NQZ                                           FLOP      361
                   ROOT(2*II-1)  =  SOLT(II,LL) * VTT / VC                    FLOP      362
                16 ROOT(2*II)=CONJG(ROOT(2*II-1))                             FLOP      363
                   ROWS     =  1.0 / WWF                                       FLOP      364
                   VB       = VC * 1.6878 / BR                                 FLOP      365
365                VELOC    =  VC                                              FLOP      366
                   CALL ZANLYN (F,EPS,NSIG,NQZ1,NQU1,ROOT,ITMAX,JT,IER)       FLOP      367
                   IF ( LC(17) .EQ. 0 )     GO TO 32                          FLOP      368
                   WRITE (ITAPEW,78)  VELOC, (JT(III), III=1,NQZ1,2)          FLOP      369
                32 INDX     = 2 * NEL(LL) - 1                                  FLOP      370
370                RC       = REAL (ROOT(INDX))                                FLOP      371
                   RCC      =  ABS (REAL(ROOT(INDX)) / AIMAG(ROOT(INDX)))      FLOP      372
                   IF ( ABS(RC) .LE. 1.E-6 )    GO TO 17                      FLOP      373
                   IF ( ITEN .EQ. 1 )       GO TO 40                           FLOP      374
                   DIFF     =  ABS (1.0 - ABS(RCC/RCP) )                       FLOP      375
375                IF ( DIFF .LE. 1.E-5 )       GO TO 17                       FLOP      376
             C                                                                 FLOP      377
                40 CONTINUE                                                    FLOP      378
                   IF ( SIGN(1.0,RC) .EQ. SIGN(1.0,RT) )       GO TO 35       FLOP      379
                   RL       =  RC                                              FLOP      380
380                VL       =  VC                                              FLOP      381
                   DO 36  II = 1,NQZ                                          FLOP      382
                36 SOLL(II,LL)  =  ROOT(2*II-1)                               FLOP      383
                   GO TO 38                                                    FLOP      384
                35 RT       =  RC                                              FLOP      385
385                VTT      =  VC                                              FLOP      386
                   DO 37  II = 1,NQZ                                          FLOP      387
                37 SOLT(II,LL)  =  ROOT(2*II-1)                               FLOP      388
                38 VC       =  RT / (RT-RL) * (VL-VTT) + VTT                   FLOP      389
                   DIFV     =  ABS (1.0 - ABS(VC/VCC) )                        FLOP      390
390                IF ( DIFV .LE. 1.E-5 )       GO TO 17                       FLOP      391
                   GO TO 15                                                    FLOP      392
                17 NVTOT = NVTOT + 1                                           FLOP      393
                   IF ( NVTOT .GT. 100 )        GO TO 64                      FLOP      394
                   VQ(NVTOT)  =  VC                                           FLOP      395
395                DO 18 II = 1,NQZ                                           FLOP      396
                18 SOLV(II,NVTOT)  = ROOT(2*II-1)                             FLOP      397
                   KPNT     =  KPNT + 1                                        FLOP      398
                   IF ( KPNT .GT. 1 )       GO TO 14                          FLOP      399
                   VELCR    =  VC                                              FLOP      400
```

```
                CCDC                                                                    FLOP     287
                      CALL WRITEC(SOLTMP(1,1),SOLECS(1,K),NQZ1)                         FLOP     288
                CCDC                                                                    FLOP     289
                C                                                                       FLOP     290
290               302 CONTINUE                                                          FLOP     291
                C                                                                       FLOP     292
                CIBM                                                                    FLOP     293
                C     REWIND ITAPSL                                                     FLOP     294
                CIBM                                                                    FLOP     295
295             C                                                                       FLOP     296
                      DO 303 K = 1,NVTOT                                                FLOP     297
                C                                                                       FLOP     298
                CIBM                                                                    FLOP     299
                C     READ (ITAPSL) (SOL(KK,K),KK=1,NQZ)                                FLOP     300
300             CIBM                                                                    FLOP     301
                C                                                                       FLOP     302
                CCDC                                                                    FLOP     303
                      CALL READEC(SOL(1,K),SOLECS(1,K),NQZ1)                            FLOP     304
                CCDC                                                                    FLOP     305
305             C                                                                       FLOP     306
                      DO 304 KK = 1,NQZ                                                 FLOP     307
                      IF(AIMAG(SOL(KK,K)).LT.0.0) SOL(KK,K) = CONJG(SOL(KK,K))          FLOP     308
                  304 CONTINUE                                                          FLOP     309
                  303 CONTINUE                                                          FLOP     310
310                   CALL FRORD (NVTOT,NQZ,VV,SOL,BR,KPNT,VELCR,KCR,MID,0,1)           FLOP     311
                      DO 305 K = 1,NVTOT                                                FLOP     312
                      VQ(K) = VV(K)                                                     FLOP     313
                C     DO 306 KK=1,NQZ                                                   FLOP     314
                C 306 SOLV(KK,K) = SOL(KK,K)                                            FLOP     315
315               305 CONTINUE                                                          FLOP     316
                      KPNT      =  0                                                    FLOP     317
                      DO 85  J = 1,NQZ                                                  FLOP     318
                   85 DMPP(J)   =  ABS( REAL(SOLV(J,1)) / AIMAG(SOLV(J,1)) )          FLOP     319
                      DO 12  J = 2,NVV                                                  FLOP     320
320                   JJ        =  J                                                    FLOP     321
                      KNV       =  0                                                    FLOP     322
                      DO 13 KZ = 1,NQZ                                                  FLOP     323
                      K         = KZ                                                    FLOP     324
                      RL = REAL (SOLV(K,JJ))                                            FLOP     325
325                   RT   =  REAL (SOLV(K,JJ-1))                                       FLOP     326
                      RR        =  REAL (SOLV(K,JJ+1))                                  FLOP     327
                      DMP       =  ABS (REAL(SOLV(K,JJ)) / AIMAG(SOLV(K,JJ)) )          FLOP     328
                      DMPP(K)   =  DMPP(K) + DMP                                        FLOP     329
                      IF (DMPP(K) / FLOAT (J) .LE. 1.E-5) GO TO 13                      FLOP     330
330                   IF (DMP .GT. 1.E-10) GO TO 48                                     FLOP     331
                      IF ( SIGN(1.0,RT) .EQ. SIGN(1.0,RR) )       GO TO 13              FLOP     332
                      KPNT      =  KPNT + 1                                             FLOP     333
                      IF ( KPNT .GT. 1 )           GO TO 13                           FLOP     334
                      VELCR     =  VQ(JJ)                                               FLOP     335
335                   KCR       =  K                                                    FLOP     336
                      VLAMB     =  SOLV (KCR,JJ)                                        FLOP     337
                      GO TO 13                                                          FLOP     338
                   48 IF ( SIGN(1.0,RL) .EQ. SIGN(1.0,RT) )       GO TO 13              FLOP     339
                      KNV       =  KNV + 1                                              FLOP     340
340                   VZA(KNV)  = RT/(RT-RL) * (VQ(JJ)-VQ(JJ-1)) + VQ(JJ-1)           FLOP     341
                      NEL(KNV) = K                                                      FLOP     342
                      DO 34  II = 1,NQZ                                                 FLOP     343
```

```
                  IF ( SIGN(1.0,DIFIA) .NE. SIGN(1.0,DIFIB) )      KLUE = 1          FLOP      230
230            41 CONTINUE                                                          FLOP      231
                  ROWS      =  1.0 / WWF                                           FLOP      232
               4000 IF ( KLUE .NE. 0 )       GO TO 42                              FLOP      233
                  DO 11  K = 1,NQZ                                                 FLOP      234
                  SOLV(K,KJI)  =  ROOT(2*K-1)                                      FLOP      235
235               IF ( LC(18) .NE. 0 .AND. AIMAG(SOLV(K,KJI)) .LT. 0.0 )           FLOP      236
                 1              SOLV(K,KJI)  =  CONJG (SOLV(K,KJI))               FLOP      237
                11 CONTINUE                                                        FLOP      238
                  IF ( LC(18) .EQ. 0 )     GO TO 4                               FLOP      239
                  CALL FRORD (NVTOT,NQZ,VQ,SOLV,BR,KPNT,VELCR,KCR,MID,1,KJI)       FLOP      240
240               GO TO 4                                                          FLOP      241
                42 IJK       =  IJK + 1                                          FLOP      242
                  DELV      =  VQ(KJI) - VQ(KJI-1)                               FLOP      243
                  DO 44  JJ = 1,5                                                  FLOP      244
                  JL        =  J-1 + 4*(IJK-1) + JJ                              FLOP      245
245               VQ(JL)    =  V(J-1) + FLOAT(JJ)*DELV/5.0                       FLOP      246
            C                                                                      FLOP      247
                  VB        =  VQ(JL) * 1.6878 / BR                              FLOP      248
            C         PREDICT NEXT ROOTS                                         FLOP      249
                  CALL RTIN (NQZ,SOLV,ROOT,JL,VQ,MID,LC(18))                       FLOP      250
250         C                                                                      FLOP      251
                  VELOC     =  VQ(JL)                                            FLOP      252
                  CALL ZANLYN (F,EPS,NSIG,NQZ1,NQU1,ROOT,ITMAX,JT,IER)             FLOP      253
                  IF ( LC(17) .EQ. 0 )     GO TO 46                              FLOP      254
                  WRITE (ITAPEW,78)  VELOC, (JT(III), III=1,NQZ1,2)                FLOP      255
255            46 DO 47  KL = 1,NQZ                                                FLOP      256
                  SOLV(KL,JL)  =  ROOT(2*KL-1)                                     FLOP      257
                  IF ( LC(18) .NE. 0 .AND. AIMAG(SOLV(KL,JL)) .LT. 0.0 )           FLOP      258
                 1              SOLV(KL,JL)  =  CONJG (SOLV(KL,JL))               FLOP      259
                47 CONTINUE                                                        FLOP      260
260               IF ( LC(18) .EQ. 0 )     GO TO 44                              FLOP      261
                  CALL FRORD (NVTOT,NQZ,VQ,SOLV,BR,KPNT,VELCR,KCR,MID,1,JL)        FLOP      262
                44 CONTINUE                                                        FLOP      263
                  KLUE      =  0                                                 FLOP      264
                 4 CONTINUE                                                        FLOP      265
265         C     DETERMINE WHETHER FLUTTER OCCURS FOR ANY MODE ----------------   FLOP      266
                  NVTOT     =  NV + 4*IJK                                        FLOP      267
                  NVV       =  NVTOT                                             FLOP      268
            C                                                                      FLOP      269
                  CALL AORDER(VQ,NVTOT,IPERM,1)                                    FLOP      270
270         C                                                                      FLOP      271
            CIBM                                                                   FLOP      272
            C     REWIND ITAPSL                                                    FLOP      273
            CIBM                                                                   FLOP      274
            C                                                                      FLOP      275
275               DO 302 K = 1, NVTOT                                              FLOP      276
                  II = IPERM(K)                                                    FLOP      277
                  VV(K) = VQ(II)                                                   FLOP      278
                  DO 301 KK = 1, NQZ                                               FLOP      279
                  SOLTMP(KK,1) = SOLV(KK,II)                                       FLOP      280
280            301 CONTINUE                                                        FLOP      281
            C                                                                      FLOP      282
            CIBM                                                                   FLOP      283
            C     WRITE (ITAPSL) SOLTMP                                            FLOP      284
            CIBM                                                                   FLOP      285
285         C                                                                      FLOP      286
```

VARIABLES		SN	TYPE		RELOCATION							
						500	502	531	533	534	563	570	572
						579	DEFINED	157	266	392			
3411	NVTT		INTEGER			REFS	535	DEFINED	534				
3352	NVV		INTEGER			REFS	319	DEFINED	267				
6200	OMG		REAL	ARRAY	FLEXT	REFS	23	41	172	2*191			
17500	OMM		REAL	ARRAY	MODD	REFS	24	42					
3336	OM1		REAL			REFS	227	DEFINED	219				
3337	OM2		REAL			REFS	2*224	227	228	DEFINED	221		
3340	OM3		REAL			REFS	224	228	DEFINED	222			
3302	PLOTG	*	REAL			DEFINED	148						
2	PROD		REAL		FACE	REFS	46						
0	Q		COMPLEX	ARRAY	MODD	REFS	31	42					
33726	QRS		COMPLEX	ARRAY		REFS	32	587	593	615	617	620	701
						702	705	DEFINED	614				
3331	RA		REAL			REFS	213	DEFINED	210				
3332	RB		REAL			REFS	213	214	DEFINED	211			
3372	RC		REAL			REFS	372	378	379	384	DEFINED	370	
3370	RCC		REAL			REFS	359	374	DEFINED	371			
3367	RCP		REAL			REFS	374	DEFINED	359				
3333	RD		REAL			REFS	214	DEFINED	212				
6250	RHO		REAL		FLEXT	REFS	41	587	589	645	701		
0	RHOP		REAL		F.P.	REFS	125	488	647	DEFINED	2		
3316	RIMP		REAL			REFS	2*173	DEFINED	172				
3327	RL		REAL			REFS	208	338	340	388	DEFINED	206	324
						350	379						
30366	ROOT		COMPLEX	ARRAY		REFS	29	174	181	198	207	2*212	222
						234	249	252	256	362	366	370	2*371
						382	387	396	DEFINED	173	174	361	362
4	ROWS		REAL		FACE	REFS	46	DEFINED	193	231	363		
3356	RR		REAL			REFS	331	DEFINED	326				
3330	RT		REAL			REFS	208	331	338	2*340	378	2*388	
						DEFINED	207	325	352	384			
42126	S		COMPLEX	ARRAY		REFS	32	620	677	680	687	690	707
						DEFINED	675	677	685	687	705		
362	SCAALE		REAL	ARRAY	STORES	REFS	58						
0	SCALE		REAL		FACE	REFS	46						
3426	SOL		COMPLEX	ARRAY		REFS	29	66	303	2*307	310	441	2*445
						449	460	461	467	2*490	492	559	572
						DEFINED	307	445					
6200	SOLECS		COMPLEX	ARRAY	FLPCOM	REFS	13	14	71	287	303	425	441
30626	SOLL		COMPLEX	ARRAY		REFS	30	350	DEFINED	343	382		
32266	SOLT		COMPLEX	ARRAY		REFS	30	352	361	DEFINED	344	387	
30246	SOLTMP		COMPLEX	ARRAY		REFS	28	287	425	DEFINED	279	417	
3426	SOLV		COMPLEX	ARRAY		REFS	29	66	181	206	2*210	2*211	219
						221	2*235	239	249	2*257	261	279	2*318
						324	325	326	2*327	336	343	344	402
						417	DEFINED	234	235	256	257	396	
0	SRATIO		REAL	*UNUSED	F.P.	DEFINED	2						
3426	STOR		REAL	ARRAY		REFS	26	66	67	68			
11	STPOLD		REAL		STRCLU	REFS	63						
305	STRIDN		REAL	ARRAY	STORES	REFS	58						
266	STRIDO		REAL	ARRAY	STORES	REFS	58						
122	STRII		REAL	ARRAY	STORES	REFS	58						
160	STRIN		REAL	ARRAY	STORES	REFS	58						
141	STRIO		REAL	ARRAY	STORES	REFS	58						
343	STRRDN		REAL	ARRAY	STORES	REFS	58						
324	STRRDO		REAL	ARRAY	STORES	REFS	58						

VARIABLES	SN	TYPE	RELOCATION								
177	STRRI	REAL	ARRAY	STORES	REFS	58					
235	STRRN	REAL	ARRAY	STORES	REFS	58					
216	STRRO	REAL	ARRAY	STORES	REFS	58					
261	STRWDN	REAL	ARRAY	STORES	REFS	58					
254	STRWDO	REAL	ARRAY	STORES	REFS	58					
103	STRWI	REAL	ARRAY	STORES	REFS	58					
115	STRWN	REAL	ARRAY	STORES	REFS	58					
110	STRWO	REAL	ARRAY	STORES	REFS	58					
3241	SUM	COMPLEX			REFS	12	705	707	DEFINED	704	706
0	V	REAL	ARRAY	FLUTB	REFS	18	44	162	163	245	
					DEFINED	135	136	137			
6251	VB	REAL		FLEXT	REFS	41	172	611	DEFINED	163	247	364
					588						
3415	VBO	REAL			REFS	587	589	590	701	709	
					DEFINED	586					
3365	VC	REAL			REFS	356	358	361	364	365	380	385
					389	394	399	DEFINED	354	388	
3366	VCC	REAL			REFS	389	DEFINED	356	358		
10	VDES	REAL		KLUES	REFS	50					
0	VECC	COMPLEX	ARRAY	FLUT	REFS	33	49	620	622	661	680	690
					695	707					
120	VECR	COMPLEX	ARRAY	FLUT	REFS	33	49	625	626	627	661	677
					682	687	695	705	DEFINED	682	
3345	VELCR	REAL			REFS	239	261	310	449	455	588	647
					649	651	DEFINED	334	399	570	
240	VELEQ	REAL		FLUT	REFS	49	651	653	655	DEFINED	647	
5	VELOC	REAL		FACE	REFS	46	202	254	368	DEFINED	197	251
					365						
30032	VEQ	REAL	ARRAY		REFS	22	498	500	DEFINED	494	495	
3402	VINC	REAL			REFS	541	550	DEFINED	470	544	
3363	VL	REAL			REFS	388	DEFINED	351	380		
3425	VLAM	REAL			REFS	692	708	709	DEFINED	691	
3251	VLAMA	COMPLEX			REFS	35	620	625	658	691	
					DEFINED	611					
3245	VLAMB	COMPLEX			REFS	32	460	461	586	611	2*648	649
					DEFINED	336	402	572			
3377	VLI	REAL			REFS	462	DEFINED	461			
3376	VLR	REAL			REFS	462	DEFINED	460			
10	VNEW	REAL		STRCLU	REFS	63	125	652	DEFINED	653	
0	VNSAVE	REAL		VSAVE	REFS	64	654	DEFINED	655		
7	VOLD	REAL		STRCLU	REFS	63	DEFINED	652			
1	VOSAVE	REAL		VSAVE	REFS	64	DEFINED	654			
27262	VQ	REAL	ARRAY		REFS	21	181	197	219	221	222	239
					2*242	247	249	251	261	269	277	334
					3*340	351	353	407	415	DEFINED	162	245
					312	394					
6	VS	REAL		STRCLU	REFS	63					
27426	VT	REAL	ARRAY		REFS	21	494	522	541	544		
					DEFINED	488					
3265	VTEST	REAL			REFS	128	565	568	578	DEFINED	125	563
					568	577					
3266	VTEST2	REAL			REFS	127	128	DEFINED	126	127	
3364	VTT	REAL			REFS	361	2*388	DEFINED	353	385	
26416	VV	REAL	ARRAY		REFS	19	310	312	449	455	467	488
					492	495	522	563	564	570	577	579
					DEFINED	277	415					
3267	VXL	REAL			REFS	129	131	132	134	135	136	137

VARIABLES	SN	TYPE		RELOCATION								
					DEFINED	128	131	133	134			
3270	VXP	REAL			REFS	130	DEFINED	129				
27236	VZA	REAL	ARRAY		REFS	21	354	DEFINED	340			
0	V1	REAL		FLUTV	REFS	45	467	475				
1	V2	REAL		FLUTV	REFS	45	467	475				
14400	WW	REAL	ARRAY	MODD	REFS	24	42	191	593			
3321	WWF	REAL			REFS	191	193	231	363	DEFINED	184	191
3413	X	REAL			REFS	560	566	580	DEFINED	559	564	578
1	XK	REAL	ARRAY	KZERO	REFS	17	39					
3416	XX	REAL			REFS	590	594	DEFINED	589			
3417	XXX	REAL			REFS	594	DEFINED	590				
3414	Y	REAL			REFS	566	580	DEFINED	565	579		
1	YES	INTEGER		CONSTS	REFS	4	57	482				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES						
ADIV		6		617						
ALOG10	REAL	1	LIBRARY	129						
AORDER		4		269	407					
CLUTSL		6		626						
COMSCA	COMPLEX	6		37	705	707				
CONV		5		598	615	683	702			
FRORD		11		239	261	310	449			
GCVEC		10		620						
GRVEC		9		625						
ORIENT		2		622	627					
PLB		3		507	509	518	524	636	638	646
PROGNA		2		76	484	633				
PTABLE		3		514	643					
QFLIN		6		587	701					
READEC		3		303	441	670	727			
REDMOD		1		114						
RTIN		7		181	249					
SQRT	REAL	1	LIBRARY	125	488	647				
TITLES		1		503	635					
VECP		7		467						
WRITEC		3		109	287	425	607			
ZANLYN		9		198	252	366				

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES							
ABS	REAL	1	INTRIN	219	221	222	224	318	327	371	372
				2*374	2*389	532	533	586			
AIMAG	REAL	1	INTRIN	210	211	212	219	221	222	235	257
				307	318	327	371	445	2*461	490	492
				586	594	648	649	691	709		
CMPLX	COMPLEX	2	INTRIN	173	594	597					
CONJG	COMPLEX	1	INTRIN	174	235	257	307	362	445		
FLOAT	REAL	1	INTRIN	245	329	533					
IFIX	INTEGER	1	INTRIN	130	132						
REAL	REAL	1	INTRIN	206	207	210	211	212	318	324	325
				326	327	350	352	370	371	2*460	490
				559	594	648	709				
SIGN	REAL	2	INTRIN	2*208	2*215	217	2*229	2*331	2*338	2*378	

STATEMENT LABELS		DEF LINE	REFERENCES	
40	1	126	569	582
67	2	139	123	

STATEMENT LABELS			DEF LINE	REFERENCES					
2177	3		712	555	657				
470	4		264	158	238	240			
160	5		178	164					
153	6		175	166	169				
143	7		171	167					
0	8		170	168					
250	9		203	199					
0	11		237	233					
1111	12		404	319	346				
671	13		345	322	329	331	333	337	338
1106	14		403	348	398				
712	15		355	391					
0	16		362	360					
1055	17		392	372	375	390			
0	18		396	395					
0	19		428	413					
0	20		418	416					
0	21		447	434					
0	22		446	444					
1461	24		549	485	526	533	547		
0	25		496	486					
2753	26	FMT	739	517					
2775	28	FMT	744	522					
1231	29		468	451	452	453			
165	30		183	178					
761	32		369	367					
207	33		192	186	189				
0	34		344	342					
1023	35		384	378					
0	36		382	381					
0	37		387	386					
1042	38		388	383					
717	39		360	357					
1001	40		377	373					
347	41		230	205	216	218	220	226	
401	42		241	232					
464	44		262	243	260				
0	45		677	674	676				
441	46		255	253					
0	47		259	255					
636	48		338	330					
323	49		220	209					
0	50		597	591	592				
0	51		614	612	613				
337	52		227	223					
3002	53	FMT	745	645					
3011	54	FMT	747	651					
3030	55	FMT	750	658					
3036	56	FMT	751	659	693				
0	57		661	660					
3043	58	FMT	752	661	695				
0	59		680	679					
0	60		682	681					
0	61		687	684	686				
0	62		690	689					
3052	63	FMT	754	692					
2211	64		734	161	393				

STATEMENT LABELS			DEF LINE	REFERENCES					
3062	65	FMT	756	734					
202	66		191	187					
0	67		190	188					
0	68		695	694					
3073	69	FMT	758	696					
3100	70	FMT	759	619	624				
1174	71		450	448					
0	72		456	454					
1207	73		458	455					
1227	74		466	457	464				
0	75		463	459					
1225	76		465	462					
3102	77	FMT	760	200					
3104	78	FMT	761	202	254	368			
0	79		532	531					
1456	80		548	535	536	537	539	540	541
3115	81	FMT	764	550					
0	82		705	703					
3140	83	FMT	769	710					
0	85		318	317					
1243	86		476	473	474				
1337	87		501	497	499				
3156	90	FMT	773	562	576	712			
3165	91	FMT	774	566	580				
1514	96		570	567					
0	97		561	558					
1524	98		575	560					
1536	99		583	556	574	581			
1670	100		632	584					
2210	101		730	719					
27	105		118	93					
31	110		121	115					
1363	150		516	505					
1371	200		520	504					
0	300		523	502					
0	301		280	278					
0	302		290	275					
0	303		309	296					
0	304		308	306					
0	305		315	311					
0	905		608	606					
0	906		671	669					
3172	1620	FMT	775	508					
3202	1640	FMT	778	637					
354	4000		232	203					

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
117	4	J	158 264	354B		EXT REFS	EXITS	NOT INNER
133	6	II	166 175	23B		NOT INNER		
136	8	JJ	168 170	5B	INSTACK	EXITS		
172	33	II	186 192	20B		EXT REFS	NOT INNER	
175	67	JJ	188 190	5B	INSTACK	EXITS		
240		III	202 202	7B		EXT REFS		
266	41	K	205 230	63B	OPT			
366	11	K	233 237	6B	INSTACK			
406	44	JJ	243 262	61B		EXT REFS	NOT INNER	
431		III	254 254	7B		EXT REFS		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
452	47	KL	255 259	6B	INSTACK
500	302	K	275 290	26B	EXT REFS NOT INNER
512	301	KK	278 280	3B	INSTACK
527	303	K	296 309	24B	EXT REFS NOT INNER
543	304	KK	306 308	5B	INSTACK
560	305	K	311 315	3B	INSTACK
571	85	J	317 318	4B	INSTACK
577	12	J	319 404	315B	EXT REFS EXITS NOT INNER
602	13	KZ	322 345	72B	NOT INNER
662	34	II	342 344	6B	INSTACK
677	14	LL	348 403	212B	EXT REFS EXITS NOT INNER
730	16	II	360 362	5B	INSTACK
751		III	368 368	7B	EXT REFS
1016	36	II	381 382	4B	INSTACK
1035	37	II	386 387	4B	INSTACK
1070	18	II	395 396	4B	INSTACK
1116	19	K	413 428	26B	EXT REFS NOT INNER
1130	20	KK	416 418	3B	INSTACK
1145	21	K	434 447	24B	EXT REFS NOT INNER
1161	22	KK	444 446	5B	INSTACK
1201	72	II	454 456	5B	INSTACK EXITS
1211	75	II	459 463	13B	OPT EXITS
1251	24	K	485 549	213B	EXT REFS NOT INNER
1252	25	J	486 496	27B	EXT REFS
1307		J	498 498	11B	EXT REFS
1325		J	500 500	11B	EXT REFS
1340	300	IV	502 523	50B	EXT REFS
1422	79	J	531 532	4B	INSTACK
1435	80	J	535 548	24B	OPT EXITS
1473	97	I1	558 561	6B	INSTACK EXITS
1555	50	II	591 597	24B	NOT INNER
1563	50	JJ	592 597	12B	OPT
1606	905	JJJ	606 608	11B	EXT REFS
1623	51	II	612 614	17B	NOT INNER
1633	51	JJ	613 614	3B	INSTACK
1745	57	II	660 661	11B	EXT REFS
1757	906	JJJ	669 671	11B	EXT REFS
1771	45	K	674 677	24B	NOT INNER
2003	45	L	676 677	7B	INSTACK
2025	59	K	679 680	7B	INSTACK
2044	60	K	681 682	7B	INSTACK
2061	61	K	684 687	24B	NOT INNER
2073	61	L	686 687	7B	INSTACK
2115	62	K	689 690	7B	INSTACK
2133	68	K	694 695	11B	EXT REFS
2154	82	II	703 705	12B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
FLPCOM	14400 ECS	0	GKECS	(3200)	3200	SOLECS	(8000)	11200	AECS	(3200)
KZERO	16	0	KO	(1)	1	XK	(15)			
COMA	41	0	LC	(40)	40	BR	(1)			
FLEXT	3242	0	GK	(3200)	3200	OMG	(40)	3240	RHO	(1)
		3241	VB	(1)						
MODD	8041	0	Q	(3200)	3200	DETAD	(3200)	6400	WW	(1600)
		8000	OMM	(40)	8040	NC	(1)			
FITR	41	0	NOMI	(1)	1	NIND	(40)			
FLUTB	27	0	V	(25)	25	NV	(1)	26	DV	(1)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
FLUTV	7	0 V1 (1)	1 V2 (1)	2 FLO (1)			
		3 FHI (1)	4 IE (1)	5 NQZ (1)			
		6 NVTOT (1)					
FACE	6	0 SCALE (1)	1 FACT (1)	2 PROD (1)			
		3 EM (1)	4 ROWS (1)	5 VELOC (1)			
DETAIL	2	0 EPS (1)	1 LVEC (1)				
CTAPES	50	0 ITAPES (50)					
FLUT	244	0 VECC (80)	80 VECR (80)	160 VELEQ (1)			
		161 FRQSQ (1)	162 C (1)	163 NMODE (1)			
		164 IDMODE (80)					
KLUES	24	0 KLUSE (1)	1 KLUNAL (1)	2 IRED (1)			
		3 KLUMD (1)	4 KLUBAL (1)	5 MSADD (1)			
		6 NPAS (1)	7 IDNOPT (1)	8 VDES (1)			
		9 EPS1 (1)	10 DWMAX (1)	11 NBAR (1)			
		12 NFIX (1)	13 D (1)	14 DEL (1)			
		15 EPS2 (1)	16 NCYC (1)	17 NNN (1)			
		18 IBAND (1)	19 IFIN (1)	20 KLUB (1)			
		21 KLUQ (1)	22 MORBAL (1)	23 DBAL (1)			
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)			
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)			
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)			
		9 KOUNTH (1)	10 KOUNTI (1)				
CTABLE	8	0 KTABLE (1)	1 NPASS (1)	2 NROWS (1)			
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLO (1)			
		6 NPAGEA (1)	7 ITAPET (1)				
CONSTS	2	0 NO (1)	1 YES (1)				
STORES	277	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)			
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)			
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)			
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)			
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)			
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)			
		212 STRRDO (15)	227 STRRDN (15)	242 SCAALE (35)			
STRCLU	10	0 ICYCLE (1)	1 ISTEP (1)	2 M1 (1)			
		3 M2 (1)	4 M3 (1)	5 M4 (1)			
		6 VS (1)	7 VOLD (1)	8 VNEW (1)			
		9 STPOLD (1)					
VSAVE	2	0 VNSAVE (1)	1 VOSAVE (1)				

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
STOR	9600	0 SOL (8000)	0 SOLV (8000)	0 A (3200)
		0 AA (3200)	3200 B (3200)	6400 FF (3200)

STATISTICS

PROGRAM LENGTH	42421B	17681
CM LABELED COMMON LENGTH	27423B	12051
ECS LABELED COMMON LENGTH	34100B	14400

56400B CM USED

```
      SUBROUTINE ZANLYN (F,EPS,NSIG,NGUESS,N,X,ITMAX,INFER,IER)          ZANLYN     2
C                                                                        ZANLYN     3
C     MODIFIED IMSL ROUTINE AS ALTERNATIVE TO ZERO                       ZANLYN     4
C     F         FUNCTION SUBROUTINE WRITTEN BY USER                      ZANLYN     5
C     EPS       FIRST STOPPING CRITERION , A ROOT Z IS ACCEPTED IF       ZANLYN     6
C               ABS(F(Z)) .LE. EPS                                       ZANLYN     7
C     NSIG      SECOND STOPPING CRITERION , A ROOT IS ACCEPTED IF IN TWO ZANLYN     8
C               SUCCESSIVE APPROXIMATIONS TO A GIVEN ROOT , AGREEMENT IS ZANLYN     9
C               IN FIRST SIG DIGITS                                      ZANLYN    10
C     NGUESS    NUMBER OF INITIAL ESTIMATES OF ROOTS                     ZANLYN    11
C     N         NUMBER OF ROOTS TO BE FOUND                              ZANLYN    12
C               IF NEGATIVE PRINT OUTPUT OF ITERATION OCCURS             ZANLYN    13
C     ITMAX     MAXIMUM NUMBER OF ITERATIONS PER ROOT                    ZANLYN    14
C     INFER     ARRAY OF NUMBER OF ITERATIONS PER ROOT                   ZANLYN    15
C     IER       ERROR PARAMETER (OUTPUT)                                 ZANLYN    16
C               WARNING ERROR = 32 + N                                   ZANLYN    17
C                N = 1  FAILURE TO CONVERGE WITHIN ITMAX ITERATIONS FOR  ZANLYN    18
C                ONE OF N ROOTS TO BE FOUND                              ZANLYN    19
      COMPLEX    X(1) , ONE , D , DD , DEN , DI , FRT , F , G           ZANLYN    20
      COMPLEX    H , RT , T1 , T2 , T3 , TEM , XO , X1 , X2 , BI , XX   ZANLYN    21
      COMPLEX HSTART                                                     ZANLYN    22
      DIMENSION        NAME(2)                                           ZANLYN    23
      DIMENSION ITAPES(50)                                               ZANLYN    24
      DIMENSION     INFER(1)                                             ZANLYN    25
C                                                                        ZANLYN    26
      COMMON /FACE/ SCALE , FACT , PROD , EM , ROWS , VELOC              ZANLYN    27
      COMMON /CTAPES/  ITAPES                                            ZANLYN    28
C                                                                        ZANLYN    29
C                                                                        ZANLYN    30
      DATA  NAME/4HZANL,4HYN  /                                          ZANLYN    31
      DATA SKIP/4HO   /                                                  ZANLYN    32
      SIZE(ZI)  =  ABS(REAL(ZI)) + ABS(AIMAG(ZI))                       ZANLYN    33
      ITAPEW =  ITAPES(6)                                                ZANLYN    34
      MM  =  IABS (N)                                                    ZANLYN    35
      DO 500  III = 1,MM                                                 ZANLYN    36
  500 INFER(III)  =  0                                                   ZANLYN    37
      IER       =  0                                                     ZANLYN    38
      ONE       =  (1.0 , 0.0)                                           ZANLYN    39
      EPS1      =  10.0**(-NSIG)                                         ZANLYN    40
      ICONJ     =  0                                                     ZANLYN    41
      SCALE     =  1.0                                                   ZANLYN    42
      PROD      =  1.0                                                   ZANLYN    43
      FACT      =  1.0                                                   ZANLYN    44
      LO        =  0                                                     ZANLYN    45
      L         =  1                                                     ZANLYN    46
      IF ( N .LT. 0 )    WRITE (ITAPEW,200)  VELOC                       ZANLYN    47
    5 JK        =  0                                                     ZANLYN    48
      HSTART = CMPLX(0.1*REAL(X(L)),0.0)                                 ZANLYN    49
      QZ        =  SIZE (X(L))                                           ZANLYN    50
      IF ( QZ .LE. 1.E-15 )        GO TO 25                            ZANLYN    51
   10 H = - HSTART                                                       ZANLYN    52
      RT = X(L) + H                                                      ZANLYN    53
      ASSIGN 15 TO NN                                                    ZANLYN    54
      GO TO 135                                                          ZANLYN    55
   15 XO        =  FRT                                                   ZANLYN    56
      L1        =  L                                                     ZANLYN    57
      L11       =  L1/2 + 1                                              ZANLYN    58
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                  IF ( N .LT. 0 )    WRITE (ITAPEW,300)  L11 , SKIP , RT , XO      ZANLYN     59
                  H = 2.0 * HSTART                                                 ZANLYN     60
 60               RT = RT + H                                                      ZANLYN     61
                  ASSIGN 20 TO NN                                                  ZANLYN     62
                  GO TO 135                                                        ZANLYN     63
               20 X1       =  FRT                                                 ZANLYN     64
                  IF ( N .LT. 0 )    WRITE (ITAPEW,400)  JK , RT , X1 , H          ZANLYN     65
 65               H = - HSTART                                                     ZANLYN     66
                  RT = RT + H                                                      ZANLYN     67
                  ASSIGN 40 TO NN                                                  ZANLYN     68
                  GO TO 135                                                        ZANLYN     69
            C                                                                      ZANLYN     70
 70            25 RT       =  -ONE                                                ZANLYN     71
                  ASSIGN 30 TO NN                                                  ZANLYN     72
                  GO TO 135                                                        ZANLYN     73
               30 XO       =  FRT                                                 ZANLYN     74
                  RT       =  ONE                                                 ZANLYN     75
 75               ASSIGN 35 TO NN                                                  ZANLYN     76
                  GO TO 135                                                        ZANLYN     77
               35 X1       =  FRT                                                 ZANLYN     78
                  RT       =  0.0                                                 ZANLYN     79
                  HSTART = ONE                                                     ZANLYN     80
 80               H = - ONE                                                        ZANLYN     81
                  ASSIGN 40 TO NN                                                  ZANLYN     82
                  GO TO 135                                                        ZANLYN     83
               40 X2       =  FRT                                                 ZANLYN     84
                  IF ( N .LT. 0 )    WRITE (ITAPEW,400)  JK , RT , X2 , H          ZANLYN     85
 85            45 D        =  (-0.5,0.0)                                          ZANLYN     86
                  H = -HSTART                                                      ZANLYN     87
            C                          BEGIN MAIN ALGORITHM                      ZANLYN     88
               50 DD       =  D + ONE                                             ZANLYN     89
                  T1       =  XO * D * D                                          ZANLYN     90
 90               T2       =  X1 * DD * DD                                        ZANLYN     91
                  XX       =  X2 * DD                                             ZANLYN     92
                  T3       =  X2 * D                                              ZANLYN     93
                  BI       =  T1 - T2 + XX + T3                                   ZANLYN     94
                  DEN      =  BI*BI - 4.0*(XX*T1-T3*(T2-XX))                      ZANLYN     95
 95            C                  USE DENOMINATOR OF MAXIMUM AMPLITUDE            ZANLYN     96
                  T1       =  CSQRT (DEN)                                         ZANLYN     97
                  T2       =  BI + T1                                             ZANLYN     98
                  T3       =  BI - T1                                             ZANLYN     99
                  QZ       =  SIZE(T2) - SIZE(T3)                                 ZANLYN    100
100               IF ( QZ .GE. 0 )        GO TO 60                                 ZANLYN    101
               55 DEN      =  T3                                                  ZANLYN    102
                  GO TO 65                                                         ZANLYN    103
               60 DEN      =  T2                                                  ZANLYN    104
            C                    TEST FOR ZERO DENOMINATOR                       ZANLYN    105
105            65 QZ       =  SIZE (DEN)                                          ZANLYN    106
                  IF ( QZ .GT. 1.E-15 )        GO TO 75                            ZANLYN    107
               70 DEN      =  ONE                                                 ZANLYN    108
               75 DI       =  -2.0 * XX / DEN                                     ZANLYN    109
                  H        =  DI * H                                              ZANLYN    110
110               RT       =  RT + H                                              ZANLYN    111
            C                    CHECK CONVERGENCE OF THE FIRST KIND             ZANLYN    112
                  QZ       =  SIZE (H/RT)                                         ZANLYN    113
                  IF ( QZ .LE. EPS1 )     GO TO 100                              ZANLYN    114
               80 ASSIGN 85 TO NN                                                ZANLYN    115
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115                GO TO 135                                                    ZANLYN    116
                85 QZ        =  SIZE(FRT) - SIZE(10.0*X2)                     ZANLYN    117
                   IF ( QZ .LT. 0.0 )       GO TO 95                         ZANLYN    118
              C                    TAKE REMEDIAL ACTION TO                    ZANLYN    119
              C                    INDUCE CONVERGENCE                         ZANLYN    120
120           90 DI        =  DI * 0.5                                         ZANLYN    121
                H         =  H * 0.5                                          ZANLYN    122
                RT        =  RT - H                                           ZANLYN    123
                GO TO 135                                                     ZANLYN    124
                95 XO        =  X1                                            ZANLYN    125
125             X1        =  X2                                               ZANLYN    126
                X2        =  FRT                                              ZANLYN    127
                D         =  DI                                               ZANLYN    128
                GO TO 50                                                      ZANLYN    129
              C                  A ROOT HAS BEEN FOUND                        ZANLYN    130
130           100 CALL ASSESS (FRT, F, X, LO, RT, 2)                          ZANLYN    131
              105 X(L)      =  RT                                             ZANLYN    132
                JK        =  JK + 1                                           ZANLYN    133
                IF ( N .LT. 0 .AND. JK .GT. 3 )                               ZANLYN    134
               1          WRITE (ITAPEW,400 )  JK , RT , FRT , H              ZANLYN    135
135             INFER(L)  =  JK                                               ZANLYN    136
                L         =  L + 1                                            ZANLYN    137
                LO        =  L                                                ZANLYN    138
                X(L)      =  CONJG (RT)                                       ZANLYN    139
                L         =  L + 1                                            ZANLYN    140
140             IF (L-MM)  5,5,185                                            ZANLYN    141
              135 JK        =  JK + 1                                         ZANLYN    142
                IF ( JK .GT. ITMAX )     GO TO 180                            ZANLYN    143
                CALL ASSESS (FRT, F, X, LO, RT, 2)                            ZANLYN    144
                IF ( JK .GE. 2 )         GO TO 2                              ZANLYN    145
145             SCALE     =  1.0 / SIZE (FRT)                                 ZANLYN    146
                FRT       =  SCALE * FRT                                      ZANLYN    147
                IF ( LO .EQ. 0 )         GO TO 120                            ZANLYN    148
                FACT      =  FACT / PROD**(1.0/FLOAT(LO))                     ZANLYN    149
              120 ROWS      =  ROWS * (SCALE/PROD)**(1.0/EM)                  ZANLYN    150
150             2 IF ( N .LT. 0 .AND. JK .GT. 3 )                             ZANLYN    151
               1          WRITE (ITAPEW,400 )  JK , RT , FRT , H              ZANLYN    152
                QZ        =  SIZE (FRT)                                       ZANLYN    153
                IF ( QZ .GE. EPS )       GO TO 170                            ZANLYN    154
                GO TO 105                                                     ZANLYN    155
155           170 GO TO NN,(15,20,30,35,40,85)                                ZANLYN    156
              C                                                               ZANLYN    157
              C                                                               ZANLYN    158
              C                    WARNING ERROR , ITMAX = MAXIMUM            ZANLYN    159
              180 IER       =  33                                             ZANLYN    160
160             GOTO 100                                                      ZANLYN    161
              185 IF ( IER .EQ. 0 )        GO TO 9005                         ZANLYN    162
                CALL UERTST (IER,NAME)                                        ZANLYN    163
              C                                                               ZANLYN    164
              C     FORMATS                                                   ZANLYN    165
165           C                                                               ZANLYN    166
              200 FORMAT (1H1,/ 5X37HOUTPUT FROM SUBROUTINE ZANLYN FOR V =,F12.3 /  ZANLYN  167
                 1        7X4HITER,12X13HAPPROXIMATION,23X14HFUNCTION VALUE,  ZANLYN    168
                2         23X9HINCREMENT, /9X3HNO., /)                        ZANLYN    169
              300 FORMAT (2X,I3,2X,A4,3(1PE20.7,E16.7))                       ZANLYN    170
170           400 FORMAT (7X,I4,3(1PE20.7,E16.7))                             ZANLYN    171
              C                                                               ZANLYN    172
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      9005 RETURN                                                    ZANLYN    173
           END                                                       ZANLYN    174
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SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	ZANLYN	1	172

VARIABLES		SN	TYPE		RELOCATION								
651	BI		COMPLEX			REFS	20	2*94	97	98	DEFINED	93	
613	D		COMPLEX			REFS	19	88	2*89	92	DEFINED	85	127
615	DD		COMPLEX			REFS	19	2*90	91	DEFINED	88		
617	DEN		COMPLEX			REFS	19	96	2*105	108	DEFINED	94	101
						103	107						
621	DI		COMPLEX			REFS	19	109	120	127	DEFINED	108	120
3	EM		REAL		FACE	REFS	26	149					
0	EPS		REAL		F.P.	REFS	153	DEFINED	1				
662	EPS1		REAL			REFS	113	DEFINED	39				
0	F		COMPLEX		F.P.	REFS	19	130	143	DEFINED	1		
1	FACT		REAL		FACE	REFS	26	148	DEFINED	43	148		
623	FRT		COMPLEX			REFS	19	55	63	73	77	83	2*116
						126	130	133	143	2*145	146	150	2*152
						DEFINED	146						
625	G	*	COMPLEX	*UNDEF		REFS	19						
627	H		COMPLEX			REFS	20	52	60	64	66	84	109
						110	2*112	121	122	133	150		
						DEFINED	51	59	65	80	86	109	121
655	HSTART		COMPLEX			REFS	21	51	59	65	86		
						DEFINED	48	79					
663	ICONJ	*	INTEGER			DEFINED	40						
0	IER		INTEGER		F.P.	REFS	161	162	DEFINED	1	37	159	
661	III		INTEGER			REFS	36	DEFINED	35				
0	INFER		INTEGER	ARRAY	F.P.	REFS	24	DEFINED	1	36	135		
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	23	27	33				
657	ITAPEW		INTEGER			DEFINED	33	I/O REFS	46	58	64	84	133
						150							
0	ITMAX		INTEGER		F.P.	REFS	142	DEFINED	1				
666	JK		INTEGER			REFS	64	84	132	2*133	135	141	142
						144	2*150	DEFINED	47	132	141		
665	L		INTEGER			REFS	48	2*49	52	56	131	135	136
						137	138	139	140	DEFINED	45	136	139
664	LO		INTEGER			REFS	130	143	147	148	DEFINED	44	137
671	L1		INTEGER			REFS	57	DEFINED	56				
672	L11		INTEGER			REFS	58	DEFINED	57				
660	MM		INTEGER			REFS	35	140	DEFINED	34			
0	N		INTEGER		F.P.	REFS	34	46	58	64	84	133	150
						DEFINED	1						
673	NAME		INTEGER	ARRAY		REFS	22	162	DEFINED	30			
0	NGUESS		INTEGER	*UNUSED	F.P.	DEFINED	1						
670	NN		INTEGER			REFS	155	DEFINED	53	61	67	71	75
						81	114						
0	NSIG		INTEGER		F.P.	REFS	39	DEFINED	1				
611	ONE		COMPLEX			REFS	19	70	74	79	80	88	107

VARIABLES	SN	TYPE	RELOCATION								
				DEFINED	38						
2	PROD	REAL	FACE	REFS	26	148	149	DEFINED	42		
667	QZ	REAL		REFS	50	100	106	113	117	153	
				DEFINED	49	99	105	112	116	152	
4	ROWS	REAL	FACE	REFS	26	149	DEFINED	149			
631	RT	COMPLEX		REFS	20	58	60	64	66	84	110
				2*112	122	130	131	133	138	143	150
				DEFINED	52	60	66	70	74	78	110
				122							
0	SCALE	REAL	FACE	REFS	26	146	149	DEFINED	41	145	
502	SKIP	REAL		REFS	58	DEFINED	31				
641	TEM	* COMPLEX	*UNDEF	REFS	20						
633	T1	COMPLEX		REFS	20	93	94	97	98		
				DEFINED	89	96					
635	T2	COMPLEX		REFS	20	93	94	2*99	103		
				DEFINED	90	97					
637	T3	COMPLEX		REFS	20	93	94	2*99	101		
				DEFINED	92	98					
5	VELOC	REAL	FACE	REFS	26	46					
0	X	COMPLEX	ARRAY F.P.	REFS	19	48	2*49	52	130	143	
				DEFINED	1	131	138				
653	XX	COMPLEX		REFS	20	93	2*94	108	DEFINED	91	
643	XO	COMPLEX		REFS	20	58	89	DEFINED	55	73	124
645	X1	COMPLEX		REFS	20	64	90	124	DEFINED	63	77
				125							
647	X2	COMPLEX		REFS	20	84	91	92	2*116	125	
				DEFINED	83	126					

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES	
ASSESS		6		130	143
CSQRT	COMPLEX	1	LIBRARY	96	
UERTST		2		162	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES						
ABS	REAL	1	INTRIN		2*49	4*99	2*105	2*112	4*116	2*145	2*152
AIMAG	REAL	1	INTRIN		49	2*99	105	112	2*116	145	152
CMPLX	COMPLEX	2	INTRIN		48						
CONJG	COMPLEX	1	INTRIN		138						
FLOAT	REAL	1	INTRIN		148						
IABS	INTEGER	1	INTRIN		34						
REAL	REAL	1	INTRIN		48	49	2*99	105	112	2*116	145	152
SIZE	REAL	1	SF	32	49	2*99	105	112	2*116	145	152

STATEMENT LABELS			DEF LINE	REFERENCES		
442	2		150	144		
35	5		47	2*140		
0	10	INACTIVE	51			
54	15		55	53	155	
74	20		63	61	155	
111	25		70	50		
116	30		73	71	155	
126	35		77	75	155	
141	40		83	67	81	155
0	45	INACTIVE	85			
154	50		88	128		
0	55	INACTIVE	101			

STATEMENT LABELS			DEF LINE	REFERENCES						
263	60		103	100						
266	65		105	102						
0	70	INACTIVE	107							
276	75		108	106						
0	80	INACTIVE	114							
326	85		116	114	155					
0	90	INACTIVE	120							
347	95		124	117						
362	100		130	113	160					
366	105		131	154						
436	120		149	147						
413	135		141	54	62	68	72	76	82	115	123
455	170		155	153						
457	180		159	142						
461	185		161	140						
552	200	FMT	166	46						
570	300	FMT	169	58						
574	400	FMT	170	64	84	133	150			
0	500		36	35						
465	9005		172	161						

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	500	III	35 36	28	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
FACE	6	0 SCALE	(1)	1 FACT	(1)	2 PROD	(1)
		3 EM	(1)	4 ROWS	(1)	5 VELOC	(1)
CTAPES	50	0 ITAPES	(50)				

STATISTICS

PROGRAM LENGTH	675B	445
CM LABELED COMMON LENGTH	70B	56

52000B CM USED

```
      1                 COMPLEX FUNCTION F(Z)                                          F         2
                  C                                                                    F         3
                  C     FUNCTION TO DETERMINE FLUTTER DETERMINANT FOR P-K METHOD        F         4
                  C                                                                    F         5
      5                 DIMENSION ENT(40), WW(40,40), OMM(40), OMG(40), NIND(40), LC(40) F         6
                  C                                                                    F         7
                        COMPLEX B(40,40), DETAD(40,40), BB(40,40), QRS(40,40)          F         8
                        COMPLEX Z, QV, CDET                                            F         9
                        COMMON /CTAPES/ ITAPES(50)                                     F        10
     10                 COMMON /COMA  / LC,BR                                          F        11
                        COMMON /FLEXT / BB, OMG, RHO, VB                               F        12
                        COMMON / FLUTV / VL, VH, FLO, FHI, IE, NQZ, NVTOT              F        13
                        COMMON /FACE/ SCALE , FACT , PROD , EM , ROWS , VELOC          F        14
                        COMMON /FITR  / NOMI, NIND                                     F        15
     15                 COMMON /MODD  / B, DETAD, WW, OMM, NC                          F        16
                  C                                                                    F        17
                        ITAPE = ITAPES(50)                                             F        18
                        NQ  = LC(2)                                                    F        19
                        MID = 40                                                       F        20
     20                 QV = Z * Z * VB * VB                                           F        21
                        VBB       =  AMAX1 (1.E-5,ABS(AIMAG(Z)))                       F        22
                        VBO       =  1.0 / VBB                                         F        23
                        CALL QFLIN (ITAPE,VBO,QRS,RHO,0,MID)                           F        24
                        XX        =  RHO * VBO * BR                                    F        25
     25                 XXX       =   XX * VBO * BR                                    F        26
                        DO 1 I = 1,NQ                                                  F        27
                        DO 1 J = 1,NQ                                                  F        28
                        IF ( AIMAG(Z)  LT. 0.0 )     QRS(I,J) = CONJG(QRS(I,J))        F        29
                        QRS(I,J)  =  - QRS(I,J) * RHO * (VB * AIMAG(Z))**2             F        30
     30           C     ---------------------------------------------------------------- F        31
                  C     --------- ADD STIFFNESS TERMS ---------------------------------- F        32
                        QRS(I,J)  =  QRS(I,J) + BB(I,J)                                F        33
                       1          + CMPLX(REAL(DETAD(I,J))*XXX,AIMAG(DETAD(I,J))*XX)   F        34
                  C     ---------------------------------------------------------------- F        35
     35           C     --------- ADD MASS TERMS ----------------------------------------- F        36
                      1 QRS(I,J)  = QRS(I,J) + QV * WW(I,J)                            F        37
                  C                                                                    F        38
                        IF ( NQZ .NE. NQ )   CALL CONV (NQ,NQZ,NOMI,NIND,QRS)          F        39
                        DO 3  I = 1,NQZ                                                F        40
     40                 DO 3  J = 1,NQZ                                                F        41
                      3 QRS(I,J)  =  QRS(I,J) * ROWS                                   F        42
                        F = CDET (QRS,NQZ,MID,ENT,NIX)                                 F        43
                        RETURN                                                         F        44
                        END                                                            F        45
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
5	F	1	43

VARIABLES	SN	TYPE		RELOCATION				
0	B	COMPLEX	ARRAY	MODD	REFS	7	15	
0	BB	COMPLEX	ARRAY	FLEXT	REFS	7	11	32

```
      SUBROUTINE FRORD (NV,NQ,V,SOL,BR,KPNT,VELCR,KCR,MID,KEXT,NVA)
C
C     ORDERING ROUTINE FOR FLUTTER SOLUTION BY EXTRAPOLATION
C
      DIMENSION FRR(40), DRR(40), IORD(40), IPERM(40)
      DIMENSION V(1), VV(3), VOT(3)
      DIMENSION ITAPES(50)
C
      COMPLEX SOL(MID,1), SOLL(40), RLLT, RLT(3)
C
      COMMON/CTAPES/ ITAPES
C
      CONST    =  1.6878 / (BR*6.2832)
      ITAPEW = ITAPES(6)
C
      DO 1   I = 1,NV
      IF ( KEXT .NE. 0 .AND. I  NE. NVA )    GO TO 1
      IF ( I  GE. 3 )          GO TO 18
      DO 19  J = 1,NQ
   19 FRR(J)  =  AIMAG (SOL(J,I)) * V(I) * CONST
      CALL AORDER ( FRR , NQ , IPERM , 1 )
      DO 20  J = 1,NQ
      JJ       =  IPERM (J)
   20 SOLL(J)  =  SOL (JJ,I)
      DO 21  J = 1,NQ
   21 SOL(J,I)  =  SOLL (J)
      IF ( KEXT .NE. 0 )       GO TO 500
      GO TO 1
   18 DO 2  J = 1,NQ
    2 SOLL(J)  =  SOL(J,I)
      IF ( I .GT. 3 )    GO TO 100
      DO 3  J = 1,2
      VOT(J)   =  1.0
      DO 3  K = 1,2
      IF ( K .EQ. J )          GO TO 3
      VOT(J)   =  VOT(J) * (V(3)-V(K)) / (V(J)-V(K))
    3 CONTINUE
      DO 13  J = 1,NQ
      DO 16  K = 1,2
      A = AIMAG(SOL(J,K))*V(K)*CONST
      B = REAL(SOL(J,K))/AIMAG(SOL(J,K))
   16 RLT(K) = CMPLX(B,A)
      RLLT     =  CMPLX (0.0,0.0)
      DO 17  K = 1,2
   17 RLLT     =  RLLT + VOT(K) * RLT(K)
      FRR(J) = AIMAG(RLLT)
   13 DRR(J) = REAL(RLLT)
      GO TO 200
  100 KQ       =  I - 4
      DO 4  J = 1,3
      KQ       =  KQ + 1
    4 VV(J)    =  V (KQ)
      DO 6  J = 1,3
      VOT(J)   =  1.0
      DO 6  K = 1,3
      IF ( K .EQ. J )    GO TO 6
      VOT(J)   =  VOT(J) * (V(I)-VV(K)) / (VV(J)-VV(K))
```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
17	100	I	10 11	11B	OPT

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

FACE 6

0 SCALE (1) 1 FACT (1) 2 PROD (1)
3 EM (1) 4 ROWS (1) 5 VELOC (1)

STATISTICS

PROGRAM LENGTH	66B	54
CM LABELED COMMON LENGTH	6B	6

520000B CM USED

```
      1              SUBROUTINE ASSESS (G, FA, ROOT, N, Z, KASES)                    ASSESS     2
                     COMPLEX    FA                                                   ASSESS     3
                     COMPLEX G                                                       ASSESS     4
                     COMPLEX     F,  ROOT,  Z,  WO                                   ASSESS     5
      5              COMMON /FACE/ SCALE , FACT , PROD , EM , ROWS , VELOC           ASSESS     6
                     DIMENSION ROOT (1)                                              ASSESS     7
                   101 CONTINUE                                                      ASSESS     8
                     G = CMPLX(1.0,0.0)                                              ASSESS     9
                     IF (N.EQ.0)  GO TO 110                                          ASSESS    10
     10              DO 100 I = 1,N                                                  ASSESS    11
                   100 G       =  (Z - ROOT(I)) * G * FACT                         ASSESS    12
                     IF (ABS(REAL(G)) + ABS(AIMAG(G)).LT.1.0E-40) G=CMPLX(1.0E-40,0.0) ASSESS  13
                     PROD      =  ABS(REAL(G)) + ABS(AIMAG(G))                     ASSESS    14
                   110 G       =  F(Z) / G                                         ASSESS    15
     15              RETURN                                                          ASSESS    16
                     END                                                             ASSESS    17
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	ASSESS	1	15

VARIABLES

		SN	TYPE	RELOCATION								
3	EM		REAL	FACE	REFS	5						
0	FA		COMPLEX	*UNUSED F.P.	REFS	2	DEFINED	1				
1	FACT		REAL	FACE	REFS	5	11					
0	G		COMPLEX	F.P.	REFS	3	11	2*12	2*13	14		
					DEFINED	1	8	11	12	14		
62	I		INTEGER		REFS	11	DEFINED	10				
0	KASES		INTEGER	*UNUSED F.P.	DEFINED	1						
0	N		INTEGER	F.P.	REFS	9	10	DEFINED	1			
2	PROD		REAL	FACE	REFS	5	DEFINED	13				
0	ROOT		COMPLEX	ARRAY F.P.	REFS	4	6	11	DEFINED	1		
4	ROWS		REAL	FACE	REFS	5						
0	SCALE		REAL	FACE	REFS	5						
5	VELOC		REAL	FACE	REFS	5						
60	WO	*	COMPLEX	*UNDEF	REFS	4						
0	Z		COMPLEX	F.P.	REFS	4	11	14	DEFINED	1		

EXTERNALS

	TYPE	ARGS	REFERENCES	
F	COMPLEX	1	4	14

INLINE FUNCTIONS

	TYPE	ARGS		DEF LINE	REFERENCES	
ABS	REAL	1	INTRIN		2*12	2*13
AIMAG	REAL	1	INTRIN		12	13
CMPLX	COMPLEX	2	INTRIN		8	12
REAL	REAL	1	INTRIN		12	13

STATEMENT LABELS

			DEF LINE	REFERENCES
0	100		11	10
0	101	INACTIVE	7	
43	110		14	9

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
132	6	I	39 44	228	NOT INNER
142	6	J	41 44	68	INSTACK
155	7	I	45 54	438	NOT INNER
167	8	J	47 49	58	INSTACK
202	9	J	51 52	68	INSTACK

STATISTICS

PROGRAM LENGTH 273B 187

520000B CM USED

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES		
3	RTIN	1	15	31	55

VARIABLES	SN	TYPE		RELOCATION								
225	I	INTEGER			REFS	2*13	2*14	2*20	22	3*23	28	29
						30	38	2*40	42	3*43	49	53	54
					DEFINED	12	19	25	36	39	45	
227	J	INTEGER			REFS	22	2*23	2*28	42	2*43	49	2*52
					DEFINED	21	27	41	47	51		
0	K	INTEGER		F.P.	REFS	9	2*11	13	16	18	20	23
						35	40	43	46	DEFINED	1	
226	KK	INTEGER			REFS	19	21	27	DEFINED	18		
230	KQ	INTEGER			REFS	37	38	48	49	DEFINED	35	37
						46	48					
0	LINP	INTEGER		F P.	REFS	9	DEFINED	1				
0	MID	INTEGER		F P.	REFS	6	DEFINED	1				
0	N	INTEGER		F.P.	REFS	12	25	45	DEFINED	1		
222	RLLT	COMPLEX			REFS	7	28	29	30	52	53	54
					DEFINED	26	28	50	52			
241	RLT	COMPLEX	ARRAY		REFS	6	52	DEFINED	49			
0	ROOT	COMPLEX	ARRAY	F.P.	REFS	6	14	DEFINED	1	13	14	29
						30	53	54				
0	SOL	COMPLEX	ARRAY	F.P.	REFS	6	13	28	49	DEFINED	1	
0	V	REAL	ARRAY	F.P.	REFS	5	2*11	2*20	4*23	38	40	43
					DEFINED	1						
235	VOT	REAL	ARRAY		REFS	5	23	28	43	52		
					DEFINED	20	23	40	43			
231	VV	REAL	ARRAY		REFS	5	40	3*43	DEFINED	38		
224	VVO	REAL			REFS	13	DEFINED	11				

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES		
CMPLX	COMPLEX	2	INTRIN		26	50	
CONJG	COMPLEX	1	INTRIN		14	30	54

STATEMENT LABELS		DEF LINE	REFERENCES		
0	1	14	12		
62	2	24	19	21	22
0	3	30	25		
0	4	28	27		
0	5	38	36		
147	6	44	39	41	42
0	7	54	45		
0	8	49	47		
0	9	52	51		
37	10	16	9		
116	100	35	16		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
31	1	I	12 14	5B	INSTACK
44	2	I	19 24	23B	NOT INNER
55	2	J	21 24	6B	INSTACK
70	3	I	25 30	25B	NOT INNER
100	4	J	27 28	5B	INSTACK
125	5	I	36 38	3B	INSTACK

```
      SUBROUTINE RTIN (N,SOL,ROOT,K,V,MID,LINP)                          RTIN      2
C                                                                        RTIN      3
C     ROOT PREDICTOR ROUTINE USING LAGRANGIAN INTERPOLATION              RTIN      4
C                                                                        RTIN      5
      DIMENSION           V(1) ,       VV(4) ,       VOT(4)              RTIN      6
      COMPLEX       SOL(MID,1) ,     ROOT(1) ,       RLT(4)              RTIN      7
      COMPLEX             RLLT                                           RTIN      8
C                                                                        RTIN      9
      IF ( K .GT. 2 .AND. LINP .NE. 0 )      GO TO 10                    RTIN     10
C           ONE KNOWN SET OF ROOTS                                       RTIN     11
      VVO       = V(K-1) / V(K)                                          RTIN     12
      DO 1  I = 1,N                                                      RTIN     13
      ROOT(2*I-1)  =  VVO * SOL(I,K-1)                                   RTIN     14
    1 ROOT(2*I)    =  CONJG (ROOT(2*I-1))                                RTIN     15
      RETURN                                                             RTIN     16
   10 IF ( K .GT. 5 )         GO TO 100                                  RTIN     17
C           UP TO FOUR KNOWN SETS OF ROOTS                               RTIN     18
      KK        = K - 1                                                  RTIN     19
      DO 2  I = 1,KK                                                     RTIN     20
      VOT(I)    = V(I) / V(K)                                            RTIN     21
      DO 2  J = 1,KK                                                     RTIN     22
      IF ( J .EQ. I )          GO TO 2                                   RTIN     23
      VOT(I)    = VOT(I) * (V(K)-V(J)) / (V(I)-V(J))                     RTIN     24
    2 CONTINUE                                                           RTIN     25
      DO 3  I = 1,N                                                      RTIN     26
      RLLT      = CMPLX (0.0,0.0)                                        RTIN     27
      DO4   J = 1,KK                                                     RTIN     28
    4 RLLT      = RLLT + VOT(J) * SOL(I,J)                               RTIN     29
      ROOT(2*I-1)    =  RLLT                                           RTIN     30
    3 ROOT(2*I)     =  CONJG (RLLT)                                      RTIN     31
      RETURN                                                             RTIN     32
C           MORE THAN FOUR KNOWN SETS OF ROOTS                           RTIN     33
C           RESTRICTION TO CUBIC FIT                                     RTIN     34
C                                                                        RTIN     35
  100 KQ        = K - 5                                                  RTIN     36
      DO 5  I = 1,4                                                      RTIN     37
      KQ        = KQ + 1                                                 RTIN     38
    5 VV(I)     = V(KQ)                                                  RTIN     39
      DO 6  I = 1,4                                                      RTIN     40
      VOT(I)    = VV(I) / V(K)                                           RTIN     41
      DO 6  J = 1,4                                                      RTIN     42
      IF ( J .EQ. I )          GO TO 6                                   RTIN     43
      VOT(I)    = VOT(I) * (V(K)-VV(J)) / (VV(I)-VV(J))                  RTIN     44
    6 CONTINUE                                                           RTIN     45
      DO 7  I = 1,N                                                      RTIN     46
      KQ        = K - 5                                                  RTIN     47
      DO 8  J = 1,4                                                      RTIN     48
      KQ        = KQ + 1                                                 RTIN     49
    8 RLT(J)    = SOL (I,KQ)                                             RTIN     50
      RLLT      = CMPLX (0.0,0.0)                                        RTIN     51
      DO 9  J = 1,4                                                      RTIN     52
    9 RLLT      = RLLT + VOT(J) * RLT(J)                                 RTIN     53
      ROOT(2*I-1)    =  RLLT                                           RTIN     54
    7 ROOT(2*I)     =  CONJG (RLLT)                                      RTIN     55
      RETURN                                                             RTIN     56
      END                                                                RTIN     57
```

```
VARIABLES      SN  TYPE            RELOCATION
   56  WARF        INTEGER                          REFS        6          7         23
   55  WARN        INTEGER                          REFS        6          7         15
       VARIABLES USED AS FILE NAMES, SEE ABOVE

STATEMENT LABELS                  DEF LINE    REFERENCES
   13  5                             19          15
   17  10                            23          19
   23  15                            28          23
   24  20                            30          18          22          26
   43  25        FMT                 33          32

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       CTAPES        50              0 ITAPES (50)

EQUIV CLASSES    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       IBIT           4              0 WARN   (1)                1 WARF   (1)              2 TERM   (1)

STATISTICS
  PROGRAM LENGTH                  105B        69
  CM LABELED COMMON LENGTH         62B        50
          52000B CM USED
```

```
      SUBROUTINE UERTST (IER,NAME)                                      UERTST     2
C                                                                       UERTST     3
      DIMENSION ITAPES(50),NAME(2)                                      UERTST     4
      DIMENSION     ITYP(5,4)  ,  IBIT(4)                               UERTST     5
      COMMON /CTAPES / ITAPES                                           UERTST     6
      INTEGER       WARN , WARF , TERM                                  UERTST     7
      EQUIVALENCE   (IBIT(1),WARN),(IBIT(2),WARF),(IBIT(3),TERM)        UERTST     8
      DATA ITYP  /4HWARN,4HING ,4H    ,4H    ,4H    ,                  UERTST     9
     1            4HWARN,4HING(,4HWITH,4H FIX,4H    ,                  UERTST    10
     2            4HTERM,4HINAL,4H    ,4H    ,4H    ,                  UERTST    11
     3            4HNON-,4HDEFI,4HNED ,4H    ,4H    /                  UERTST    12
      DATA  IBIT /32,64,128,0/                                          UERTST    13
      ITAPEW  =  ITAPES(6)                                              UERTST    14
      IER2    =  IER                                                    UERTST    15
      IF ( IER2 .GE. WARN )   GO TO 5                                   UERTST    16
C                     NON - DEFINED                                     UERTST    17
      IER1    =  4                                                      UERTST    18
      GO TO 20                                                          UERTST    19
    5 IF ( IER2 .LT. TERM )   GO TO 10                                  UERTST    20
C                     TERMINAL                                          UERTST    21
      IER1    =  3                                                      UERTST    22
      GO TO 20                                                          UERTST    23
   10 IF ( IER2 .LT. WARF )   GO TO 15                                  UERTST    24
C                     WARNING (WITH FIX)                                UERTST    25
      IER1    =  2                                                      UERTST    26
      GO TO 20                                                          UERTST    27
C                     WARNING                                           UERTST    28
   15 IER1    =  1                                                      UERTST    29
C                     EXTRACT 'N'                                       UERTST    30
   20 IER2    =  IER2 - IBIT(IER1)                                      UERTST    31
C                     PRINT ERROR MESSAGE                               UERTST    32
      WRITE (ITAPEW,25)  (ITYP(I,IER1),I=1,5) , NAME , IER2             UERTST    33
   25 FORMAT (2X,20H*** IMSL(UERTST) ***,5A4,4X,2A4,4X,I2)              UERTST    34
      RETURN                                                            UERTST    35
      END                                                               UERTST    36
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	UERTST	1	34

VARIABLES

		SN	TYPE		RELOCATION								
54	I		INTEGER			REFS	32	DEFINED	32				
55	IBIT		INTEGER	ARRAY		REFS	4	3*7	30	DEFINED	12		
0	IER		INTEGER		F.P.	REFS	14	DEFINED	1				
53	IER1		INTEGER			REFS	30	32	DEFINED	17	21	25	28
52	IER2		INTEGER			REFS	15	19	23	30	32		
						DEFINED	14	30					
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	3	5	13				
51	ITAPEW		INTEGER			DEFINED	13	I/O REFS	32				
61	ITYP		INTEGER	ARRAY		REFS	4	32	DEFINED	8			
0	NAME		INTEGER	ARRAY	F.P.	REFS	3	32	DEFINED	1			
57	TERM		INTEGER			REFS	6	7	19				

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES			
ABS	REAL	1	INTRIN	2*34	38	2*45	2*58
AIMAG	REAL	1	INTRIN	34	45	58	
AMAX1	REAL	0	INTRIN	34	45		
CAP	REAL	1	SF 16	34	45	58	
IABS	INTEGER	1	INTRIN	20	3*85	3*97	
IFOOL	INTEGER	3	SF 17	85	97		
REAL	REAL	1	INTRIN	34	45	58	

STATEMENT LABELS			DEF LINE	REFERENCES	
0	100	INACTIVE	22	21	
16	110		24	2*21	
20	120		25	23	
0	130	INACTIVE	27		
0	133		35	33	
0	135	INACTIVE	37	36	
0	136		39	31	
0	140		47	44	
0	150	INACTIVE	54	2*53	
110	160		55	53	
0	170	INACTIVE	58	2*57	
0	180	INACTIVE	60	59	
135	189		62	57	2*59
0	190		64	51	
0	230	INACTIVE	66	65	
0	240	INACTIVE	70	69	
0	250		78	71	
202	260		80	2*69	
0	270	INACTIVE	82	2*81	
0	280		87	83	
231	290		88	81	
0	300		91	40	
0	310	INACTIVE	93	2*92	
0	320		99	95	
266	330		101	92	
267	340		102	105	
270	350		103	2*36	2*65

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
32	136	K1	31 39	24B		EXITS	NOT INNER	
40	133	KJ	33 35	6B	INSTACK			
57	300	K1	40 91	161B		EXT REFS	EXITS	NOT INNER
67	140	IK	44 47	6B	INSTACK			
103	190	IK	51 64	36B		EXT REFS		
165	250	KJ	71 78	13B	OPT			
220	280	IK	83 87	10B	OPT			
253	320	KK	95 99	10B	OPT			

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
L1	1	0 EL (1)

STATISTICS

PROGRAM LENGTH 405B 261

52000B CM USED

ENTRY POINTS DEF LINE REFERENCES
5 CDET 1 102

VARIABLES SN TYPE RELOCATION

0	A	COMPLEX	ARRAY	F.P.	REFS	13	14	2*34	2*45	55	2*56	2*58
					74	75	82	86	98	DEFINED	1	56
					75	76	86					
320	CDET	COMPLEX			DEFINED	100	104					
331	D	REAL			REFS	79	92	93	DEFINED	22	24	79
327	DELTA	REAL			REFS	25	DEFINED	19				
357	EL	REAL			REFS	15	68					
0	ENT	REAL	ARRAY	F.P.	REFS	14	45	58	66	67		
					DEFINED	1	38	67	68			
332	EPS	REAL			REFS	2*26	48	DEFINED	25	26		
340	G	REAL			REFS	34	36	38	45	48	59	65
					68	DEFINED	32	34	42	45	49	60
					66							
324	H	COMPLEX			REFS	13	76	86	98	100		
					DEFINED	74	82	93	98			
342	I	INTEGER			REFS	45	46	DEFINED	43	46		
343	IK	INTEGER			REFS	2*45	55	56	2*58	84	2*85	
					DEFINED	44	51	83				
355	IKD	INTEGER			REFS	85	2*86	DEFINED	84	85		
326	IZERO	INTEGER			REFS	72	73	84	96	DEFINED	18	
345	I1	INTEGER			REFS	52	54	56	58	61	63	
					DEFINED	50	63					
346	J	INTEGER			REFS	53	57	DEFINED	52			
334	KB	INTEGER			REFS	44	51	56	88	89		
					DEFINED	28	88					
341	KJ	INTEGER			REFS	2*34	72	DEFINED	33	71		
352	KJD	INTEGER			REFS	74	75	DEFINED	72			
333	KK	INTEGER			REFS	80	82	96	2*97	DEFINED	27	89
					95							
356	KKD	INTEGER			REFS	97	98	DEFINED	96	97		
354	KK1	INTEGER			REFS	81	83	2*85	DEFINED	80		
337	K1	INTEGER			REFS	33	38	52	67	68	69	71
					89	103	DEFINED	31	40			
347	L	INTEGER			REFS	56	DEFINED	54				
336	LAST	INTEGER			REFS	33	71	95	2*97	DEFINED	30	
351	LJ	INTEGER			REFS	73	77	DEFINED	70	77		
353	LJD	INTEGER			REFS	75	76	DEFINED	73			
357	L1	INTEGER			REFS	15	66	67	69	70	95	2*97
					DEFINED	61	94					
0	M	INTEGER		F.P.	REFS	20	21	DEFINED	1			
0	MID	INTEGER		F.P.	REFS	30	33	56	71	77	88	90
					94	DEFINED	1					
330	N	INTEGER			REFS	29	30	31	40	DEFINED	20	
0	NIX	INTEGER		F.P.	DEFINED	1	101	103				
335	NK	INTEGER			REFS	44	51	81	83	2*85	90	
					DEFINED	29	90					
350	P	REAL			REFS	59	60	DEFINED	58			
322	SUM	COMPLEX			REFS	10	56	DEFINED	55			
344	TOL	REAL			REFS	65	DEFINED	48				

EXTERNALS TYPE ARGS REFERENCES

ANDOR	REAL	3	68	
COMSCA	COMPLEX	6	13	56

```
                170 P = CAP(A(IK)) * ENT(I1)                                    CDET       59
                    IF (P-G) 189,189,180                                        CDET       60
60              180 G = P                                                       CDET       61
                    L1 = I1                                                     CDET       62
                189 CONTINUE                                                    CDET       63
                    I1     =  I1 + 1                                            CDET       64
                190 CONTINUE                                                    CDET       65
65                  IF (G - TOL) 350,350,230                                    CDET       66
                230 G = ENT(L1)                                                 CDET       67
                    ENT(L1) = ENT(K1)                                           CDET       68
                    ENT(K1)  =  ANDOR(EL, G, 1)                                 CDET       69
                    IF (L1 - K1) 260,260,240                                    CDET       70
70              240 LJ = L1                                                     CDET       71
                    DO 250  KJ = K1,LAST,MID                                    CDET       72
                    KJD = KJ + IZERO                                            CDET       73
                    LJD = LJ + IZERO                                            CDET       74
                    H = A(KJD)                                                  CDET       75
75                  A(KJD) = A(LJD)                                             CDET       76
                    A(LJD) = H                                                  CDET       77
                    LJ     =  LJ + MID                                          CDET       78
                250 CONTINUE                                                    CDET       79
                    D = -D                                                      CDET       80
80              260 KK1 = KK + 1                                                CDET       81
                    IF (KK1 - NK) 270,270,290                                   CDET       82
                270 H = -A(KK)                                                  CDET       83
                    DO 280  IK = KK1,NK                                         CDET       84
                    IKD = IK + IZERO                                            CDET       85
85                  IKD = IKD + IFOOL(IK,KK1,NK)                                CDET       86
                    A(IKD) = A(IKD)/H                                           CDET       87
                280 CONTINUE                                                    CDET       88
                290 KB = KB + MID                                               CDET       89
                    KK = KB + K1                                                CDET       90
90                  NK = NK + MID                                               CDET       91
                300 CONTINUE                                                    CDET       92
                    IF (D) 310,330,310                                          CDET       93
                310 H = D                                                       CDET       94
                    L1 = MID + 1                                                CDET       95
95                  DO 320  KK = 1,LAST,L1                                      CDET       96
                    KKD = KK + IZERO                                            CDET       97
                    KKD = KKD + IFOOL(KK,LAST,L1)                               CDET       98
                    H   = H * A(KKD)                                            CDET       99
                320 CONTINUE                                                    CDET      100
100                 CDET = H                                                    CDET      101
                330 NIX = 0                                                     CDET      102
                340 RETURN                                                      CDET      103
                350 NIX = -K1                                                   CDET      104
                    CDET = (0.,0.)                                              CDET      105
105                 GO TO 340                                                   CDET      106
                    END                                                         CDET      107
```

SYMBOLIC REFERENCE MAP (R=3)

```
      COMPLEX FUNCTION CDET (A,M,MID,ENT,NIX)                          CDET       2
C                                                                      CDET       3
C  TRIANGULAR DECOMPOSITION WITH OPTIONAL DETERMINANT CALCULATION.     CDET       4
C                                                                      CDET       5
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS    CDET       6
C     COMPLEX*16 SUM                                                   CDET       7
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS       CDET       8
C                                                                      CDET       9
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS    CDET      10
      COMPLEX SUM                                                      CDET      11
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS       CDET      12
C                                                                      CDET      13
      COMPLEX    A, H, COMSCA                                          CDET      14
      DIMENSION A(1),ENT(1)                                            CDET      15
      EQUIVALENCE (L1,EL)                                              CDET      16
      CAP(H) = ABS(REAL(H)) + ABS( AIMAG(H))                           CDET      17
      IFOOL(I,J,K) = IABS(I-I) + IABS(J-J) + IABS(K-K)                 CDET      18
      IZERO = 0                                                        CDET      19
      DELTA    =  1.0E-10                                              CDET      20
      N = IABS(M)                                                      CDET      21
      IF (M)  100, 110, 110                                            CDET      22
  100 D = 0.                                                           CDET      23
      GO TO 120                                                        CDET      24
  110 D = 1.                                                           CDET      25
  120 EPS = DELTA                                                      CDET      26
      IF (EPS .LT. 0.  .OR.  EPS .GT. 1.E-5)  EPS = 3.E-7              CDET      27
  130 KK = 1                                                           CDET      28
      KB = 1                                                           CDET      29
      NK = N                                                           CDET      30
      LAST = N*MID                                                     CDET      31
      DO 136  K1 = 1,N                                                 CDET      32
      G = 0.                                                           CDET      33
      DO 133  KJ = K1,LAST,MID                                         CDET      34
      G       =  AMAX1(G,CAP(A(KJ)))                                   CDET      35
  133  )NTINUE                                                         CDET      36
        (G - 1.E-70) 350, 350, 135                                     CDET      37
  135 CONTINUE                                                         CDET      38
      ENT(K1) =  ABS(4./G)                                             CDET      39
  136 CONTINUE                                                         CDET      40
      DO 300  K1 = 1,N                                                 CDET      41
C   SET G TO MAX. ELT. OF (IMPLICITLY) SCALED ORIGINAL COLUMN K.       CDET      42
      G = 0.                                                           CDET      43
      I = 1                                                            CDET      44
      DO 140  IK = KB,NK                                               CDET      45
      G = AMAX1(G,ENT(I)*CAP(A(IK)))                                   CDET      46
      I       =  I + 1                                                 CDET      47
  140 CONTINUE                                                         CDET      48
      TOL = G * EPS                                                    CDET      49
      G = 0.                                                           CDET      50
      I1 = 1                                                           CDET      51
      DO 190  IK = KB,NK                                               CDET      52
      J = I1 - K1                                                      CDET      53
      IF (J) 150,150,160                                               CDET      54
  150 L = I1 - 1                                                       CDET      55
  160 SUM = A(IK)                                                      CDET      56
      A(IK) = COMSCA(A(I1),A(KB),SUM,L,MID,1)                          CDET      57
      IF (J) 189,170,170                                               CDET      58
```

STATEMENT LABELS	DEF LINE	REFERENCES	
0 1	36	26	27
0 3	41	39	40

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
35	1	I	26 36	35B	NOT INNER
46	1	J	27 36	21B	OPT
77	3	I	39 41	15B	NOT INNER
105	3	J	40 41	4B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
CTAPES	50	0	ITAPES	(50)						
COMA	41	0	LC	(40)	40	BR	(1)			
FLEXT	3242	0	BB	(3200)	3200	OMG	(40)	3240	RHO	(1)
		3241	VB	(1)						
FLUTV	7	0	VL	(1)	1	VH	(1)	2	FLO	(1)
		3	FHI	(1)	4	IE	(1)	5	NQZ	(1)
		6	NVTOT	(1)						
FACE	6	0	SCALE	(1)	1	FACT	(1)	2	PROD	(1)
		3	EM	(1)	4	ROWS	(1)	5	VELOC	(1)
FITR	41	0	NOMI	(1)	1	NIND	(40)			
MODD	8041	0	B	(3200)	3200	DETAD	(3200)	6400	WW	(1600)
		8000	OMM	(40)	8040	NC	(1)			

STATISTICS

PROGRAM LENGTH	6440B	3360
CM LABELED COMMON LENGTH	26244B	11428

520000B CM USED

VARIABLES	SN	TYPE		RELOCATION							
50	BR	REAL		COMA	REFS	10	24	25			
6200	DETAD	COMPLEX	ARRAY	MODD	REFS	7	15	2*32			
3	EM	REAL		FACE	REFS	13					
165	ENT	REAL	ARRAY		REFS	5	42				
147	F	COMPLEX			DEFINED	42					
1	FACT	REAL		FACE	REFS	13					
3	FHI	REAL		FLUTV	REFS	12					
2	FLO	REAL		FLUTV	REFS	12					
162	I	INTEGER			REFS	2*28	2*29	5*32	3*36	2*41	
					DEFINED	26	39				
4	IE	INTEGER		FLUTV	REFS	12					
153	ITAPE	INTEGER			REFS	23	DEFINED	17			
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	9	17				
163	J	INTEGER			REFS	2*28	2*29	5*32	3*36	2*41	
					DEFINED	27	40				
0	LC	INTEGER	ARRAY	COMA	REFS	5	10	18			
155	MID	INTEGER			REFS	23	42	DEFINED	19		
17550	NC	INTEGER		MODD	REFS	15					
1	NIND	INTEGER	ARRAY	FITR	REFS	5	14	38			
164	NIX *	INTEGER			REFS	42					
0	NOMI	INTEGER		FITR	REFS	14	38				
154	NQ	INTEGER			REFS	26	27	2*38	DEFINED	18	
5	NQZ	INTEGER		FLUTV	REFS	12	2*38	39	40	42	
6	NVTOT	INTEGER		FLUTV	REFS	12					
6200	OMG	REAL	ARRAY	FLEXT	REFS	5	11				
17500	OMM	REAL	ARRAY	MODD	REFS	5	15				
2	PROD	REAL		FACE	REFS	13					
235	QRS	COMPLEX	ARRAY		REFS	7	23	28	29	32	36 38
					41	42	DEFINED	28	29	32	36 41
151	QV	COMPLEX			REFS	8	36	DEFINED	20		
6250	RHO	REAL		FLEXT	REFS	11	23	24	29		
4	ROWS	REAL		FACE	REFS	13	41				
0	SCALE	REAL		FACE	REFS	13					
6251	VB	REAL		FLEXT	REFS	11	2*20	29			
156	VBB	REAL			REFS	22	DEFINED	21			
157	VBO	REAL			REFS	23	24	25	DEFINED	22	
5	VELOC	REAL		FACE	REFS	13					
1	VH	REAL		FLUTV	REFS	12					
0	VL	REAL		FLUTV	REFS	12					
14400	WW	REAL	ARRAY	MODD	REFS	5	15	36			
160	XX	REAL			REFS	25	32	DEFINED	24		
161	XXX	REAL			REFS	32	DEFINED	25			
0	Z	COMPLEX		F.P.	REFS	8	2*20	21	28	29	
					DEFINED	1					

EXTERNALS	TYPE	ARGS	REFERENCES	
CDET	COMPLEX	5	8	42
CONV		5	38	
QFLIN		6	23	

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES				
ABS	REAL	1	INTRIN	21				
AIMAG	REAL	1	INTRIN	21	28	29	32	
AMAX1	REAL	0	INTRIN	21				
CMPLX	COMPLEX	2	INTRIN	32				
CONJG	COMPLEX	1	INTRIN	28				
REAL	REAL	1	INTRIN	32				

```
                6 CONTINUE                                                      FRORD      59
                  DO 7  J = 1,NQ                                                FRORD      60
60                KQ      =  I - 4                                              FRORD      61
                  DO 8  K = 1,3                                                 FRORD      62
                  KQ      =  KQ + 1                                             FRORD      63
                  A = AIMAG(SOL(J,KQ))*VV(K)*CONST                              FRORD      64
                  B = REAL(SOL(J,KQ))/AIMAG(SOL(J,KQ))                          FRORD      65
65                8 RLT(K) = CMPLX(B,A)                                         FRORD      66
                  RLLT    =  CMPLX (0.0,0.0)                                    FRORD      67
                  DO 9  K = 1,3                                                 FRORD      68
                9 RLLT    =  RLLT + VOT(K) * RLT(K)                             FRORD      69
                  FRR(J) = AIMAG(RLLT)                                          FRORD      70
70                7 DRR(J) = REAL(RLLT)                                         FRORD      71
              200 DO 10  J = 1,NQ                                               FRORD      72
                  IORD(J)  =  J                                                 FRORD      73
                  N1       =  J                                                 FRORD      74
                  RT1 = AIMAG(SOLL(J)) * V(I) * CONST                           FRORD      75
75                DIF1 = ABS(RT1 - FRR(J))                                      FRORD      76
                  DO 11  K = 1,NQ                                               FRORD      77
                  IF ( K .EQ. J )    GO TO 11                                   FRORD      78
                  RTDIFF = AIMAG(SOLL(K)) * V(I) * CONST                        FRORD      79
                  DIFF = ABS( RTDIFF - FRR(J))                                  FRORD      80
80                IF ( DIFF .GE. DIF1 )   GO TO 11                              FRORD      81
                  RT1 = RTDIFF                                                  FRORD      82
                  DIF1    =  DIFF                                               FRORD      83
                  N1      =  K                                                  FRORD      84
               11 CONTINUE                                                      FRORD      85
85                N2      =  N1 + 1                                             FRORD      86
                  IF ( N2 .GT. NQ )       N2 = N2 - 2                           FRORD      87
                  RT2 = AIMAG(SOLL(N2)) * V(I) * CONST                          FRORD      88
                  DIF2 = ABS( RT2 - FRR(J))                                     FRORD      89
                  DO 12  K = 1,NQ                                               FRORD      90
90                IF ( K .EQ. N1 .OR. K .EQ. N2 )       GO TO 12                FRORD      91
                  RTDIFF = AIMAG(SOLL(K)) * V(I) * CONST                        FRORD      92
                  DIFF = ABS( RTDIFF - FRR(J))                                  FRORD      93
                  IF ( DIFF .GE. DIF2 )   GO TO 12                              FRORD      94
                  RT2 = RTDIFF                                                  FRORD      95
95                DIF2    =  DIFF                                               FRORD      96
                  N2      =  K                                                  FRORD      97
               12 CONTINUE                                                      FRORD      98
                  IF ( J .EQ. 1 )    GO TO 400                                  FRORD      99
                  JJ      =  J - 1                                              FRORD     100
100               KLUE1   =  0                                                  FRORD     101
                  KLUE2   =  0                                                  FRORD     102
                  DO 14  K = 1,JJ                                               FRORD     103
                  IF ( IORD(K) .EQ. N1 )       KLUE1 = 1                        FRORD     104
                  IF ( IORD(K) .EQ. N2 )       KLUE2 = 1                        FRORD     105
105            14 CONTINUE                                                      FRORD     106
                  IF ( KLUE1 .EQ. 0 .AND. KLUE2 .EQ.1 )       GO TO 300         FRORD     107
                  IF(KLUE1.EQ.1.AND.KLUE2.EQ.1) GO TO 1000                      FRORD     108
                  IF ( KLUE1 .EQ. 0 .AND. KLUE2 .EQ.0 )       GO TO 400         FRORD     109
                  N1      =  N2                                                 FRORD     110
110               GO TO 300                                                     FRORD     111
              400 DELTA = ABS((RT1 - RT2 )/RT2 )                                FRORD     112
                  IF(DIF2.GE.1.5*DIF1.AND.DELTA.GE.0.05) GO TO 300              FRORD     113
                  DID1    =  ABS (REAL(SOLL(N1))/AIMAG(SOLL(N1)) - DRR(J) )     FRORD     114
                  DID2    =  ABS (REAL(SOLL(N2))/AIMAG(SOLL(N2)) - DRR(J) )     FRORD     115
```

```
115                IF(DID2.GT.DID1) GO TO 300                                  FRORD    116
                   FRRN1 = DIF1/DIF2                                           FRORD    117
                   DRRN2 = DID2/DID1                                           FRORD    118
                   IF(DRRN2.LT.FRRN1) N1 = N2                                  FRORD    119
                 300 IORD(J)  =  N1                                            FRORD    120
120                10 CONTINUE                                                 FRORD    121
                   DO 15  J = 1,NQ                                             FRORD    122
                   II       =  IORD(J)                                         FRORD    123
                  15 SOL(J,I)  =  SOLL(II)                                     FRORD    124
                   IF ( KEXT .NE. 0 )      GO TO 500                           FRORD    125
125                 1 CONTINUE                                                 FRORD    126
                  500 RETURN                                                   FRORD    127
                 1000 WRITE(ITAPEW,1001) I,J                                   FRORD    128
                 1001 FORMAT(1H1,////58H********* ABNORMAL EXIT FROM ORDERING SUBROUTINE FRORD    129
                     1 *********,///11X,13HVELOCITY NO. ,I4,8X,9HROOT NO. ,I4,/)FRORD    130
130                RETURN                                                      FRORD    131
                   END                                                         FRORD    132
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

36 I V ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES

3	FRORD	1	126 130

VARIABLES	SN	TYPE	RELOCATION								
541	A	REAL		REFS	42	65	DEFINED	40	63		
542	B	REAL		REFS	42	65	DEFINED	41	64		
0	BR	REAL	F.P.	REFS	13	DEFINED	1				
533	CONST	REAL		REFS	20	40	63	74	78	87	91
				DEFINED	13						
556	DELTA	REAL		REFS	112	DEFINED	111				
557	DID1	REAL		REFS	115	117	DEFINED	113			
560	DID2	REAL		REFS	115	117	DEFINED	114			
550	DIFF	REAL		REFS	80	82	93	95	DEFINED	79	92
546	DIF1	REAL		REFS	80	112	116	DEFINED	75	82	
553	DIF2	REAL		REFS	93	112	116	DEFINED	88	95	
634	DRR	REAL	ARRAY	REFS	5	113	114	DEFINED	47	70	
562	DRRN2	REAL		REFS	118	DEFINED	117				
564	FRR	REAL	ARRAY	REFS	5	21	75	79	88	92	
				DEFINED	20	46	69				
561	FRRN1	REAL		REFS	118	DEFINED	116				
535	I	INTEGER		REFS	17	18	2*20	24	26	30	31
					49	57	60	74	78	87	91	123
					127	DEFINED	16				
563	II	INTEGER		REFS	123	DEFINED	122				
704	IORD	INTEGER	ARRAY	REFS	5	103	104	122	DEFINED	72	119
754	IPERM	INTEGER	ARRAY	REFS	5	21	23				

VARIABLES	SN	TYPE		RELOCATION							
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	7	11	14			
534	ITAPEW	INTEGER			DEFINED	14	I/O REFS	127			
536	J	INTEGER			REFS	2*20	23	24	2*26	2*30	33	35
						3*36	40	2*41	46	47	52	54	56
						3*57	63	2*64	69	70	2*72	73	74
						75	77	79	88	92	98	99	113
						114	119	122	123	127	DEFINED	19	22
						25	29	32	38	50	53	59	71
						121							
537	JJ	INTEGER			REFS	24	102	DEFINED	23	99			
540	K	INTEGER			REFS	35	2*36	2*40	2*41	42	2*45	56	
						2*57	63	65	2*68	77	78	83	2*90
						91	96	103	104	DEFINED	34	39	44
						55	61	67	76	89	102		
0	KCR	INTEGER	*UNUSED	F.P.	DEFINED	1							
0	KEXT	INTEGER		F.P.	REFS	17	27	124	DEFINED	1			
554	KLUE1	INTEGER			REFS	106	107	108	DEFINED	100	103		
555	KLUE2	INTEGER			REFS	106	107	108	DEFINED	101	104		
0	KPNT	INTEGER	*UNUSED	F.P.	DEFINED	1							
543	KQ	INTEGER			REFS	51	52	62	63	2*64			
					DEFINED	49	51	60	62				
0	MID	INTEGER		F.P.	REFS	9	DEFINED	1					
0	NQ	INTEGER		F.P.	REFS	19	21	22	25	29	38	59	
						71	76	86	89	121	DEFINED	1	
0	NV	INTEGER		F.P.	REFS	16	DEFINED	1					
0	NVA	INTEGER		F.P.	REFS	17	DEFINED	1					
544	N1	INTEGER			REFS	85	90	103	2*113	119			
					DEFINED	73	83	109	118				
551	N2	INTEGER			REFS	2*86	87	90	104	109	2*114	118	
					DEFINED	85	86	96					
531	RLLT	COMPLEX			REFS	9	45	46	47	68	69	70	
					DEFINED	43	45	66	68				
1152	RLT	COMPLEX	ARRAY		REFS	9	45	68	DEFINED	42	65		
547	RTDIFF	REAL			REFS	79	81	92	94	DEFINED	78	91	
545	RT1	REAL			REFS	75	111	DEFINED	74	81			
552	RT2	REAL			REFS	88	2*111	DEFINED	87	94			
0	SOL	COMPLEX	ARRAY	F.P.	REFS	9	20	24	30	40	2*41	63	
						2*64	DEFINED	1	26	123			
1032	SOLL	COMPLEX	ARRAY		REFS	9	26	74	78	87	91	2*113	
						2*114	123	DEFINED	24	30			
0	V	REAL	ARRAY	F.P.	REFS	6	20	4*36	40	52	57	74	
						78	87	91	DEFINED	1			
0	VELCR	REAL	*UNUSED	F.P.	DEFINED	1							
1027	VOT	REAL	ARRAY		REFS	6	36	45	57	68			
					DEFINED	33	36	54	57				
1024	VV	REAL	ARRAY		REFS	6	3*57	63	DEFINED	52			
	VARIABLES USED AS FILE NAMES, SEE ABOVE												

EXTERNALS	TYPE	ARGS	REFERENCES
AORDER		4	21

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES						
ABS	REAL	1	INTRIN		75	79	88	92	111	113	114	
AIMAG	REAL	1	INTRIN		20	40	41	46	63	64	69	74
					78	87	91	113	114			
CMPLX	COMPLEX	2	INTRIN		42	43	65	66				
REAL	REAL	1	INTRIN		41	47	64	70	113	114		

STATEMENT LABELS			DEF LINE	REFERENCES			
463	1		125	16	17	28	
0	2		30	29			
126	3		37	32	34	35	
0	4		52	50			
221	6		58	53	55	56	
0	7		70	59			
0	8		65	61			
0	9		68	67			
0	10		120	71			
321	11		84	76	77	80	
361	12		97	89	90	93	
0	13		47	38			
0	14		105	102			
0	15		123	121			
0	16		42	39			
0	17		45	44			
75	18		29	18			
0	19		20	19			
0	20		24	22			
0	21		26	25			
172	100		49	31			
272	200		71	48			
442	300		119	106	110	112	115
414	400		111	98	108		
466	500		126	27	124		
467	1000		127	107			
506	1001	FMT	128	127			

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES			
16	1	I	16 125	4508		EXT REFS	EXITS	NOT INNER
33	19	J	19 20	4B	INSTACK			
52	20	J	22 24	6B	INSTACK			
70	21	J	25 26	3B	INSTACK			
104	2	J	29 30	3B	INSTACK			
113	3	J	32 37	20B		NOT INNER		
121	3	K	34 37	6B	INSTACK			
134	13	J	38 47	36B		NOT INNER		
143	16	K	39 42	5B	INSTACK			
156	17	K	44 45	6B	INSTACK			
200	4	J	50 52	3B	INSTACK			
205	6	J	53 58	21B		NOT INNER		
214	6	K	55 58	6B	INSTACK			
227	7	J	59 70	43B		NOT INNER		
241	8	K	61 65	7B	INSTACK			
256	9	K	67 68	6B	INSTACK			
273	10	J	71 120	153B		EXITS	NOT INNER	
310	11	K	76 84	13B	OPT			
345	12	K	89 97	16B	OPT			
373	14	K	102 105	7B	INSTACK			
454	15	J	121 123	5B	INSTACK			

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTAPES	50	0 ITAPES (50)

STATISTICS

PROGRAM LENGTH	12248	660
CM LABELED COMMON LENGTH	62B	50

520000B CM USED

```
      SUBROUTINE VECP (NV,   V.SOL,          KCR,V1,V2,MID)
C
C     VECTOR ROUTINE FOR FLUTTER MODE
C
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C     COMPLEX*16 SUM    ,DCMPLF
C     DOUBLE PRECISION ARG1,ARG2
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
      COMPLEX SUM    ,DCMPLF
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS
C
      DIMENSION V(1), QZ(220), WW(40,40), OMM(40), OMG(40)
      DIMENSION NIND(40)
      DIMENSION ITAPES(50)
C
      COMPLEX B(40,40), DETAD(40,40), SOL(MID,1)
      COMPLEX VEC(40), QRS(40,40), GK(40,40), QZZ(220)
      COMPLEX VEP(220), Z, QV, COMSCA
C
      COMMON /MODD  / B, DETAD, WW, OMM, NC
      COMMON / FLUTV / VL, VH, FLO, FHI, IE, NQZ, NVTOT
      COMMON /FLEXT / GK, OMG, RHO, VB
      COMMON / CTAPES / ITAPES
      COMMON / COMA / LC(40), BR
      COMMON / FITR / NOMI,NIND
C
C
      ITAPEW = ITAPES(6)
      MTAP49 =  ITAPES(49)
      ITAPE = ITAPES(50)
      ARG1 = 0.0
      ARG2 = 0.0
      NORIG = LC(2)
C
C
      DO 1  I = 1,NV
      IF ( V(I) .LT. VL .OR. V(I) .GT. VH )       GO TO 1
      VB        =  V(I) * 1.6878 / BR
      Z         =  SOL (KCR,I)
      QV        =  Z * Z * VB * VB
      QVV       =  RHO * VB * VB * AIMAG(Z) * AIMAG(Z)
      VBB       =  AMAX1 (1.E-4 , ABS(AIMAG(Z)))
      VBO       =  1.0 / VBB
      CALL QFLIN (ITAPE,VBO,QRS,RHO,0,MID)
      XX        =  RHO * VBO * BR
      XXX       =   XX * VBO * BR
      DO 2 J=1,NORIG
      DO 2 K=1,NORIG
      QRS(J,K)  =  -QRS(J,K) * QVV
     1           + CMPLX(REAL(DETAD(I,J))*XXX,AIMAG(DETAD(I,J))*XX)
    2 QRS(J,K) = QRS(J,K) + GK(J,K) + QV * WW(J,K)
      IF (NQZ.LT.NORIG)  CALL CONV (NORIG,NQZ,NOMI,NIND,QRS)
      CALL GENEIG (NQZ,QRS,VEC,MID)
      IF (LC(29).EQ.0) GO TO 4
      REWIND MTAP49
```

```
                  DO 5  N=1,NQZ                                                  VECP       59
                5 READ (MTAP49) DUMMY,COORDS                                     VECP       60
60                DO 3  J = 1,NC                                                 VECP       61
                  CALL RNRW  (-MTAP49, QZ, NQZ)                                  VECP       62
                  DO 10  II=1,NQZ                                                VECP       63
               10 QZZ(II) = CMPLX (QZ(II),0.0)                                   VECP       64
                  SUM = DCMPLF(ARG1,ARG2)                                        VECP       65
65              3 VEP(J)  = COMSCA (VEC, QZZ, SUM, NQZ, 1, 1)                    VECP       66
                4 CONTINUE                                                       VECP       67
                  REWIND MTAP49                                                  VECP       68
                  VELEQ     =  V(I) * SQRT(RHO/0.076474)                         VECP       69
                  WRITE (ITAPEW,20)  V(I) , VELEQ , RHO                          VECP       70
70                WRITE (ITAPEW,30)                                              VECP       71
                  LINES     =   10 + NQZ/3                                       VECP       72
                  WRITE (ITAPEW,40)     (J, VEC(J), J=1,NQZ)                     VECP       73
                  IF (LC(29).EQ.0) GO TO 1                                       VECP       74
                  WRITE (ITAPEW,60)                                              VECP       75
75                WRITE (ITAPEW,30)                                              VECP       76
                  NCC       =  NC / 3                                            VECP       77
                  NCR       =  NC - 3*NCC                                        VECP       78
                  NCO       =   NCC *3                                           VECP       79
                  DO 70  J = 1,NCO,3                                             VECP       80
80                LINES     =  LINES + 1                                         VECP       81
                  IF ( LINES .LT. 55 )          GO TO 80                         VECP       82
                  WRITE (ITAPEW,50)                                              VECP       83
                  WRITE (ITAPEW,60)                                              VECP       84
                  WRITE (ITAPEW,30)                                              VECP       85
85                LINES     = 7                                                  VECP       86
               80 II1       =  J                                                 VECP       87
                  II2       =  J + 1                                             VECP       88
                  II3       =  J + 2                                             VECP       89
               70 WRITE (ITAPEW,40)   II1,VEP(II1),II2,VEP(II2),II3,VEP(II3)    VECP       90
90                IF ( NCR .EQ. 0 )       GO TO 1                                VECP       91
                  IF ( NCR .EQ. 2 )       GO TO 90                               VECP       92
                  WRITE (ITAPEW,40)   NC,VEP(NC)                                 VECP       93
                  GO TO 1                                                        VECP       94
               90 II1       =  NC - 1                                            VECP       95
95                II2       =  NC                                                VECP       96
                  WRITE (ITAPEW,40)   II1,VEP(II1),II2,VEP(II2)                  VECP       97
                1 CONTINUE                                                       VECP       98
            C                                                                    VECP       99
            C                                                                    VECP      100
100         C FORMATS                                                            VECP      101
            C                                                                    VECP      102
               20 FORMAT (1H1,/15X42HEIGENVECTOR FOR CRITICAL FLUTTER SPEED FOR,//  VECP   103
                 1        20X10HV(TRUE) = ,F12.4,15X8HV(EQ) = ,F12.4,15X,      VECP      104
                 2        18HRHO(LBS/CU.FT.) = ,F16.8//)                       VECP      105
105            30 FORMAT (4X,3(5HINDEX,4X,4HREAL,10X4HIMAG,9X)//)                VECP      106
               40 FORMAT (3(5X,I3,2X,E12.4,2X,E12.4))                            VECP      107
               50 FORMAT (1H1)                                                   VECP      108
               60 FORMAT (//20X14HFLUTTER VECTOR,//)                             VECP      109
            C                                                                    VECP      110
110            RETURN                                                            VECP      111
               END                                                               VECP      112
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
3 VECP 1 110

VARIABLES SN TYPE RELOCATION

515	ARG1		REAL			REFS	64	DEFINED	33				
516	ARG2		REAL			REFS	64	DEFINED	34				
0	B		COMPLEX	ARRAY	MODD	REFS	18	22					
50	BR		REAL		COMA	REFS	26	40	47	48			
532	COORDS	*	REAL			DEFINED	59						
6200	DETAD		COMPLEX	ARRAY	MODD	REFS	18	22	2*51				
531	DUMMY	*	REAL			DEFINED	59						
3	FHI		REAL		FLUTV	REFS	23						
2	FLO		REAL		FLUTV	REFS	23						
0	GK		COMPLEX	ARRAY	FLEXT	REFS	19	24	53				
520	I		INTEGER			REFS	2*39	40	41	2*51	68	69	
						DEFINED	38						
4	IE		INTEGER		FLUTV	REFS	23						
533	II		INTEGER			REFS	2*63	DEFINED	62				
541	II1		INTEGER			REFS	2*89	2*96	DEFINED	86	94		
542	II2		INTEGER			REFS	2*89	2*96	DEFINED	87	95		
543	II3		INTEGER			REFS	2*89	DEFINED	88				
514	ITAPE		INTEGER			REFS	46	DEFINED	32				
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	16	25	30	31	32		
512	ITAPEW		INTEGER			DEFINED	30	I/O REFS	69	70	72	74	75
							82	83	84	89	92	96	
526	J		INTEGER			REFS	4*51	4*53	65	2*72	86	87	88
						DEFINED	49	60	72	79			
527	K		INTEGER			REFS	2*51	4*53	DEFINED	50			
0	KCR		INTEGER		F.P.	REFS	41	DEFINED	1				
0	LC		INTEGER	ARRAY	COMA	REFS	26	35	56	73			
535	LINES		INTEGER			REFS	80	81	DEFINED	71	80	85	
0	MID		INTEGER		F.P.	REFS	18	46	55	DEFINED	1		
513	MTAP49		INTEGER			REFS	61	DEFINED	31	I/O REFS	57	59	67
530	N	*	INTEGER			DEFINED	58						
17550	NC		INTEGER		MODD	REFS	22	60	76	77	2*92	94	95
536	NCC		INTEGER			REFS	77	78	DEFINED	76			
540	NCO		INTEGER			REFS	79	DEFINED	78				
537	NCR		INTEGER			REFS	90	91	DEFINED	77			
1	NIND		INTEGER	ARRAY	FITR	REFS	15	27	54				
0	NOMI		INTEGER		FITR	REFS	27	54					
517	NORIG		INTEGER			REFS	49	50	2*54	DEFINED	35		
5	NQZ		INTEGER		FLUTV	REFS	23	2*54	55	58	61	62	65
							71	72					
0	NV		INTEGER		F.P.	REFS	38	DEFINED	1				
6	NVTOT		INTEGER		FLUTV	REFS	23						
6200	OMG		REAL	ARRAY	FLEXT	REFS	14	24					
17500	OMM		REAL	ARRAY	MODD	REFS	14	22					
1220	QRS		COMPLEX	ARRAY		REFS	19	46	51	53	54	55	
						DEFINED	51	53					
510	QV		COMPLEX			REFS	20	53	DEFINED	42			
521	QVV		REAL			REFS	51	DEFINED	43				
544	QZ		REAL	ARRAY		REFS	14	61	63				
7420	QZZ		COMPLEX	ARRAY		REFS	19	65	DEFINED	63			
6250	RHO		REAL		FLEXT	REFS	24	43	46	47	68	69	

VARIABLES	SN	TYPE		RELOCATION							
0	SOL	COMPLEX	ARRAY	F.P.	REFS	18	41	DEFINED	1		
504	SUM	COMPLEX			REFS	11	65	DEFINED	64		
0	V	REAL	ARRAY	F.P.	REFS	14	2*39	40	68	69	
					DEFINED	1					
6251	VB	REAL		FLEXT	REFS	24	2*42	2*43	DEFINED	40	
522	VBB	REAL			REFS	45	DEFINED	44			
523	VBO	REAL			REFS	46	47	48	DEFINED	45	
1100	VEC	COMPLEX	ARRAY		REFS	19	55	65	72		
534	VELEQ	REAL			REFS	69	DEFINED	68			
10310	VEP	COMPLEX	ARRAY		REFS	20	3*89	92	2*96	DEFINED	65
1	VH	REAL		FLUTV	REFS	23	39				
0	VL	REAL		FLUTV	REFS	23	39				
0	V1	REAL	*UNUSED	F.P.	DEFINED	1					
0	V2	REAL	*UNUSED	F.P.	DEFINED	1					
14400	WW	REAL	ARRAY	MODD	REFS	14	22	53			
524	XX	REAL			REFS	48	51	DEFINED	47		
525	XXX	REAL			REFS	51	DEFINED	48			
506	Z	COMPLEX			REFS	20	2*42	2*43	44	DEFINED	41

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES		
COMSCA	COMPLEX	6		20	65	
CONV		5		54		
DCMPLF	COMPLEX	2		11	64	
GENEIG		4		55		
QFLIN		6		46		
RNRW		3		61		
SQRT	REAL	1	LIBRARY	68		

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES		
ABS	REAL	1	INTRIN		44		
AIMAG	REAL	1	INTRIN		2*43	44	51
AMAX1	REAL	0	INTRIN		44		
CMPLX	COMPLEX	2	INTRIN		51	63	
REAL	REAL	1	INTRIN		51		

STATEMENT LABELS			DEF LINE	REFERENCES				
277	1		97	38	39	73	90	93
0	2		53	49	50			
0	3		65	60				
157	4		66	56				
0	5		59	58				
0	10		63	62				
441	20	FMT	102	69				
457	30	FMT	105	70	75	84		
464	40	FMT	106	72	89	92	96	
470	50	FMT	107	82				
472	60	FMT	108	74	83			
0	70		89	79				
237	80		86	81				
266	90		94	91				

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
20	1	I	38 97	262B	EXT REFS	NOT INNER
55	2	J	49 53	35B	NOT INNER	
74	2	K	50 53	13B	OPT	
125	5	N	58 59	5B	EXT REFS	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
133	3	J	60 65	24B	EXT REFS NOT INNER
142	10	II	62 63	3B	INSTACK
202		J	72 72	7B	EXT REFS
225	70	J	79 89	31B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
MODD	8041	0	B	(3200)	3200	DETAD	(3200)	G400	WW		(1600)
		8000	OMM	(40)	8040	NC	(1)				
FLUTV	7	0	VL	(1)	1	VH	(1)	2	FLO		(1)
		3	FHI	(1)	4	IE	(1)	5	NQZ		(1)
		6	NVTOT	(1)							
FLEXT	3242	0	GK	(3200)	3200	OMG	(40)	3240	RHO		(1)
		3241	VB	(1)							
CTAPES	50	0	ITAPES	(50)							
COMA	41	0	LC	(40)	40	BR	(1)				
FITR	41	0	NOMI	(1)	1	NIND	(40)				

STATISTICS

PROGRAM LENGTH	11211B	4745
CM LABELED COMMON LENGTH	26236B	11422

520000B CM USED

```
      SUBROUTINE GENEIG (NN,AE,EVEC,MID)                                GENEIG     2
      DIMENSION ITAPES(50)                                              GENEIG     3
C                                                                       GENEIG     4
      COMPLEX AE(MID,1), EVEC(1)                                        GENEIG     5
      COMPLEX B(40,40), C(40,40), X(40)                                 GENEIG     6
      COMMON / CTAPES / ITAPES                                          GENEIG     7
C                                                                       GENEIG     8
C                                                                       GENEIG     9
      ITAPEW = ITAPES(6)                                                GENEIG    10
C                                                                       GENEIG    11
C                                                                       GENEIG    12
      NX       =  NN - 1                                                GENEIG    13
      IT       =  1                                                     GENEIG    14
      ITL      =  IT                                                    GENEIG    15
      IR       =  0                                                     GENEIG    16
      GO TO 7                                                           GENEIG    17
C                                                                       GENEIG    18
    5 IR       =  IT                                                    GENEIG    19
      IT       =  IT + 1                                                GENEIG    20
      ITL      =  IT                                                    GENEIG    21
    7 ITT      =  IT - 1                                                GENEIG    22
      IF ( ITT .GT. 0 )       GO TO 50                                  GENEIG    23
      EVEC(1)  =  CMPLX (1.0,0.0)                                       GENEIG    24
      DO 20 IB = 1,NN                                                   GENEIG    25
      DO 20 IA = 1,NX                                                   GENEIG    26
   20 B(IB,IA)  =  AE(IB,IA+1)                                          GENEIG    27
      DO 30 IB = 1,NN                                                   GENEIG    28
   30 B(IB,NN)  =  -AE(IB,1)                                            GENEIG    29
      GO TO 200                                                         GENEIG    30
   50 IF (IT .LT. NN )        GO TO 100                                 GENEIG    31
      EVEC(NN)  =  CMPLX (1.0,0.0)                                      GENEIG    32
      DO 80  IB = 1,NN                                                  GENEIG    33
      DO 80  IA = 1,NX                                                  GENEIG    34
   80 B(IB,IA)  =  AE(IB,IA)                                            GENEIG    35
      DO 90  IB = 1,NN                                                  GENEIG    36
   90 B(IB,NN)  =  -AE(IB,NN)                                           GENEIG    37
      GO TO 200                                                         GENEIG    38
  100 EVEC(IT)  =  CMPLX (1.0,0.0)                                      GENEIG    39
      DO 130  IB = 1,NN                                                 GENEIG    40
      DO 130  IA = 1,ITT                                                GENEIG    41
  130 B(IB,IA)  =  AE(IB,IA)                                            GENEIG    42
      DO 150  IB = 1,NN                                                 GENEIG    43
      DO 150  IA = IT,NX                                                GENEIG    44
  150 B(IB,IA)  =  AE(IB,IA+1)                                          GENEIG    45
      DO 160  IB = 1,NN                                                 GENEIG    46
  160 B(IB,NN)  =  -AE(IB,IT)                                           GENEIG    47
  200 IRR       =  IR                                                   GENEIG    48
      IR        =  IR + 1                                               GENEIG    49
      IF ( IR .LE. NN )       GO TO 205                                 GENEIG    50
      IR        =  1                                                    GENEIG    51
      IRR       =  0                                                    GENEIG    52
      ITL       =  -IT                                                  GENEIG    53
  205 IF ( IRR .GT. 0 )       GO TO 240                                 GENEIG    54
      DO 230  IB = 1,NX                                                 GENEIG    55
      DO 230  IA = 1,NN                                                 GENEIG    56
  230 C(IB,IA)  =  B(IB+1,IA)                                           GENEIG    57
      GO TO 350                                                         GENEIG    58
```

```
                240 IF ( IR .LT. NN )       GO TO 280                          GENEIG     59
                    DO 270  IB = 1,NX                                          GENEIG     60
60                  DO 270  IA = 1,NN                                          GENEIG     61
                270 C(IB,IA) =  B(IB,IA)                                       GENEIG     62
                    GO TO 350                                                  GENEIG     63
                280 DO 300  IB = 1,IRR                                         GENEIG     64
                    DO 300  IA = 1,NN                                          GENEIG     65
65              300 C(IB,IA)  =  B(IB,IA)                                      GENEIG     66
                    DO 320  IB = IR,NX                                         GENEIG     67
                    DO 320  IA = 1,NN                                          GENEIG     68
                320 C(IB,IA)  =  B(IB+1,IA)                                    GENEIG     69
                350 CALL JORCOM (C,NX,X,MID,MID)                               GENEIG     70
70                  IF ( ITT .GT. 0 )       GO TO 380                          GENEIG     71
                    DO 370  IA = 2,NN                                          GENEIG     72
                370 EVEC(IA)  =  X(IA-1)                                       GENEIG     73
                    GO TO 450                                                  GENEIG     74
                380 IF ( IT .LT. NN )       GO TO 410                          GENEIG     75
75                  DO 400  IA = 1,NX                                          GENEIG     76
                400 EVEC(IA)  =  X(IA)                                         GENEIG     77
                    GO TO 450                                                  GENEIG     78
                410 DO 420  IB = 1,ITT                                         GENEIG     79
                420 EVEC(IB)  =  X(IB)                                         GENEIG     80
80                  DO 430  IB = IT,NX                                         GENEIG     81
                430 EVEC(IB+1)  =  X(IB)                                       GENEIG     82
                450 CALL ORIENT (EVEC,NN)                                      GENEIG     83
                    IF ( CABS(EVEC(IT)) .GE. .02 )    GO TO 500                GENEIG     84
                    IF ( IT .LT. NN )       GO TO 5                            GENEIG     85
85                  WRITE (ITAPEW,490) (EVEC(IB),IB=1,NN)                      GENEIG     86
            C                                                                  GENEIG     87
            C                                                                  GENEIG     88
            C FORMATS                                                          GENEIG     89
            C                                                                  GENEIG     90
90             40 FORMAT (/(15X,G16.8,3X,G16.8,15X,G16.8,3X,G16.8))            GENEIG     91
               490 FORMAT (1H1,10X39HUNABLE TO FIND EIGENVECTOR, LAST TRY = , /  GENEIG     92
                  1       (5X(E22.11,5X,E22.11)))                              GENEIG     93
            C                                                                  GENEIG     94
               500 RETURN                                                      GENEIG     95
95                 END                                                         GENEIG     96
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	GENEIG	1	94

VARIABLES

	SN	TYPE			RELOCATION							
0	AE	COMPLEX	ARRAY	F.P.	REFS	4	26	28	34	36	41	44
					46	DEFINED	1					
471	B	COMPLEX	ARRAY		REFS	5	56	61	65	68		
					DEFINED	26	28	34	36	41	44	46
6671	C	COMPLEX	ARRAY		REFS	5	69	DEFINED	56	61	65	68
0	EVEC	COMPLEX	ARRAY	F.P.	REFS	4	82	83	85	DEFINED	1	23
					31	38	72	76	79	81		
467	IA	INTEGER			REFS	2*26	2*34	2*41	2*44	2*56	2*61	2*65

VARIABLES	SN	TYPE		RELOCATION								
					2*68	2*72	2*76	DEFINED	25	33	40	43
					55	60	64	67	71	75		
466	IB	INTEGER			REFS	2*26	2*28	2*34	2*36	2*41	2*44	2*46
					2*56	2*61	2*65	2*68	2*79	2*81	85	
					DEFINED	24	27	32	35	39	42	45
					54	59	63	66	78	80	85	
464	IR	INTEGER			REFS	47	48	49	58	66		
					DEFINED	15	18	48	50			
470	IRR	INTEGER			REFS	53	63	DEFINED	47	51		
462	IT	INTEGER			REFS	14	18	19	20	21	30	38
					43	46	52	74	80	83	84	
					DEFINED	13	19					
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	2	6	9				
460	ITAPEW	INTEGER			DEFINED	9	I/O REFS	85				
463	ITL	INTEGER			DEFINED	14	20	52				
465	ITT	INTEGER			REFS	22	40	70	78	DEFINED	21	
0	MID	INTEGER		F.P.	REFS	4	2*69	DEFINED	1			
0	NN	INTEGER		F.P.	REFS	12	24	27	28	30	31	32
					35	2*36	39	42	45	46	49	55
					58	60	64	67	71	74	82	84
					85	DEFINED	1					
461	NX	INTEGER			REFS	25	33	43	54	59	66	69
					75	80	DEFINED	12				
15071	X	COMPLEX	ARRAY		REFS	5	69	72	76	79	81	

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
CABS	REAL	1	LIBRARY	83
JORCOM		5		69
ORIENT		2		82

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES		
CMPLX	COMPLEX	2	INTRIN		23	31	38

STATEMENT LABELS			DEF LINE	REFERENCES	
16	5		18	84	
21	7		21	16	
0	20		26	24	25
0	30		28	27	
440	40	FMT NO REFS	90		
61	50		30	22	
0	80		34	32	33
0	90		36	35	
124	100		38	30	
0	130		41	39	40
0	150		44	42	43
0	160		46	45	
206	200		47	29	37
214	205		53	49	
0	230		56	54	55
235	240		58	53	
0	270		61	59	60
257	280		63	58	
0	300		65	63	64
0	320		68	66	67
315	350		69	57	62
0	370		72	71	

```
STATEMENT LABELS                DEF LINE   REFERENCES
  336  380                          74        70
    0  400                          76        75
  354  410                          78        74
    0  420                          79        78
    0  430                          81        80
  401  450                          82        73        77
  445  490      FMT                 91        85
  421  500                          94        83

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
   27  20        IB           24 26        17B              NOT INNER
   37  20        IA           25 26         3B      INSTACK
   55  30        IB           27 28         3B      INSTACK
   70  80        IB           32 34        17B              NOT INNER
  100  80        IA           33 34         3B      INSTACK
  120  90        IB           35 36         3B      INSTACK
  131  130       IB           39 41        17B              NOT INNER
  141  130       IA           40 41         3B      INSTACK
  151  150       IB           42 44        20B              NOT INNER
  162  150       IA           43 44         3B      INSTACK
  202  160       IB           45 46         3B      INSTACK
  217  230       IB           54 56        16B              NOT INNER
  226  230       IA           55 56         3B      INSTACK
  241  270       IB           59 61        16B              NOT INNER
  250  270       IA           60 61         3B      INSTACK
  260  300       IB           63 65        16B              NOT INNER
  267  300       IA           64 65         3B      INSTACK
  277  320       IB           66 68        16B              NOT INNER
  306  320       IA           67 68         3B      INSTACK
  331  370       IA           71 72         3B      INSTACK
  347  400       IA           75 76         3B      INSTACK
  362  420       IB           78 79         3B      INSTACK
  375  430       IB           80 81         3B      INSTACK

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       CTAPES        50              0 ITAPES (50)

STATISTICS
  PROGRAM LENGTH                15226B     6806
  CM LABELED COMMON LENGTH         62B       50
          52000B CM USED
```

```
115          C                                                                  GCVEC     116
             C FORMATS                                                          GCVEC     117
             C                                                                  GCVEC     118
                10 FORMAT (41HONO CONVERGENCE IN 10 TRIES WITH LAMBDA =,1P2E15.7 )  GCVEC  119
                20 FORMAT ( 8HOITER8 =, I2, 7H NORM =,G16.7 / (4G20.7))         GCVEC     120
120          C                                                                  GCVEC     121
               500 RETURN                                                       GCVEC     122
                   END                                                          GCVEC     123
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	GCVEC	1	121

VARIABLES

		SN	TYPE		RELOCATION								
0	EPS		REAL		DETAIL	REFS	30	DEFINED	38				
0	F		REAL	ARRAY	F.P.	REFS	25	65	66	72	110		
						DEFINED	1	63	64	65	66		
343	G		REAL			REFS	85	86	87	DEFINED	83		
344	H		REAL			REFS	85	86	88	DEFINED	84		
331	HURDLE		REAL			REFS	95	DEFINED	37				
336	I		INTEGER			REFS	46	47	51	52	62	83	84
							2*85	2*86	87	88	2*89	4*92	2*97	2*98
							2*99	2*100	3*105	3*106	107	108	109	
						DEFINED	45	61	82	92	96	104	
335	II		INTEGER			REFS	2*65	2*66	67	DEFINED	44	67	
341	IJ		INTEGER			REFS	4*63	4*64	DEFINED	62			
0	IT		INTEGER	ARRAY	F.P.	REFS	25	72	110	DEFINED	1		
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	26	31	34				
330	ITAPEW		INTEGER			DEFINED	34	I/O REFS	92	113			
0	ITER8		INTEGER		F.P.	REFS	92	103	111	DEFINED	1	73	111
332	KEY		INTEGER			REFS	110	DEFINED	39				
0	LAMBDA		COMPLEX		F.P.	REFS	27	42	43	113	DEFINED	1	
1	LVEC		INTEGER		DETAIL	REFS	30	91					
0	M		INTEGER		F.P.	REFS	41	45	61	72	82	92	96
							104	107	110	DEFINED	1		
0	MID		INTEGER		F.P.	REFS	40	41	62	72	107	110	
						DEFINED	1						
334	MIDM		INTEGER			REFS	62	DEFINED	41				
333	MID1		INTEGER			REFS	67	DEFINED	40				
325	MU		REAL			REFS	29	2*56	57	63	64	85	86
							105	106	DEFINED	42			
342	NIX	*	INTEGER			REFS	72						
327	NORM		REAL			REFS	29	51	89	90	92	95	97
							98	99	100	DEFINED	81	89	90
326	NU		REAL			REFS	29	2*56	57	63	64	85	86
							105	106	DEFINED	43			
0	P		REAL	ARRAY	F.P.	REFS	25	2*63	2*64	107	DEFINED	1	
0	Q		REAL	ARRAY	F.P.	REFS	25	63	64	DEFINED	1		
337	RHO		REAL			REFS	65	DEFINED	56				
0	S		REAL	ARRAY	F.P.	REFS	25	83	84	2*92	97	98	105
							106	110	DEFINED	1	51	52	85	86
							97	98	108	109				

```
      C                                                                 GCVEC      59
      C   FORM   LAMBDA**2 * I  +  LAMBDA * P  +  Q                    GCVEC      60
   60 C                                                                 GCVEC      61
            DO  130   I = 1, M                                          GCVEC      62
            DO  120   IJ = I, MIDM, MID                                 GCVEC      63
            F(1,IJ) = Q(1,IJ)  +  MU * P(1,IJ)  -  NU * P(2,IJ)         GCVEC      64
          120 F(2,IJ) = Q(2,IJ)  +  MU * P(2,IJ)  +  NU * P(1,IJ)       GCVEC      65
   65       F(1,II) = F(1,II) + RHO                                     GCVEC      66
            F(2,II) = F(2,II) + SIGMA                                   GCVEC      67
          130 II = II + MID1                                            GCVEC      68
      C                                                                 GCVEC      69
      C   CDAT IS A MODIFIED CDET, FIXED TO FORCE A FACTORIZATION COME WHAT  GCVEC  70
   70 C   MAY.  THE FUNCTION VALUE (TARGET) IS OF NO INTEREST.          GCVEC      71
      C                                                                 GCVEC      72
            TARGET = CDAT ( F, -M, MID, IT, NIX )                       GCVEC      73
            ITER8 = 0                                                   GCVEC      74
      C                                                                 GCVEC      75
   75 C   MAIN LOOP.  CLUSAL IS USED TO SOLVE (COMPLEX) SYSTEMS OF LINEAR  GCVEC  76
      C   EQUATIONS.  IT IS CLUSOL MODIFIED TO PERFORM ONLY THE FORWARD SOLU-  GCVEC 77
      C   TION ( KEY = 1 ), ONLY THE BACK SOLUTION ( KEY =-1 ), OR BOTH  GCVEC  78
      C   (WITH KEY = 0 ).  AT LEAST 2 ITERATIONS ARE CARRIED OUT, BUT NO MORE  GCVEC 79
      C   THAN 10.                                                      GCVEC      80
   80 C                                                                 GCVEC      81
          150 NORM = 0.                                                 GCVEC      82
            DO  160   I = 1, M                                          GCVEC      83
            G = S(1,I)                                                  GCVEC      84
            H = S(2,I)                                                  GCVEC      85
   85       S(1,I) = MU * G  -  NU * H  +  V(1,I)                       GCVEC      86
            S(2,I) = MU * H  +  NU * G  +  V(2,I)                       GCVEC      87
            V(1,I) = G                                                  GCVEC      88
            V(2,I) = H                                                  GCVEC      89
          160 NORM = NORM + V(1,I)**2 + V(2,I)**2                       GCVEC      90
   90       NORM = SQRT ( NORM )                                        GCVEC      91
            IF ( LVEC .EQ  0 )      GO TO 2                             GCVEC      92
               WRITE (ITAPEW,20)  ITER8, NORM, ( V(1,I), V(2,I), S(1,I),  GCVEC   93
           1                      S(2,I),  I=1,M)                       GCVEC      94
            2 CONTINUE                                                  GCVEC      95
   95       IF  ( NORM .LE. HURDLE )  GO TO 175                         GCVEC      96
            DO  170   I = 1, M                                          GCVEC      97
            S(1,I) = S(1,I) / NORM                                      GCVEC      98
            S(2,I) = S(2,I) / NORM                                      GCVEC      99
            V(1,I) = V(1,I) / NORM                                      GCVEC     100
  100       V(2,I) = V(2,I) / NORM                                      GCVEC     101
            GO TO 500                                                   GCVEC     102
      C                                                                 GCVEC     103
          175 IF ( ITER8 .GT. 10 )   GO TO 490                          GCVEC     104
            DO  180   I = 1, M                                          GCVEC     105
  105       SUM(1) = S(1,I)  +  MU * V(1,I)  -  NU * V(2,I)             GCVEC     106
            SUM(2) = S(2,I)  +  MU * V(2,I)  +  NU * V(1,I)             GCVEC     107
            CALL COMSCA ( P(1,I), V, SUM, M, MID, 1 )                   GCVEC     108
            S(1,I) = - SUM(1)                                           GCVEC     109
          180 S(2,I) = - SUM(2)                                         GCVEC     110
  110       CALL CLUSAL ( F, S, M, MID, IT, KEY )                       GCVEC     111
            ITER8 = ITER8 + 1                                           GCVEC     112
            GO TO 150                                                   GCVEC     113
          490  WRITE (ITAPEW,10)  LAMBDA                                GCVEC     114
      C                                                                 GCVEC     115
```

```
      SUBROUTINE GCVEC ( P, Q, LAMBDA, M, MID, IT, V, S, F, ITER8 )
C
C
C  EIGENVECTORS OF THE M BY M SYSTEM
C
C    ( LAMBDA**2 * I  +  LAMBDA * P  +  Q ) * V  =  O
C
C  WITH COMPLEX P AND Q.  IT IS ASSUMED THAT P AND Q ARE STORED
C   IN (COMPLEX) ARRAYS OF DIMENSION (MID,MID).  LAMBDA IS THE EIGEN-
C   VALUE ESTIMATE AND V IS THE VECTOR CALCULATED BY GCVEC ( USING
C   THE INVERSE POWER METHOD ).  IT ARRAY IS USED FOR SCRATCH AND MUST
C   HAVE DIMENSION AT LEAST 2*M.   S IS A (COMPLEX) SCRATCH VECTOR
C   OF DIMENSION AT LEAST M AND F IS A (COMPLEX) SCRATCH ARRAY OF
C   DIMENSION (MID,MID).  ITER8 GIVES THE NUMBER OF ITERATIONS NEEDED
C   TO FIND THE VECTOR.  10 ITERATIONS ARE ALLOWED (2 IS USUALLY ENOUGH)
C   AND FAILURE IS INDICATED BY ITER8 = 11 (AND ALSO BY A PRINTED
C   MESSAGE. )
C
C
C
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C     DOUBLE PRECISION SUM
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
      DIMENSION   P(2,1), Q(2,1), IT(1), V(2,1), S(2,1), F(2,1)
      DIMENSION ITAPES(50)
      COMPLEX LAMBDA, TARGET, CDAT
      DIMENSION SUM(2)
      REAL    MU, NU, NORM
      COMMON  /DETAIL/ EPS , LVEC
      COMMON / CTAPES / ITAPES
C
C
      ITAPEW = ITAPES(6)
C
C
      HURDLE   =  1.E7
      EPS = 1.E-8
      KEY = 0
      MID1 = MID + 1
      MIDM = MID * M
      MU = REAL(LAMBDA)
      NU = AIMAG(LAMBDA)
      II = 1
      DO  110   I = 1, M
      V(1,I) = 0.
      V(2,I) = 0.
C
C   THE RDM ARGUMENT IS NOT SIGNIFICANT AND IS NOT CHANGED.
C
      S(1,I) = RDM(NORM)
  110 S(2,I) = 0.
C
C   GET  LAMBDA**2
C
      RHO = MU * MU  -  NU * NU
      SIGMA = 2. * MU * NU
```

VARIABLES	SN	TYPE	RELOCATION								
0	LOC	INTEGER	ARRAY	F.P.	REFS	14	21	DEFINED	1		
0	LU	COMPLEX	ARRAY	F.P.	REFS	13	24	33	35	DEFINED	1
0	M	INTEGER		F.P.	REFS	20	29	30	33	DEFINED	1
0	MID	INTEGER		F.P.	REFS	15	24	33	DEFINED	1	
114	MID1	INTEGER			REFS	30	34	DEFINED	15		
110	S	COMPLEX			REFS	10	24	33	DEFINED	22	32
0	Y	COMPLEX	ARRAY	F.P.	REFS	13	22	23	24	31	33
					DEFINED	1	23	24	35		

EXTERNALS	TYPE	ARGS	REFERENCES		
COMSCA	COMPLEX	6	13	24	33

STATEMENT LABELS			DEF LINE	REFERENCES
0	100		24	20
37	105		29	19
43	110		31	37
0	120	INACTIVE	38	2*37

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
13	100	I	20 24	22B	EXT REFS

STATISTICS

PROGRAM LENGTH 132B 90

520008 CM USED

```
      SUBROUTINE CLUSAL(LU,Y,M,MID,LOC,KEY )                            CLUSAL     2
C  MODIFIED CLUSOL.  ALLOWS SELECTIVE USE OF FORWARD AND BACKWARD       CLUSAL     3
C  SOLUTIONS A LA TRIEQ.                                                CLUSAL     4
C                                                                       CLUSAL     5
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     CLUSAL     6
C     COMPLEX*16 S                                                      CLUSAL     7
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        CLUSAL     8
C                                                                       CLUSAL     9
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     CLUSAL    10
      COMPLEX S                                                         CLUSAL    11
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     CLUSAL    12
C                                                                       CLUSAL    13
      COMPLEX LU(1),Y(1),COMSCA,H                                       CLUSAL    14
      DIMENSION LOC(2,1)                                                CLUSAL    15
      MID1 = -(MID + 1)                                                 CLUSAL    16
C                                                                       CLUSAL    17
C   FORWARD SOLUTION  (WITH INTERCHANGES)                               CLUSAL    18
C                                                                       CLUSAL    19
      IF ( KEY .LT. 0 )  GO TO 105                                      CLUSAL    20
      DO 100  I = 1,M                                                   CLUSAL    21
      L = LOC(2,I)                                                      CLUSAL    22
      S = Y(L)                                                          CLUSAL    23
      Y(L) = Y(I)                                                       CLUSAL    24
  100 Y(I) = COMSCA(LU(I),Y,S,I-1,MID,1)                                CLUSAL    25
      IF ( KEY .GT. 0 )  RETURN                                         CLUSAL    26
C                                                                       CLUSAL    27
C   BACK SOLUTION                                                       CLUSAL    28
C                                                                       CLUSAL    29
  105 K = M                                                             CLUSAL    30
      KK1 = - M * MID1                                                  CLUSAL    31
  110 H = Y(K)                                                          CLUSAL    32
      S = -H                                                            CLUSAL    33
      H = COMSCA(LU(KK1),Y(K+1),S,M-K,MID,1)                            CLUSAL    34
      KK1 = KK1 + MID1                                                  CLUSAL    35
      Y(K) = -H / LU(KK1+1)                                             CLUSAL    36
      K = K - 1                                                         CLUSAL    37
      IF (K) 120,120,110                                                CLUSAL    38
  120 RETURN                                                            CLUSAL    39
      END                                                               CLUSAL    40
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CLUSAL	1	25 38

VARIABLES

		SN	TYPE	RELOCATION							
112	H		COMPLEX		REFS	13	32	35	DEFINED	31	33
115	I		INTEGER		REFS	21	23	3*24	DEFINED	20	
117	K		INTEGER		REFS	31	2*33	35	36	37	
					DEFINED	29	36				
0	KEY		INTEGER	F.P.	REFS	19	25	DEFINED	1		
120	KK1		INTEGER		REFS	33	34	35	DEFINED	30	34
116	L		INTEGER		REFS	22	23	DEFINED	21		

```
STATEMENT LABELS                DEF LINE    REFERENCES
  151  230                          62          58
    0  240          INACTIVE        67          66
    0  250                          72          68
  200  260                          74          2*66
    0  270          INACTIVE        76          2*75
    0  280                          78          77
  225  290                          79          75
    0  300                          82          36
    0  310          INACTIVE        83
    0  320                          86          85
    0  340          INACTIVE        88

LOOPS  LABEL   INDEX      FROM-TO     LENGTH    PROPERTIES
   32  136     K1           31 35       22B              NOT INNER
   41  133     KJ           33 34        6B     INSTACK
   55  300     K1           36 82      157B              EXT REFS  NOT INNER
   65  140     IK           40 42       10B        OPT
  103  190     IK           46 57       36B              EXT REFS
  167  250     KJ           68 72        7B     INSTACK
  215  280     IK           77 78        7B     INSTACK
  244  320     KK           85 86        6B     INSTACK

COMMON BLOCKS   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       DETAIL        2               0 DELTA  (1)                 1 LVEC   (1)

EQUIV CLASSES   LENGTH     MEMBERS - BIAS NAME(LENGTH)
       L1             1               0 EL     (1)

STATISTICS
  PROGRAM LENGTH                355B      237
  CM LABELED COMMON LENGTH       28        2
          52000B CM USED
```

VARIABLES	SN	TYPE	RELOCATION								
315	I	INTEGER		REFS	41	42	DEFINED	39	42		
316	IK	INTEGER		REFS	2*41	50	51	2*53	2*78		
				DEFINED	40	46	77				
320	I1	INTEGER		REFS	47	49	51	53	56	57	
				DEFINED	45	57					
321	J	INTEGER		REFS	48	52	DEFINED	47			
307	KB	INTEGER		REFS	40	46	51	79	80		
				DEFINED	28	79					
314	KJ	INTEGER		REFS	2*34	69	70	DEFINED	33	68	
306	KK	INTEGER		REFS	59	74	76	86	DEFINED	27	80
				85							
326	KK1	INTEGER		REFS	75	77	DEFINED	74			
312	K1	INTEGER		REFS	33	35	47	59	63	64	65
				66	68	80	DEFINED	31	36		
322	L	INTEGER		REFS	51	DEFINED	49				
311	LAST	INTEGER		REFS	33	68	85	DEFINED	30		
325	LJ	INTEGER		REFS	70	71	72	DEFINED	67	72	
324	LK	INTEGER		REFS	60	DEFINED	59				
1	LVEC	INTEGER	DETAIL	REFS	15						
327	L1	INTEGER		REFS	16	59	62	63	66	67	85
				DEFINED	56	84					
0	M	INTEGER	F.P.	REFS	20	21	DEFINED	1			
0	MID	INTEGER	F.P.	REFS	30	33	51	68	72	79	81
				84	DEFINED	1					
303	N	INTEGER		REFS	29	30	31	36	DEFINED	20	
0	NIX	INTEGER	F.P.	DEFINED	1	18					
310	NK	INTEGER		REFS	40	46	75	77	81		
				DEFINED	29	81					
323	P	REAL		REFS	54	55	DEFINED	53			
277	SUM	COMPLEX		REFS	10	51	DEFINED	50			
317	TOL	REAL		REFS	58	60	DEFINED	43			

EXTERNALS	TYPE	ARGS	REFERENCES	
COMSCA	COMPLEX	6	13	51

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES		
ABS	REAL	1	INTRIN		2*34	2*41	2*53
AIMAG	REAL	1	INTRIN		34	41	53
AMAX1	REAL	0	INTRIN		34	41	
CAP	REAL	1	SF	17	34	41	53
IABS	INTEGER	1	INTRIN		20		
REAL	REAL	1	INTRIN		34	41	53

STATEMENT LABELS			DEF LINE	REFERENCES		
0	100	INACTIVE	22	21		
16	110		24	2*21		
20	120		25	23		
0	130	INACTIVE	27			
0	133		34	33		
0	136		35	31		
0	140		42	40		
0	150	INACTIVE	49	2*48		
110	160		50	48		
0	170	INACTIVE	53	2*52		
0	180	INACTIVE	55	54		
135	190		57	46	52	2*54
0	200	INACTIVE	59	2*58		

```
                      IF ( G - TOL )  200, 200, 230                    CDAT      59
                  200 LK = KK + L1 - K1                                CDAT      60
      60              A(LK) = TOL                                      CDAT      61
                      D = 0.                                           CDAT      62
                  230 G = ENT(1,L1)                                    CDAT      63
                      ENT(1,L1) = ENT(1,K1)                            CDAT      64
                      ENT(1,K1) = G                                    CDAT      65
      65              ENT(2,K1) = EL                                   CDAT      66
                      IF (L1 - K1) 260,260,240                         CDAT      67
                  240 LJ = L1                                          CDAT      68
                      DO 250  KJ = K1,LAST,MID                         CDAT      69
                      H = A(KJ)                                        CDAT      70
      70              A(KJ) = A(LJ)                                    CDAT      71
                      A(LJ) = H                                        CDAT      72
                  250 LJ = LJ + MID                                    CDAT      73
                      D = -D                                           CDAT      74
                  260 KK1 = KK + 1                                     CDAT      75
      75              IF (KK1 - NK) 270,270,290                        CDAT      76
                  270 H = -A(KK)                                       CDAT      77
                      DO 280  IK = KK1,NK                              CDAT      78
                  280 A(IK) = A(IK) / H                                CDAT      79
                  290 KB = KB + MID                                    CDAT      80
      80              KK = KB + K1                                     CDAT      81
                      NK = NK + MID                                    CDAT      82
                  300 CONTINUE                                         CDAT      83
                  310 H = D                                            CDAT      84
                      L1 = MID + 1                                     CDAT      85
      85              DO 320  KK = 1,LAST,L1                           CDAT      86
                  320 H = H * A(KK)                                    CDAT      87
                      CDAT = H                                         CDAT      88
                  340 RETURN                                           CDAT      89
                      END                                              CDAT      90
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
5	CDAT	1	88

VARIABLES

		SN	TYPE		RELOCATION								
0	A		COMPLEX	ARRAY	F.P.	REFS	13	14	2*34	2*41	50	2*51	2*53
							69	70	76	78	86	DEFINED	1	51
							60	70	71	78				
275	CDAT		COMPLEX			DEFINED	87							
304	D		REAL			REFS	73	83	DEFINED	22	24	61	73	
0	DELTA		REAL		DETAIL	REFS	15	25	DEFINED	19				
327	EL		REAL			REFS	16	65						
0	ENT		REAL	ARRAY	F.P.	REFS	14	41	53	62	63			
						DEFINED	1	35	63	64	65			
305	EPS		REAL			REFS	2*26	43	DEFINED	25	26			
313	G		REAL			REFS	34	35	41	43	54	58	64	
						DEFINED	32	34	38	41	44	55	62	
301	H		COMPLEX			REFS	13	71	78	86	87			
						DEFINED	69	76	83	86				

```
      COMPLEX FUNCTION CDAT (A,M,MID,ENT,NIX)                          CDAT      2
C  MODIFIED CDET.  ALWAYS YIELDS A FACTORIZATION (EVEN IF A IS SING. )  CDAT      3
C  TRIANGULAR DECOMPOSITION WITH OPTIONAL DETERMINANT CALCULATION.      CDAT      4
C                                                                       CDAT      5
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     CDAT      6
C     COMPLEX*16 SUM                                                    CDAT      7
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        CDAT      8
C                                                                       CDAT      9
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     CDAT     10
      COMPLEX SUM                                                       CDAT     11
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        CDAT     12
C                                                                       CDAT     13
      COMPLEX A, H, COMSCA                                              CDAT     14
      DIMENSION  A(1), ENT(2,1)                                         CDAT     15
      COMMON  /DETAIL/ DELTA , LVEC                                     CDAT     16
      EQUIVALENCE (L1,EL)                                               CDAT     17
      CAP(H) = ABS(REAL(H)) + ABS( AIMAG(H))                            CDAT     18
      NIX = 0                                                           CDAT     19
      DELTA    =  1.E-10                                                CDAT     20
      N = IABS(M)                                                       CDAT     21
      IF (M)  100, 110, 110                                             CDAT     22
  100 D = 0.                                                            CDAT     23
      GO TO 120                                                         CDAT     24
  110 D = 1.                                                            CDAT     25
  120 EPS = DELTA                                                       CDAT     26
      IF (EPS .LT. 0.  .OR.  EPS .GT. 1.E-5)  EPS = 3.E-7               CDAT     27
  130 KK = 1                                                            CDAT     28
      KB = 1                                                            CDAT     29
      NK = N                                                            CDAT     30
      LAST = N*MID                                                      CDAT     31
      DO 136  K1 = 1,N                                                  CDAT     32
      G = 1.E-70                                                        CDAT     33
      DO 133  KJ = K1,LAST,MID                                          CDAT     34
  133 G = AMAX1(G,CAP(A(KJ)))                                           CDAT     35
  136 ENT(1,K1) = 1. / G                                                CDAT     36
      DO 300  K1 = 1,N                                                  CDAT     37
C   SET G TO MAX. ELT. OF (IMPLICITLY) SCALED ORIGINAL COLUMN K.        CDAT     38
      G = 0.                                                            CDAT     39
      I = 1                                                             CDAT     40
      DO 140  IK = KB,NK                                                CDAT     41
      G = AMAX1(G,ENT(1,I)*CAP(A(IK)))                                  CDAT     42
  140 I = I + 1                                                         CDAT     43
      TOL = G * EPS  +  1.E-12                                          CDAT     44
      G = 0.                                                            CDAT     45
      I1 = 1                                                            CDAT     46
      DO 190  IK = KB,NK                                                CDAT     47
      J = I1 - K1                                                       CDAT     48
      IF (J) 150,150,160                                                CDAT     49
  150 L = I1 - 1                                                        CDAT     50
  160 SUM = A(IK)                                                       CDAT     51
      A(IK) = COMSCA(A(I1),A(KB),SUM,L,MID,1)                           CDAT     52
      IF (J)  190, 170, 170                                             CDAT     53
  170 P = CAP(A(IK)) * ENT(1,I1)                                        CDAT     54
      IF (P - G)  190, 190,180                                          CDAT     55
  180 G = P                                                             CDAT     56
      L1 = I1                                                           CDAT     57
  190 I1 = I1 + 1                                                       CDAT     58
```

```
      1                SUBROUTINE ADIV ( A , B , C , M , MID , IT )                    ADIV        2
                       C                                                               ADIV        3
                       C   PREMULTIPLIES THE COMPLEX MATRICES  B  AND  C  BY  THE INVERSE OF   ADIV        4
                       C     THE COMPLEX ARRAY A. B AND C ARE SQUARE OF ORDER M, AND           ADIV        5
      5                C   ARE STORED IN COMPLEX DOUBLE ARRAYS OF DIMENSION (MID,*).         ADIV        6
                       C                                                               ADIV        7
                            DIMENSION  A(2,1) , B(2,1) , C(2,1) , IT(1)                ADIV        8
                            CALL CDAT ( A,-M,MID,IT,NIX )                              ADIV        9
                            LAST     =  M * MID                                        ADIV       10
     10                     DO 100  INDEX = 1,LAST,MID                                 ADIV       11
                            CALL CLUSAL (A,B(1,INDEX),M,MID,IT,0)                      ADIV       12
                        100 CALL CLUSAL (A,C(1,INDEX),M,MID,IT,0)                      ADIV       13
                            RETURN                                                     ADIV       14
                            END                                                        ADIV       15
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	ADIV	1	13

VARIABLES

		SN	TYPE		RELOCATION						
0	A		REAL	ARRAY	F.P.	REFS	7	8	11	12	DEFINED 1
0	B		REAL	ARRAY	F.P.	REFS	7	11	DEFINED	1	
0	C		REAL	ARRAY	F.P.	REFS	7	12	DEFINED	1	
75	INDEX		INTEGER			REFS	11	12	DEFINED	10	
0	IT		INTEGER	ARRAY	F.P.	REFS	7	8	11	12	DEFINED 1
74	LAST		INTEGER			REFS	10	DEFINED	9		
0	M		INTEGER		F.P.	REFS	8	9	11	12	DEFINED 1
0	MID		INTEGER		F.P.	REFS	8	9	10	11	12
						DEFINED	1				
73	NIX	*	INTEGER			REFS	8				

EXTERNALS

	TYPE	ARGS	REFERENCES	
CDAT		5	8	
CLUSAL		6	11	12

STATEMENT LABELS

		DEF LINE	REFERENCES
0	100	12	10

LOOPS

	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21	100	INDEX	10 12	238	EXT REFS

STATISTICS

PROGRAM LENGTH 1128 74

520000B CM USED

STATISTICS
PROGRAM LENGTH 63B 51
520000B CM USED

```
      1              SUBROUTINE ORIENT ( V, N )                          ORIENT      2
                     DIMENSION  V(2,N)                                   ORIENT      3
                     TOP = 0.                                            ORIENT      4
                     EUCLID   =  0.0                                     ORIENT      5
      5              L = 1                                               ORIENT      6
                     DO 110  I = 1, N                                    ORIENT      7
                     SIZE = V(1,I)**2 + V(2,I)**2                        ORIENT      8
                     IF ( SIZE .LE. TOP )          GO TO 110             ORIENT      9
                     L         =  I                                      ORIENT     10
     10              TOP = SIZE                                          ORIENT     11
                110  EUCLID   =  EUCLID + SIZE                          ORIENT     12
                     R         =  SQRT ( TOP * EUCLID )                  ORIENT     13
                     X = V(1,L) / R                                      ORIENT     14
                     Y = -V(2,L) / R                                     ORIENT     15
     15              DO 120  I = 1, N                                    ORIENT     16
                     G = V(1,I)                                          ORIENT     17
                     H = V(2,I)                                          ORIENT     18
                     V(1,I) = G * X  -  H * Y                            ORIENT     19
                120  V(2,I) = G * Y  +  H * X                           ORIENT     20
     20              RETURN                                              ORIENT     21
                     END                                                 ORIENT     22
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	ORIENT	1	20

VARIABLES

		SN	TYPE	RELOCATION								
52	EUCLID		REAL		REFS	11	12	DEFINED	4	11		
61	G		REAL		REFS	18	19	DEFINED	16			
62	H		REAL		REFS	18	19	DEFINED	17			
54	I		INTEGER		REFS	2*7	9	16	17	18	19	
					DEFINED	6	15					
53	L		INTEGER		REFS	13	14	DEFINED	5	9		
0	N		INTEGER	F.P.	REFS	2	6	15	DEFINED	1		
56	R		REAL		REFS	13	14	DEFINED	12			
55	SIZE		REAL		REFS	8	10	11	DEFINED	7		
51	TOP		REAL		REFS	8	12	DEFINED	3	10		
0	V		REAL	ARRAY F.P.	REFS	2	2*7	13	14	16	17	
					DEFINED	1	18	19				
57	X		REAL		REFS	18	19	DEFINED	13			
60	Y		REAL		REFS	18	19	DEFINED	14			

EXTERNALS

	TYPE	ARGS	REFERENCES
SQRT	REAL	1 LIBRARY	12

STATEMENT LABELS

		DEF LINE	REFERENCES	
21	110	11	6	8
0	120	19	15	

LOOPS

LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
110	I	6 11	108	OPT
120	I	15 19	78	INSTACK

VARIABLES	SN	TYPE		RELOCATION									
0	KR	INTEGER		F.P.	REFS	3	DEFINED	1					
143	L	INTEGER			REFS	16	18	19	DEFINED	13			
0	N	INTEGER		F.P.	REFS	5	22	28	30	DEFINED	1		
0	X	COMPLEX	ARRAY	F.P.	REFS	3	27	29	DEFINED	1	23		
134	XY	COMPLEX			REFS	3	20	29	30	DEFINED	18	27	

EXTERNALS	TYPE	ARGS		REFERENCES
CABS	REAL	1	LIBRARY	11

STATEMENT LABELS			DEF LINE	REFERENCES	
27	2		15	9	12
51	6		22	6	16
0	7		20	17	
0	8		23	22	
0	9		29	28	
0	10		30	25	
12	11		6	32	
132	13		33	6	24
0	15	INACTIVE	7	6	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
17	2	I	9 15	13B		EXT REFS
42	7	J	17 20	6B	INSTACK	
57	8	I	22 23	3B	INSTACK	
66	10	J	25 30	42B		NOT INNER
110	9	I	28 29	7B	INSTACK	

STATISTICS

PROGRAM LENGTH	160B	112
52000B CM USED		

```
      1              SUBROUTINE JORCOM (A,N,X,KR,KC)                          JORCOM     2
                C                                                              JORCOM     3
                      COMPLEX          A(KR,1) ,        X(1) ,        XY      JORCOM     4
                C                                                              JORCOM     5
      5               K        =  N + 1                                        JORCOM     6
                   11 IF ( K - 1 )  13 , 6 , 15                                JORCOM     7
                   15 D        =  0.0                                          JORCOM     8
                C                                                              JORCOM     9
                      DO 2  I = 2,K                                            JORCOM    10
     10               II       =  I - 1                                       JORCOM    11
                      C1       =  CABS (A(II,1))                              JORCOM    12
                      IF ( C1 .LE. D )        GO TO 2                        JORCOM    13
                      L        =  II                                          JORCOM    14
                      D        =  C1                                          JORCOM    15
     15               2 CONTINUE                                              JORCOM    16
                      IF ( L .EQ. 1 )         GO TO 6                        JORCOM    17
                      DO 7  J = 1,K                                          JORCOM    18
                      XY       =  A(L,J)                                     JORCOM    19
                      A(L,J)   =  A(1,J)                                     JORCOM    20
     20               7 A(1,J)   =  XY                                       JORCOM    21
                C                                                              JORCOM    22
                   6  DO 8  I = 1,N                                          JORCOM    23
                   8  X(I)     =  A(I,1)                                     JORCOM    24
                      IF ( K .EQ. 1 )         GO TO 13                       JORCOM    25
     25               DO 10  J = 2,K                                         JORCOM    26
                      IJ       =  J - 1                                      JORCOM    27
                      XY       =  A(1,J) / X(1)                              JORCOM    28
                      DO 9   I = 2,N                                         JORCOM    29
                   9  A(I-1,IJ)  =  A(I,J) - X(I)*XY                         JORCOM    30
     30               10 A(N,IJ)  =  XY                                      JORCOM    31
                      K        =  K - 1                                      JORCOM    32
                      GO TO 11                                               JORCOM    33
                   13 RETURN                                                 JORCOM    34
                      END                                                    JORCOM    35
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	JORCOM	1	33

VARIABLES	SN	TYPE		RELOCATION							
0	A	COMPLEX	ARRAY	F.P.	REFS	3	11	18	19	23	27	29
					DEFINED	1	19	20	29	30		
142	C1	REAL			REFS	12	14	DEFINED	11			
137	D	REAL			REFS	12	DEFINED	7	14			
140	I	INTEGER			REFS	10	2*23	3*29	DEFINED	9	22	28
141	II	INTEGER			REFS	11	13	DEFINED	10			
145	IJ	INTEGER			REFS	29	30	DEFINED	26			
144	J	INTEGER			REFS	18	2*19	20	26	27	29	
					DEFINED	17	25					
136	K	INTEGER			REFS	6	9	17	24	25	31	
					DEFINED	5	31					
0	KC	INTEGER	*UNUSED	F.P.	DEFINED	1						

VARIABLES	SN	TYPE	RELOCATION								
11	SIGMA	REAL		REFS	66	DEFINED	57				
145	SUM	REAL	ARRAY	REFS	28	107	108	109	DEFINED	105	106
123	TARGET	COMPLEX		REFS	27	DEFINED	72				
0	V	REAL	ARRAY F.P.	REFS	25	85	86	2*89	2*92	99	100
				2*105	2*106	107	DEFINED	1	46	47	87
				88	99	100					

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES	
CDAT	COMPLEX	5		27	72
CLUSAL		6		110	
COMSCA		6		107	
RDM	REAL	1		51	
SQRT	REAL	1	LIBRARY	30	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
AIMAG	REAL	1	INTRIN		43
REAL	REAL	1	INTRIN		42

STATEMENT LABELS			DEF LINE	REFERENCES
147	2		94	91
303	10	FMT	118	113
312	20	FMT	119	92
0	110		52	45
0	120		64	62
0	130		67	61
101	150		81	112
0	160		89	82
0	170		100	96
167	175		103	95
0	180		109	104
232	490		113	103
234	500		121	101

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
23	110	I	45 52	10B		EXT REFS
40	130	I	61 67	30B		NOT INNER
46	120	IU	62 64	10B	OPT	
111	160	I	82 89	14B	OPT	
133		I	92 92	13B		EXT REFS
160	170	I	96 100	5B	INSTACK	
173	180	I	104 109	24B		EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
DETAIL	2	0 EPS (1)	1 LVEC (1)
CTAPES	50	0 ITAPES (50)	

STATISTICS

PROGRAM LENGTH	377B	255
CM LABELED COMMON LENGTH	64B	52

52000B CM USED

```
      SUBROUTINE GRVEC ( P, LAMBDA, M, MID, IT, G, H, F, ITER8 )
C
C
C  ROW EIGENVECTORS OF THE SYSTEM
C
C    G (TRANSPOSE) * ( LAMBDA**2 * I  +  LAMBDA * P  +  Q )  =  0
C
C  WITH COMPLEX P AND Q. IT IS ASSUMED THAT THE CORRESPONDING COLUMN
C  VECTOR HAS ALREADY BEEN CALCULATED VIA GCVEC AND THAT THE VARIABLES
C  LAMBDA, M, AND MID AND THE ARRAYS P, IT, AND F ARE UNCHANGED FROM
C  GCVEC.  G IS THE VECTOR COMPUTED BY GRVEC, AND H IS A (COMPLEX)
C  SCRATCH VECTOR.  ITER8 IS USED IN THE SAME SENSE AS IN GCVEC.
C
C
C
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C     DOUBLE PRECISION SUM
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS
C
      DIMENSION SUM(2)
      DIMENSION   P(2,1), IT(2,1), G(2,1), H(2,1), F(2,1)
      DIMENSION ITAPES(50)
      COMMON / CTAPES / ITAPES
      COMMON /DETAIL / EPS , LVEC
      COMPLEX LAMBDA
      REAL    MU, NU, NORM
C
C
      ITAPEW = ITAPES(6)
C
C
      HURDLE   =  1.E7
      KEY = 0
      MID1 = MID + 1
      MIDM = MID * M
      MU = REAL(LAMBDA)
      NU = AIMAG(LAMBDA)
      DO  110   I = 1, M
      G(1,I) = 0.
      G(2,I) = 0.
C
C   THE RDM ARGUMENT IS NOT SIGNIFICANT AND IS NOT CHANGED.
C
      H(1,I) = RDM( NORM )
  110 H(2,I) = 0.
C
C
C
      ITER8 = 0
  120 NORM = 0.
      IB = 1
      DO 130  I = 1, M
      SUM(1) = G(1,I)  +  MU * H(1,I)  -  NU * H(2,I)
      SUM(2) = G(2,I)  +  MU * H(2,I)  +  NU * H(1,I)
      CALL COMSCA ( P(1,IB), H, SUM, M, 1, 1 )
      G(1,I) = SUM(1)
      G(2,I) = SUM(2)
```

```
                      NORM = NORM + H(1,I)**2 + H(2,I)**2                                GRVEC      59
                  130 IB = IB + MID                                                      GRVEC      60
      60              NORM = SQRT ( NORM )                                               GRVEC      61
                      DO 140  I = 1, M                                                   GRVEC      62
                      S = G(1,I)                                                         GRVEC      63
                      G(1,I) = H(1,I)                                                    GRVEC      64
                      H(1,I) = S                                                         GRVEC      65
      65              S = G(2,I)                                                         GRVEC      66
                      G(2,I) = H(2,I)                                                    GRVEC      67
                  140 H(2,I) = S                                                         GRVEC      68
                      IF ( LVEC .EQ. 0 )      GO TO 2                                    GRVEC      69
                      WRITE (ITAPEW,20) ITER8,NORM,(H(1,I),H(2,I),G(1,I),G(2,I),I=1,M)   GRVEC      70
      ,0            2 CONTINUE                                                         GRVEC      71
                      IF ( NORM .GE. HURDLE )  GO TO 500                                 GRVEC      72
                      IF ( ITER8 .GT. 10 )   GO TO 490                                   GRVEC      73
                      DO 150  I = 1, M                                                   GRVEC      74
                      H(1,I) = -MU * G(1,I)  +  NU * G(2,I)  -  H(1,I)                   GRVEC      75
      75          150 H(2,I) = -MU * G(2,I)  -  NU * G(1,I)  -  H(2,I)                   GRVEC      76
                  C                                                                      GRVEC      77
                  C  CLUTSL IS LIKE CLUSAL, BUT SOLVES SYSTEMS OF THE FORM               GRVEC      78
                  C                                                                      GRVEC      79
                  C    A (TRANSPOSE) * X  =  Y   RATHER THAN THOSE OF THE FORM           GRVEC      80
      80          C                                                                      GRVEC      81
                  C                A * X  =  Y.                                          GRVEC      82
                  C                                                                      GRVEC      83
                  C  IN EACH CASE, CDAT RECEIVES ( AND FACTORS ) THE A MATRIX.           GRVEC      84
                  C                                                                      GRVEC      85
      85              CALL CLUTSL ( F, H, M, MID, IT, KEY)                               GRVEC      86
                      ITER8 = ITER8 + 1                                                  GRVEC      87
                      GO TO 120                                                          GRVEC      88
                  C                                                                      GRVEC      89
                  C                                                                      GRVEC      90
      90          490 WRITE (ITAPEW,10)  LAMBDA                                          GRVEC      91
                  C                                                                      GRVEC      92
                  C                                                                      GRVEC      93
                  C FORMATS                                                              GRVEC      94
                  C                                                                      GRVEC      95
      95           10 FORMAT (41HONO CONVERGENCE IN 10 TRIES WITH LAMBDA =,1P2E15.7 )     GRVEC      96
                   20 FORMAT ( 8HOITER8 =, I2, 7H NORM =,G16.7 / (4G20.7))               GRVEC      97
                  C                                                                      GRVEC      98
                  500 RETURN                                                             GRVEC      99
                      END                                                                GRVEC     100
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

3 GRVEC	DEF LINE 1	REFERENCES 98

VARIABLES

0 EPS	REAL		RELOCATION DETAIL	REFS	24							
0 F	REAL	ARRAY	F.P.	REFS	21	85	DEFINED	1				
0 G	REAL	ARRAY	F.P.	REFS	21	53	54	62	65	2*69	2*74	
				2*75	DEFINED	1	39	40	56	57	63	

VARIABLES	SN	TYPE	RELOCATION									
					66							
0	H	REAL	ARRAY	F.P.	REFS	21	2*53	2*54	55	2*58	63	66
					2*69	74	75	85	DEFINED	1	44	45
					64	67	74	75				
247	HURDLE	REAL			REFS	71	DEFINED	32				
253	I	INTEGER			REFS	39	40	44	45	3*53	3*54	56
					57	2*58	62	2*63	64	65	2*66	67
					4*69	4*74	4*75	DEFINED	38	52	61	69
					73							
254	IB	INTEGER			REFS	55	59	DEFINED	51	59		
0	IT	INTEGER	ARRAY	F.P.	REFS	21	85	DEFINED	1			
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	22	23	29				
246	ITAPEW	INTEGER			DEFINED	29	I/O REFS	69	90			
0	ITER8	INTEGER		F.P.	REFS	69	72	86	DEFINED	1	49	86
250	KEY	INTEGER			REFS	85	DEFINED	33				
0	LAMBDA	COMPLEX		F.P.	REFS	25	36	37	90	DEFINED	1	
1	LVEC	INTEGER		DETAIL	REFS	24	68					
0	M	INTEGER		F.P.	REFS	35	38	52	55	61	69	73
					85	DEFINED	1					
0	MID	INTEGER		F.P.	REFS	34	35	59	85	DEFINED	1	
252	MIDM	* INTEGER			DEFINED	35						
251	MID1	* INTEGER			DEFINED	34						
243	MU	REAL			REFS	26	53	54	74	75		
					DEFINED	36						
245	NORM	REAL			REFS	26	44	58	60	69	71	
					DEFINED	50	58	60				
244	NU	REAL			REFS	26	53	54	74	75		
					DEFINED	37						
0	P	REAL	ARRAY	F.P.	REFS	21	55	DEFINED	1			
255	S	REAL			REFS	64	67	DEFINED	62	65		
256	SUM	REAL	ARRAY		REFS	20	55	56	57	DEFINED	53	54

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
CLUTSL		6		85
COMSCA		6		55
RDM	REAL	1		44
SQRT	REAL	1	LIBRARY	60

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
AIMAG	REAL	1	INTRIN		37
REAL	REAL	1	INTRIN		36

STATEMENT LABELS			DEF LINE	REFERENCES
124	2		70	68
225	10	FMT	95	90
234	20	FMT	96	69
0	110		45	38
32	120		50	87
0	130		59	52
0	140		67	61
0	150		75	73
163	490		90	72
165	500		98	71

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21	110	I	38 45	10B	EXT REFS
35	130	I	52 59	31B	EXT REFS
76	140	I	61 67	5B	INSTACK
110		I	69 69	13B	EXT REFS
137	150	I	73 75	7B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
CTAPES	50	0 ITAPES (50)	
DETAIL	2	0 EPS (1)	1 LVEC (1)

STATISTICS

PROGRAM LENGTH	302B	194
CM LABELED COMMON LENGTH	64B	52

52000B CM USED

```
      SUBROUTINE CLUTSL ( LU, Y, M, MID, LOC, KEY )                     CLUTSL     2
C                                                                       CLUTSL     3
C  SOLVES THE COMPLEX LINEAR SYSTEM   AT * X  =  Y,  WHERE AT REPRESENTS CLUTSL     4
C  A TRANSPOSE  AND THE LU ARRAY CONTAINS THE TRIANGULAR FACTORS OF A,  CLUTSL     5
C  L BELOW THE DIAG. AND U ON AND ABOVE.  THIS IS THE ARRANGEMENT PRO-   CLUTSL     6
C  DUCED BY CDAT, WHICH ALSO PUTS INTERCHANGE INFO INTO LOC.            CLUTSL     7
C                                                                       CLUTSL     8
C                                                                       CLUTSL     9
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     CLUTSL    10
C     COMPLEX*16 S                                                      CLUTSL    11
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        CLUTSL    12
C                                                                       CLUTSL    13
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     CLUTSL    14
      COMPLEX S                                                         CLUTSL    15
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        CLUTSL    16
C                                                                       CLUTSL    17
      COMPLEX LU(1),Y(1),COMSCA,H                                       CLUTSL    18
      DIMENSION LOC(2,1)                                                CLUTSL    19
      MID1  =  MID + 1                                                  CLUTSL    20
      IF  (KEY .LT. 0 )  GO TO 110                                      CLUTSL    21
C                                                                       CLUTSL    22
C   FORWARD SOLUTION                                                    CLUTSL    23
C                                                                       CLUTSL    24
      IB    =  1                                                        CLUTSL    25
      II    =  1                                                        CLUTSL    26
      DO 100  I = 1,M                                                   CLUTSL    27
      H     =  Y(I)                                                     CLUTSL    28
      S     =  -H                                                       CLUTSL    29
      Y(I)  =  -COMSCA( LU(IB), Y, S, I-1, 1, 1 )  /  LU(II)            CLUTSL    30
      IB    =  IB + MID                                                 CLUTSL    31
  100 II    =  II + MID1                                                CLUTSL    32
      IF ( KEY .GT. 0 )  RETURN                                         CLUTSL    33
C                                                                       CLUTSL    34
C   BACK SOLUTION                                                       CLUTSL    35
C                                                                       CLUTSL    36
  110 K     =  M                                                        CLUTSL    37
      KK1   =  M * MID1  -  MID  +  1                                   CLUTSL    38
  120 S     =  Y(K)                                                     CLUTSL    39
      Y(K)  =  COMSCA( LU(KK1), Y(K+1), S, M-K, 1, 1 )                  CLUTSL    40
      KK1   =  KK1 - MID1                                               CLUTSL    41
      K     =  K - 1                                                    CLUTSL    42
      IF  ( K )  130, 130, 120                                          CLUTSL    43
  130 K     =  M                                                        CLUTSL    44
  140 L     =  LOC(2,K)                                                 CLUTSL    45
      H     =  Y(K)                                                     CLUTSL    46
      Y(K)  =  Y(L)                                                     CLUTSL    47
      Y(L)  =  H                                                        CLUTSL    48
      K     =  K - 1                                                    CLUTSL    49
      IF  ( K )  150, 150, 140                                          CLUTSL    50
  150 RETURN                                                            CLUTSL    51
      END                                                               CLUTSL    52
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	CLUTSL	1	32 50

VARIABLES	SN	TYPE		RELOCATION								
126	H	COMPLEX			REFS	17	28	47	DEFINED	27	45	
133	I	INTEGER			REFS	27	2*29	DEFINED	26			
131	IB	INTEGER			REFS	29	30	DEFINED	24	30		
132	II	INTEGER			REFS	29	31	DEFINED	25	31		
134	K	INTEGER			REFS	38	3*39	41	42	44	45	46
						48	49	DEFINED	36	41	43	48
0	KEY	INTEGER		F.P.	REFS	20	32	DEFINED	1			
135	KK1	INTEGER			REFS	39	40	DEFINED	37	40		
136	L	INTEGER			REFS	46	47	DEFINED	44			
0	LOC	INTEGER	ARRAY	F.P.	REFS	18	44	DEFINED	1			
0	LU	COMPLEX	ARRAY	F.P.	REFS	17	2*29	39	DEFINED	1		
0	M	INTEGER		F.P.	REFS	26	36	37	39	43		
					DEFINED	1						
0	MID	INTEGER		F.P.	REFS	19	30	37	DEFINED	1		
130	MID1	INTEGER			REFS	31	37	40	DEFINED	19		
124	S	COMPLEX			REFS	14	29	39	DEFINED	28	38	
0	Y	COMPLEX	ARRAY	F.P.	REFS	17	27	29	38	39	45	46
					DEFINED	1	29	39	46	47		

EXTERNALS	TYPE	ARGS	REFERENCES		
COMSCA	COMPLEX	6	17	29	39

STATEMENT LABELS			DEF LINE	REFERENCES
0	100		31	26
46	110		36	20
53	120		38	42
0	130	INACTIVE	43	2*42
75	140		44	49
0	150	INACTIVE	50	2*49

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	100	I	26 31	308	EXT REFS

STATISTICS

PROGRAM LENGTH 147B 103

52000B CM USED

```
      SUBROUTINE EIGM (RHOP,IR,IS)                                      EIGM       2
C                                                                       EIGM       3
C     EIGENVALUE MATRIX PROGRAM                                         EIGM       4
C                                                                       EIGM       5
CIBM  BEGINNING OF STATEMENTS ASSOCI'TED WITH IBM COMPUTER PROGRAMS     EIGM       6
C     COMPLEX*16 SUM                                                    EIGM       7
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        EIGM       8
C                                                                       EIGM       9
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     EIGM      10
      COMPLEX SUM                                                       EIGM      11
      COMPLEX BECS(40,40),BBECS(40,40)                                  EIGM      12
      COMMON /BCOM/ BECS,BBECS                                          EIGM      13
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        EIGM      14
C                                                                       EIGM      15
      DIMENSION LOC(40), NIND(40), WW(40,40), OMG(40), OMGA(40)         EIGM      16
      DIMENSION ITAPES(50), LC(40)                                      EIGM      17
      DIMENSION VBO(30), RVBO(15)                                       EIGM      18
C                                                                       EIGM      19
      COMPLEX B(40,40), DETAD(40,40), BB(40,40), CC(40,40)              EIGM      20
      COMPLEX AIB(40,40), Q(40,40), QAA(40,40), COMSCA                  EIGM      21
C                                                                       EIGM      22
      COMMON /FLEXT / BB, OMGA, RHO, VB                                 EIGM      23
      COMMON /MODD  / B, DETAD, WW, OMG, NC                             EIGM      24
      COMMON /FITR  / NOMI, NIND                                        EIGM      25
      COMMON /FLUTAN/ FMACH ,BETA  ,VBO   ,RVBO  ,NRVBO                 EIGM      26
      COMMON / CTAPES / ITAPES                                          EIGM      27
      COMMON /FLUTV / VL, VH, FLO, FHI, IE, NQZ, NVTOT                  EIGM      28
      COMMON /COMA  / LC,BR                                             EIGM      29
C                                                                       EIGM      30
      EQUIVALENCE (Q(1,1),AIB(1,1))                                     EIGM      31
      EQUIVALENCE (B(1,1),QAA(1,1))                                     EIGM      32
      EQUIVALENCE (BB(1,1),CC(1,1))                                     EIGM      33
C                                                                       EIGM      34
CCDC                                                                    EIGM      35
      LEVEL 3, BECS,BBECS                                               EIGM      36
CCDC                                                                    EIGM      37
C                                                                       EIGM      38
      ITAPEW = ITAPES(6)                                                EIGM      39
      MTAP1 = ITAPES(37)                                                EIGM      40
      MTAP50 = ITAPES(50)                                               EIGM      41
      MTAP = MTAP50                                                     EIGM      42
      MID = 40                                                          EIGM      43
C                                                                       EIGM      44
CIBM                                                                    EIGM      45
C     ITAPWK=59                                                         EIGM      46
C     REWIND ITAPWK                                                     EIGM      47
C     WRITE (ITAPWK) B, BB                                              EIGM      48
C     REWIND ITAPWK                                                     EIGM      49
CIBM                                                                    EIGM      50
C                                                                       EIGM      51
CCDC                                                                    EIGM      52
      MIDSQ2 = MID * MID * 2                                            EIGM      53
      CALL WRITEC(B(1,1),BECS(1,1),MIDSQ2)                              EIGM      54
      CALL WRITEC(BB(1,1),BBECS(1,1),MIDSQ2)                            EIGM      55
CCDC                                                                    EIGM      56
C                                                                       EIGM      57
      NQ   = LC(2)                                                      EIGM      58
```

```
                  IF (IE.EQ.1)  NQZ = NQ                                    EIGM       59
                  NROW = (NQ*NQ)/3                                          EIGM       60
   60             NDZS = 50 - NROW                                          EIGM       61
                C                                                           EIGM       62
                C  ******************************************************   EIGM       63
                C  *       THE FOLLOWING LINES OF CODE ARE NOT USED     *   EIGM       64
                C  *       IN THE CURRENT VERSION OF ESP BECAUSE 'BB'   *   EIGM       65
   65           C  *       IS TEMPORARILY SAVED ON AN I/O UNIT AND      *   EIGM       66
                C  *       'BB' AND 'CC' ARE EQUIVALENCED.              *   EIGM       67
                C  ******************************************************   EIGM       68
                C     DO 1  I=1,NQ                                          EIGM       69
                C     DO 1  J=1,NQ                                          EIGM       70
   70           C   1 CC(I,J) = BB(I,J)                                     EIGM       71
                C  ******************************************************   EIGM       72
                C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.     *   EIGM       73
                C  ******************************************************   EIGM       74
                C                                                           EIGM       75
   75              IF (IE.NE.1) CALL CONV (NQ,NQZ,NOMI,NIND,CC)             EIGM       76
                   NIX  =  0                                                EIGM       77
                   IF (LC(12).NE.0)  CALL SREVNC (CC,NQZ,LOC,MID,NIX)       EIGM       78
                   IF (NIX.EQ.0) GOTO 2                                     EIGM       79
                   WRITE (ITAPEW,3)                                         EIGM       80
   80              STOP                                                     EIGM       81
                  2 REWIND MTAP                                             EIGM       82
                C                                                           EIGM       83
                C                                                           EIGM       84
                   NVBO = LC(4)                                             EIGM       85
   85           C                                                           EIGM       86
                   NLITE=0                                                  EIGM       87
                   NVTOT = NVBO                                             EIGM       88
                   WRITE (MTAP1) VL,VH,FLO,FHI,IE,NQZ,NVTOT                 EIGM       89
                  9 CONTINUE                                                EIGM       90
   90             DO 21 IV=1,NVBO                                          EIGM       91
                  IF (LC(13) .EQ. 0)   GOTO 10                              EIGM       92
                  READ (MTAP)  Q                                            EIGM       93
                  GOTO 30                                                   EIGM       94
                 10 DO 40  I=1,NQ                                           EIGM       95
   95            40 READ (MTAP)  (Q(I,II), II=1,NQ)                        EIGM       96
                 30 CONTINUE                                                EIGM       97
                  IF ( LC(1) .NE. 2 )     GO TO 7                           EIGM       98
                  XX        =  0.0                                          EIGM       99
                  XXX       =  RHO                                          EIGM      100
  100             GO TO 8                                                   EIGM      101
                  7 XX        =  RHO * VBO(IV) * BR                         EIGM      102
                  XXX       =   XX * VBO(IV) * BR                         EIGM      103
                  8 CONTINUE                                                EIGM      104
                  DO 20 I=1,NQ                                              EIGM      105
  105             DO 20 J=1,NQ                                              EIGM      106
                  QAA(I,J)  =  RHO * Q(I,J)                                 EIGM      107
                 1          + CMPLX(REAL(DETAD(I,J))*XXX,AIMAG(DETAD(I,J))*XX)  EIGM      108
                  IF (LC(1).NE.2)  QAA(I,J) = QAA(I,J) + WW(I,J)            EIGM      109
                 20 CONTINUE                                                EIGM      110
  110             IF (IE.EQ.1)  GOTO 6                                      EIGM      111
                  CALL CONV (NQ,NQZ,NOMI,NIND,QAA)                          EIGM      112
                  6 NIX = 0                                                 EIGM      113
                  IF (LC(12).EQ.0)  CALL SREVNC (QAA,NQZ,LOC,MID,NIX)       EIGM      114
                  IF (NIX.EQ.0) GOTO 4                                      EIGM      115
```

```
115                WRITE (ITAPEW,3)                                                  EIGM      116
                   STOP                                                              EIGM      117
                 4 DO 5  I=1,NQZ                                                     EIGM      118
                   DO 5  J=1,NQZ                                                     EIGM      119
                   SUM = 0.0                                                         EIGM      120
120                IF (LC(12).EQ.0) AIB(I,J) = COMSCA(QAA(I,1),CC(1,J),SUM,          EIGM      121
                  1                                   NQZ,MID,1)                     EIGM      122
                   IF (LC(12).NE.0) AIB(I,J) = COMSCA(CC(I,1),QAA(1,J), SUM,        EIGM      123
                  1                                   NQZ,MID,1)                     EIGM      124
                 5 CONTINUE                                                          EIGM      125
125                IF (LC(30).EQ.0) GOTO 25                                          EIGM      126
                   IF (LC(1).NE.2) GOTO 46                                           EIGM      127
                   IF (NLITE.EQ.0) WRITE (ITAPEW,800)                                EIGM      128
                   WRITE (ITAPEW,801) RHOP                                           EIGM      129
                   GO TO 500                                                         EIGM      130
130              46 IF(NLITE.EQ.0)WRITE (ITAPEW,802)                                 EIGM      131
                   WRITE (ITAPEW,609) VBO(IV), RHOP                                  EIGM      132
                500 WRITE (ITAPEW,814)                                               EIGM      133
                   DO 12 I=1,NQZ                                                     EIGM      134
                 12 WRITE (ITAPEW,608) (AIB(I,J),J=1,NQZ)                            EIGM      135
135                NLITE = NLITE + NROW + 10                                         EIGM      136
                   IF(NLITE.GT.NDZS)NLITE=0                                          EIGM      137
                 25 CALL FLSL (RHOP, AIB, MID, IV)                                   EIGM      138
                 21 CONTINUE                                                         EIGM      139
               C                                                                     EIGM      140
140            CIBM                                                                  EIGM      141
               C     READ (ITAPWK) B, BB                                             EIGM      142
               C     REWIND ITAPWK                                                   EIGM      143
               CIBM                                                                  EIGM      144
               C                                                                     EIGM      145
145            CCDC                                                                  EIGM      146
                     CALL READEC(B(1,1),BECS(1,1),MIDSQ2)                          EIGM      147
                     CALL READEC(BB(1,1),BBECS(1,1),MIDSQ2)                        EIGM      148
               CCDC                                                                  EIGM      149
               C                                                                     EIGM      150
150                  REWIND MTAP                                                     EIGM      151
               C                                                                     EIGM      152
               C                                                                     EIGM      153
               C FORMATS                                                             EIGM      154
               C                                                                     EIGM      155
155                3 FORMAT (1H1,20X, 33HFAILED TO INVERT STIFFNESS MATRIX, //,30X, EIGM      156
                  1        20HEXECUTION TERMINATED)                                EIGM      157
                 608 FORMAT(/( T8,1PE10.3,T20,1PE10.3, T6,2H (,T18,2H, ,T30,2H) ,  EIGM      158
                    1        T34,1PE10.3,T46,1PE10.3,T32,2H (,T44,2H, ,T56,2H) ,   EIGM      159
                    2         T60,1PE10.3,T72,1PE10.3,T58,2H (,T70,2H, ,T82,2H) )) EIGM      160
160              609 FORMAT (/11X, 24HA-1B OR B-1A MATRIX-VBO=,F12.7,5X, 12HRHO/RHO(SL) EIGM      161
                  1=, F12.7/)                                                        EIGM      162
                 800 FORMAT (1H1,4X,19HDIVERGENCE ANALYSIS,//)                       EIGM      163
                 801 FORMAT (//11X, 35HA-1B OR B-1A MATRIX - RHO/RHO(SL) =,F12.7//) EIGM      164
                 802 FORMAT (1H1,4X, 16HFLUTTER ANALYSIS,//)                         EIGM      165
165              814 FORMAT (/11X,  7HBY ROWS,15X,11H(REAL,IMAG),/)                  EIGM      166
               C                                                                     EIGM      167
                     RETURN                                                          EIGM      168
                     END                                                             EIGM      169
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	EIGM	1	167

VARIABLES	SN	TYPE		RELOCATION								
565	AIB	COMPLEX	ARRAY		REFS	20	30	134	137	DEFINED	120	122
0	B	COMPLEX	ARRAY	MODD	REFS	19	23	31	53	146		
0	BB	COMPLEX	ARRAY	FLEXT	REFS	19	22	32	54	147		
6200	BBECS	COMPLEX	ARRAY	BCOM	REFS	11	12	35	54	147		
0	BECS	COMPLEX	ARRAY	BCOM	REFS	11	12	35	53	146		
1	BETA	REAL		FLUTAN	REFS	25						
50	BR	REAL		COMA	REFS	28	101	102				
0	CC	COMPLEX	ARRAY	FLEXT	REFS	19	32	75	77	120	122	
6200	DETAD	COMPLEX	ARRAY	MODD	REFS	19	23	2*106				
3	FHI	REAL		FLUTV	REFS	27	88					
2	FLO	REAL		FLUTV	REFS	27	88					
0	FMACH	REAL		FLUTAN	REFS	25						
560	I	INTEGER			REFS	95	4*106	3*108	2*120	2*122	134	
					DEFINED	94	104	117	133			
4	IE	INTEGER		FLUTV	REFS	27	58	75	88	110		
561	II	INTEGER			REFS	95	DEFINED	95				
0	IR	INTEGER	*UNUSED	F.P.	DEFINED	1						
0	IS	INTEGER	*UNUSED	F.P.	DEFINED	1						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	16	26	38	39	40		
543	ITAPEW	INTEGER			DEFINED	38	I/O REFS	79	115	127	128	130
					131	132	134					
557	IV	INTEGER			REFS	101	102	131	137	DEFINED	90	
564	J	INTEGER			REFS	4*106	3*108	2*120	2*122	134		
					DEFINED	105	118	134				
0	LC	INTEGER	ARRAY	COMA	REFS	16	28	57	77	84	91	97
					108	113	120	122	125	126		
6765	LOC	INTEGER	ARRAY		REFS	15	77	113				
547	MID	INTEGER			REFS	2*52	77	113	120	122	137	
					DEFINED	42						
550	MIDSQ2	INTEGER			REFS	53	54	146	147	DEFINED	52	
546	MTAP	INTEGER			DEFINED	41	I/O REFS	81	92	95	150	
544	MTAP1	INTEGER			DEFINED	39	I/O REFS	88				
545	MTAP50	INTEGER			REFS	41	DEFINED	40				
17550	NC	INTEGER		MODD	REFS	23						
553	NDZS	INTEGER			REFS	136	DEFINED	60				
1	NIND	INTEGER	ARRAY	FITR	REFS	15	24	75	111			
554	NIX	INTEGER			REFS	77	78	113	114	DEFINED	76	112
556	NLITE	INTEGER			REFS	127	130	135	136	DEFINED	86	135
					136							
0	NOMI	INTEGER		FITR	REFS	24	75	111				
551	NQ	INTEGER			REFS	58	2*59	75	94	95	104	105
					111	DEFINED	57					
5	NQZ	INTEGER		FLUTV	REFS	27	75	77	88	111	113	117
					118	120	122	133	134	DEFINED	58	
552	NROW	INTEGER			REFS	60	135	DEFINED	59			
57	NRVBO	INTEGER		FLUTAN	REFS	25						
555	NVBO	INTEGER			REFS	87	90	DEFINED	84			
6	NVTOT	INTEGER		FLUTV	REFS	27	88	DEFINED	87			
17500	OMG	REAL	ARRAY	MODD	REFS	15	23					
6200	OMGA	REAL	ARRAY	FLEXT	REFS	15	22					

VARIABLES	SN	TYPE		RELOCATION								
565	Q	COMPLEX	ARRAY		REFS	20	30	106	DEFINED	92	95	
0	QAA	COMPLEX	ARRAY	MODD	REFS	20	31	108	111	113	120	122
					DEFINED	106	108					
6250	RHO	REAL		FLEXT	REFS	22	99	101	106			
0	RHOP	REAL		F.P.	REFS	128	131	137	DEFINED	1		
40	RVBO	REAL	ARRAY	FLUTAN	REFS	17	25					
541	SUM	COMPLEX			REFS	10	120	122	DEFINED	119		
6251	VB	REAL		FLEXT	REFS	22						
2	VBO	REAL	ARRAY	FLUTAN	REFS	17	25	101	102	131		
1	VH	REAL		FLUTV	REFS	27	88					
0	VL	REAL		FLUTV	REFS	27	88					
14400	WW	REAL	ARRAY	MODD	REFS	15	23	108				
562	XX	REAL			REFS	102	106	DEFINED	98	101		
563	XXX	REAL			REFS	106	DEFINED	99	102			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES		
COMSCA	COMPLEX	6	20	120	122
CONV		5	75	111	
FLSL		4	137		
READEC		3	146	147	
SREVNC		5	77	113	
WRITEC		3	53	54	

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
AIMAG	REAL	1	INTRIN	106
CMPLX	COMPLEX	2	INTRIN	106
REAL	REAL	1	INTRIN	106

STATEMENT LABELS			DEF LINE	REFERENCES	
45	2		81	78	
451	3	FMT	155	79	115
157	4		117	114	
0	5		124	117	118
147	6		112	110	
106	7		101	97	
113	8		103	100	
0	9	INACTIVE	89		
60	10		94	91	
0	12		134	133	
0	20		109	104	105
0	21		138	90	
266	25		137	125	
101	30		96	93	
0	40		95	94	
227	46		130	126	
237	500		132	129	
462	608	FMT	157	134	
502	609	FMT	160	131	
512	800	FMT	162	127	
517	801	FMT	163	128	
526	802	FMT	164	130	
532	814	FMT	165	132	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
54	21	IV	90 138	220B	EXT REFS NOT INNER
61	40	I	94 95	20B	EXT REFS NOT INNER

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
64		II	95 95	11B	EXT REFS
114	20	I	104 109	30B	NOT INNER
125	20	J	105 109	13B	OPT
160	5	I	117 124	36B	EXT REFS NOT INNER
161	5	J	118 124	33B	EXT REFS
242	12	I	133 134	20B	EXT REFS NOT INNER
245		J	134 134	11B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
BCOM	6400 ECS	0	BECS	(3200)	3200	BBECS	(3200)				
FLEXT	3242	0	BB	(3200)	3200	OMGA	(40)	3240	RHO	(1)	
		3241	VB	(1)							
MODD	8041	0	B	(3200)	3200	DETAD	(3200)	6400	WW	(1600)	
		8000	OMG	(40)	8040	NC	(1)				
FITR	41	0	NOMI	(1)	1	NIND	(40)				
FLUTAN	48	0	FMACH	(1)	1	BETA	(1)	2	VBO	(30)	
		32	RVBO	(15)	47	NRVBO	(1)				
ITAPES	50	0	ITAPES	(50)							
FLUTV	7	0	VL	(1)	1	VH	(1)	2	FLO	(1)	
		3	FHI	(1)	4	IE	(1)	5	NQZ	(1)	
		6	NVTOT	(1)							
COMA	41	0	LC	(40)	40	BR	(1)				

EQUIV	CLASSES	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)
	Q	3200	0	AIB	(3200)
BB	BB	3200	0	CC	(3200)
B	B	3200	0	QAA	(3200)

STATISTICS

PROGRAM LENGTH	7037B	3615
CM LABELED COMMON LENGTH	26316B	11470
ECS LABELED COMMON LENGTH	14400B	6400

52000B CM USED

```
      SUBROUTINE CONV (NQ,NQZ,NOMI,NIND,A)                              CONV        2
C                                                                       CONV        3
C                                                                       CONV        4
C     MODE ELIMINATION SCHEME FOR DETERMINANT                           CONV        5
C                                                                       CONV        6
      DIMENSION NIND(40)                                                CONV        7
C                                                                       CONV        8
      COMPLEX   A(40,40), B(40,40)                                      CONV        9
C                                                                       CONV       10
      NQZ = NQ - NOMI                                                   CONV       11
      DO 1 I=1,NQ                                                       CONV       12
      DO 1 J=1,NQ                                                       CONV       13
    1 B(I,J) = A(I,J)                                                   CONV       14
      DO 2 I=1,NQ                                                       CONV       15
      IND = 0                                                           CONV       16
      DO 2 J=1,NQ                                                       CONV       17
      DO 3 K=1,NOMI                                                     CONV       18
      IF (NIND(K).EQ.J) GO TO 4                                         CONV       19
    3 CONTINUE                                                          CONV       20
      GO TO 2                                                           CONV       21
    4 IND = IND + 1                                                     CONV       22
      NRA = NQ - IND                                                    CONV       23
      J1 = J - IND + 1                                                  CONV       24
      DO 5 K = J1,NRA                                                   CONV       25
    5 A(I,K) = B(I,K+IND)                                               CONV       26
    2 CONTINUE                                                          CONV       27
      DO 6 I=1,NQ                                                       CONV       28
      DO 6 J=1,NQZ                                                      CONV       29
    6 B(I,J) = A(I,J)                                                   CONV       30
      DO 7 J=1,NQZ                                                      CONV       31
      IND = 0                                                           CONV       32
      DO 7 I=1,NQ                                                       CONV       33
      DO 8 K=1,NOMI                                                     CONV       34
      IF (NIND(K) EQ.I) GO TO 9                                         CONV       35
    8 CONTINUE                                                          CONV       36
      GO TO 7                                                           CONV       37
    9 IND = IND + 1                                                     CONV       38
      NRA = NQ - IND                                                    CONV       39
      I1 = I -IND + 1                                                   CONV       40
      DO 10 K = I1,NRA                                                  CONV       41
   10 A(K,J) = B(K+IND,J)                                               CONV       42
    7 CONTINUE                                                          CONV       43
      RETURN                                                            CONV       44
      END                                                               CONV       45
```

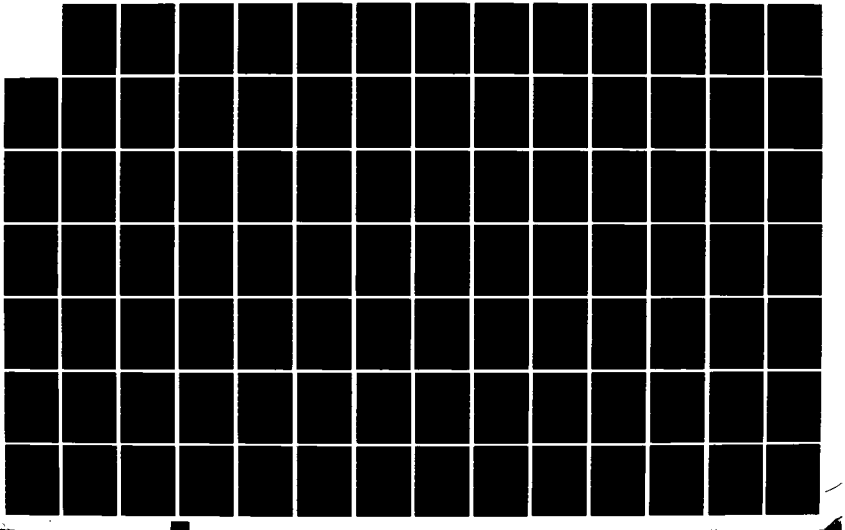
SYMBOLIC REFERENCE MAP (R=3)

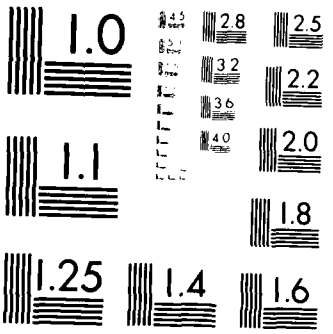
ENTRY	POINTS	DEF LINE	REFERENCES
3	CONV	1	43

VARIABLES	SN	TYPE		RELOCATION								
0	A	COMPLEX	ARRAY	F.P.	REFS	8	13	29	DEFINED	1	25	41
160	B	COMPLEX	ARRAY		REFS	8	25	41	DEFINED	13	29	

AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING..(U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2 4/8

UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

VARIABLES	SN	TYPE	RELOCATION								
151	I	INTEGER		REFS	2*13	2*25	2*29	34	39		
				DEFINED	11	14	27	32			
153	IND	INTEGER		REFS	21	22	23	25	37	38	39
				41	DEFINED	15	21	31	37		
157	I1	INTEGER		REFS	40	DEFINED	39				
152	J	INTEGER		REFS	2*13	18	23	2*29	2*41		
				DEFINED	12	16	28	30			
156	J1	INTEGER		REFS	24	DEFINED	23				
154	K	INTEGER		REFS	18	2*25	34	2*41	DEFINED	17	24
				33	40						
0	NIND	INTEGER	ARRAY F.P.	REFS	6	18	34	DEFINED	1		
0	NOMI	INTEGER	F.P.	REFS	10	17	33	DEFINED	1		
0	NQ	INTEGER	F.P.	REFS	10	11	12	14	16	22	27
				32	38	DEFINED	1				
0	NQZ	INTEGER	F.P.	REFS	28	30	DEFINED	1	10		
155	NRA	INTEGER		REFS	24	40	DEFINED	22	38		

STATEMENT LABELS		DEF LINE	REFERENCES		
0	1	13	11	12	
64	2	26	14	16	20
0	3	19	17		
43	4	21	18		
0	5	25	24		
0	6	29	27	28	
143	7	42	30	32	36
0	8	35	33		
123	9	37	34		
0	10	41	40		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	1	I	11 13	17B	NOT INNER
22	1	J	12 13	3B	INSTACK
32	2	I	14 26	37B	NOT INNER
34	2	J	16 26	33B	NOT INNER
35	3	K	17 19	5B	INSTACK EXITS
60	5	K	24 25	3B	INSTACK
72	6	I	27 29	17B	NOT INNER
102	6	J	28 29	3B	INSTACK
112	7	J	30 42	36B	NOT INNER
114	7	I	32 42	32B	NOT INNER
115	8	K	33 35	5B	INSTACK EXITS
137	10	K	40 41	3B	INSTACK

STATISTICS

PROGRAM LENGTH 6405B 3333

520000B CM USED

```
      SUBROUTINE SREVNC(A,M,LOC,MID,NIX)                                SREVNC     2
      DIMENSION  A(2,1), LOC(1)                                         SREVNC     3
C                                                                       SREVNC     4
C   FIRST SUBSCRIPT MERELY SELECTS REAL OR IMAG. PART.  TO CALLING      SREVNC     5
C   PROGRAM, ROUTINE APPEARS TO BE INVERTING A COMPLEX M BY M MATRIX    SREVNC     6
C   STORED IN A COMPLEX ARRAY OF DIMENSION (MID,*).                     SREVNC     7
C                                                                       SREVNC     8
      KK = 1                                                            SREVNC     9
      KB = 1                                                            SREVNC    10
      MK = M                                                            SREVNC    11
      MID1 = MID + 1                                                    SREVNC    12
      MM = M*MID1 - MID                                                 SREVNC    13
      DO 190  K = 1,M                                                   SREVNC    14
      BIG = 0.                                                          SREVNC    15
      DO 110  IK = KK,MK                                                SREVNC    16
      X = A(1,IK)**2 + A(2,IK)**2                                       SREVNC    17
      IF (X - BIG) 110,100,100                                          SREVNC    18
  100 L = IK                                                            SREVNC    19
      BIG = X                                                           SREVNC    20
   10 CONTINUE                                                          SREVNC    21
      L = L - KB + 1                                                    SREVNC    22
      IF (BIG) 130,120,130                                              SREVNC    23
  120 NIX = -K                                                          SREVNC    24
      RETURN                                                            SREVNC    25
  130 LOC(K)  = L                                                       SREVNC    26
      IF (L - K) 135,145,135                                            SREVNC    27
  135 LJ = L                                                            SREVNC    28
      DO 140  KJ = K,MM,MID                                             SREVNC    29
      X = A(1,KJ)                                                       SREVNC    30
      Y = A(2,KJ)                                                       SREVNC    31
      A(1,KJ) = A(1,LJ)                                                 SREVNC    32
      A(2,KJ) = A(2,LJ)                                                 SREVNC    33
      A(1,LJ) = X                                                       SREVNC    34
      A(2,LJ) = Y                                                       SREVNC    35
  140 LJ = LJ + MID                                                     SREVNC    36
  145 X = A(1,KK)                                                       SREVNC    37
      A(1,KK) = 1.                                                      SREVNC    38
      Y = A(2,KK)                                                       SREVNC    39
      A(2,KK) = 0.                                                      SREVNC    40
      T = X*X + Y*Y                                                     SREVNC    41
      X = X / T                                                         SREVNC    42
      Y = Y / T                                                         SREVNC    43
      DO 150  KJ = K,MM,MID                                             SREVNC    44
      T = A(1,KJ)*X + A(2,KJ)*Y                                         SREVNC    45
      A(2,KJ) = A(2,KJ)*X - A(1,KJ)*Y                                   SREVNC    46
  150 A(1,KJ) = T                                                       SREVNC    47
      IK = KB                                                           SREVNC    48
      DO 180  I = 1,M                                                   SREVNC    49
      IF (I - K) 160,180,160                                            SREVNC    50
  160 X = -A(1,IK)                                                      SREVNC    51
      A(1,IK) = 0.                                                      SREVNC    52
      Y = -A(2,IK)                                                      SREVNC    53
      A(2,IK) = 0.                                                      SREVNC    54
      KJ = K                                                            SREVNC    55
      DO 170  IJ = I,MM,MID                                             SREVNC    56
      A(1,IJ) = A(1,IJ) + A(1,KJ)*X - A(2,KJ)*Y                         SREVNC    57
      A(2,IJ) = A(2,IJ) + A(1,KJ)*Y + A(2,KJ)*X                         SREVNC    58
```

```
                  170 KJ = KJ + MID                                    SREVNC     59
                  180 IK = IK + 1                                      SREVNC     60
      60              KB = KB + MID                                    SREVNC     61
                      MK = MK + MID                                    SREVNC     62
                      KK = KK + MID1                                   SREVNC     63
                  190 CONTINUE                                         SREVNC     64
                      K = M                                            SREVNC     65
      65          200 MK = MK - MID                                    SREVNC     66
                      KB = KB - MID                                    SREVNC     67
                      L = LOC(K)                                       SREVNC     68
                      IF (L - K) 205,215,205                           SREVNC     69
                  205 IL = (L - 1) * MID                               SREVNC     70
      70              DO 210  IK = KB,MK                               SREVNC     71
                      IL = IL + 1                                      SREVNC     72
                      X = A(1,IK)                                      SREVNC     73
                      Y = A(2,IK)                                      SREVNC     74
                      A(1,IK) = A(1,IL)                                SREVNC     75
      75              A(2,IK) = A(2,IL)                                SREVNC     76
                      A(1,IL) = X                                      SREVNC     77
                  210 A(2,IL) = Y                                      SREVNC     78
                  215 K = K - 1                                        SREVNC     79
                      IF (K) 220,220,200                               SREVNC     80
      80          220 NIX = 0                                          SREVNC     81
                      RETURN                                           SREVNC     82
                      END                                              SREVNC     83
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES	
3	SREVNC	1	24	81

VARIABLES	SN	TYPE	RELOCATION							
0	A	REAL	ARRAY	F.P.	REFS	2	2*16	29	30	31	32	36
						38	2*44	2*45	50	52	3*56	3*57	72
						73	74	75	DEFINED	1	31	32	33
						34	37	39	45	46	51	53	56
						57	74	75	76	77			
213	BIG	REAL			REFS	17	22	DEFINED	14	19			
223	I	INTEGER			REFS	49	55	DEFINED	48				
224	IJ	INTEGER			REFS	2*56	2*57	DEFINED	55				
214	IK	INTEGER			REFS	2*16	18	50	51	52	53	59
						72	73	74	75	DEFINED	5	47	59
						70							
225	IL	INTEGER			REFS	71	74	75	76	77			
					DEFINED	69	71						
212	K	INTEGER			REFS	23	25	26	28	43	49	54
						67	68	78	79	DEFINED	13	64	78
206	KB	INTEGER			REFS	21	47	60	66	70			
					DEFINED	9	60	66					
220	KJ	INTEGER			REFS	29	30	31	32	2*44	3*45	46
						2*56	2*57	58	DEFINED	28	43	54	58
205	KK	INTEGER			REFS	15	36	37	38	39	62		
					DEFINED	8	62						

VARIABLES	SN	TYPE	RELOCATION								
216	L	INTEGER		REFS	21	25	26	27	68	69	
				DEFINED	18	21	67				
217	LJ	INTEGER		REFS	31	32	33	34	35		
				DEFINED	27	35					
0	LOC	INTEGER	ARRAY F.P.	REFS	2	67	DEFINED	1	25		
0	M	INTEGER	F.P.	REFS	10	12	13	48	64		
				DEFINED	1						
0	MID	INTEGER	F.P.	REFS	11	12	28	35	43	55	58
					60	61	65	66	69	DEFINED	1
210	MID1	INTEGER		REFS	12	62	DEFINED	11			
207	MK	INTEGER		REFS	15	61	65	70	DEFINED	10	61
					65						
211	MM	INTEGER		REFS	28	43	55	DEFINED	12		
0	NIX	INTEGER	F.P.	DEFINED	1	23	80				
222	T	REAL		REFS	41	42	46	DEFINED	40	44	
215	X	REAL		REFS	17	19	33	2*40	41	44	45
					56	57	76	DEFINED	16	29	36	41
					50	72					
221	Y	REAL		REFS	34	2*40	42	44	45	56	57
					77	DEFINED	30	38	42	52	73	

STATEMENT LABELS			DEF LINE	REFERENCES	
0	100	INACTIVE	18	2*17	
26	110		20	15	17
0	120	INACTIVE	23	22	
36	130		25	2*22	
0	135	INACTIVE	27	2*26	
0	140		35	28	
60	145		36	26	
0	150		46	43	
0	160	INACTIVE	50	2*49	
0	170		58	55	
134	180		59	48	49
0	190		63	13	
152	200		65	79	
0	205	INACTIVE	69	2*68	
0	210		77	70	
200	215		78	68	
0	220	INACTIVE	80	2*79	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	190	K	13 63	134B	NOT INNER
21	110	IK	15 20	7B	INSTACK
50	140	KJ	28 35	7B	INSTACK
74	150	KJ	43 46	6B	INSTACK
105	180	I	48 59	33B	NOT INNER
122	170	IJ	55 58	11B	OPT
170	210	IK	70 77	7B	INSTACK

STATISTICS

PROGRAM LENGTH 247B 167

52000B CM USED

```
      SUBROUTINE FLSL (RHOP, Q, MMOD, IV)                                FLSL     2
C                                                                        FLSL     3
C     FLUTTER SOLUTION DECK USING QR ALGORITHM FOR EIGENVALUE            FLSL     4
C     DETERMINATION PROVIDING GERSCHGORIN DISC TEST FOR ROOT             FLSL     5
C     CHECK AND INCLUDING PRINT PLOT FOR FLUTTER SOLUTION                FLSL     6
C                                                                        FLSL     7
      DIMENSION OMG(40), FREQ(40), GC(40), FLSP(40), DAMP(40)            FLSL     8
      DIMENSION GR(40), CFREQ(40), VFLSP(40), XI(40), XR(40)             FLSL     9
      DIMENSION VALUE(41), AR(41)                                        FLSL    10
      DIMENSION QQZ(220), ZR(220), ZI(220)                               FLSL    11
      DIMENSION WW(40,40), BMG(40), NIND(40)                             FLSL    12
      DIMENSION           LC(40)                                         FLSL    13
      DIMENSION VBO(30), RVBO(15)                                        FLSL    14
      DIMENSION ITAPES(50)                                               FLSL    15
C                                                                        FLSL    16
      COMPLEX B(40,40), DETAD(40,40), BB(40,40), Q(MMOD,1)               FLSL    17
      COMPLEX ROOT(40), VEC(40,40), RQ(40,40), VINFV(40,40)              FLSL    18
      COMPLEX RORT(40), ROBT(40), VECT(40,40)                            FLSL    19
      COMPLEX A(1600)                                                    FLSL    20
C                                                                        FLSL    21
      COMMON /FLUTAN/ FMACH ,BETA  ,VBO   ,RVBO  ,NRVBO                  FLSL    22
      COMMON /FITR  / NOMI, NIND                                         FLSL    23
      COMMON /FLEXT / BB, OMG, RHO, VB                                   FLSL    24
      COMMON /FLUTV / VL, VH, FLO, FHI, IE, NQZ, NVTOT                   FLSL    25
      COMMON /MODD  / B, DETAD, WW, BMG, NC                              FLSL    26
      COMMON /COMA  / LC, BR                                             FLSL    27
      COMMON / CTAPES / ITAPES                                           FLSL    28
C                                                                        FLSL    29
      EQUIVALENCE (B(1,1),RQ(1,1),VECT(1,1))                             FLSL    30
      EQUIVALENCE (A(1),VINFV(1,1))                                      FLSL    31
C                                                                        FLSL    32
      ITAPEW = ITAPES(6)                                                 FLSL    33
      MTAP2  =  ITAPES(22)                                               FLSL    34
      MTAP1  =  ITAPES(37)                                               FLSL    35
      MTAP49 =  ITAPES(49)                                               FLSL    36
C                                                                        FLSL    37
      NQ = NQZ                                                           FLSL    38
      JSS = 0                                                            FLSL    39
      IF (LC(1).EQ.2) JSS = 1                                            FLSL    40
      TOLR = 1.0E-05                                                     FLSL    41
C                                                                        FLSL    42
      NPOINT  =  NC                                                      FLSL    43
      NREFO = LC(11)                                                     FLSL    44
      NLITE1= 0                                                          FLSL    45
      DO 348 I=1,NQ                                                      FLSL    46
      DO 348 J=1,NQ                                                      FLSL    47
  348 RQ(I,J)=Q(I,J)                                                     FLSL    48
      IF (LC(20).NE.0) MQ = -NQ                                          FLSL    49
      IF (LC(20).EQ.0) MQ =  NQ                                          FLSL    50
      CALL BUCK (Q,MQ,ROOT,NQ,AR,MMOD,VEC,1,A,1.0E-07,NIX)               FLSL    51
      IF(NIX.LE.0)GO TO 213                                              FLSL    52
      NRTS=NQ-NIX                                                        FLSL    53
      WRITE (ITAPEW,214)NIX                                              FLSL    54
      WRITE (ITAPEW,215)(ROOT(I),I=1,NRTS)                               FLSL    55
      GO TO 347                                                          FLSL    56
  213 CALL GGCHK (NQ,RQ,VEC,ROOT,QUO,VINFV,GR,GC,ICLUE,NOD,Q,TOLR,MMOD)  FLSL    57
      DO 2 IB =1,NQ                                                      FLSL    58
```

```
      2 RORT(IB) = ROOT(IB)                                                  FLSL       59
        CALL TRFR(RORT,ITCH3,JSS,FREQ,FLSP,DAMP,CFREQ,VFLSP,NQ,BR,ROBT,      FLSL       60
60     1          OMG(NREFO),RHOP,VBO(IV),VECT,VEC)                         FLSL       61
        IF(JSS.NE.O)GO TO 4                                                  FLSL       62
        IF (LC(15).EQ.O) WRITE(MTAP2) (CFREQ(I),DAMP(I),VFLSP(I),I=1,NQ)     FLSL       63
        IF (LC(15).NE.O) WRITE(MTAP2) (CFREQ(I),DAMP(I), FLSP(I),I=1,NQ)     FLSL       64
        IF (LC(14).EQ.O) GOTO 4                                              FLSL       65
65      IF(LC(15).EQ.O) WRITE(MTAP1)(CFREQ(I),DAMP(I),VFLSP(I),I=1,NQ)       FLSL       66
        IF(LC(15).NE.O) WRITE(MTAP1)(CFREQ(I),DAMP(I),FLSP(I) ,I=1,NQ)       FLSL       67
      4 IF (JSS.EQ.O) GO TO 9                                                FLSL       68
        IF(NLITE1.EQ.O)WRITE (ITAPEW,1139)                                   FLSL       69
        LILG=48-2*NQ                                                         FLSL       70
70      LADD=12+2*NQ                                                         FLSL       71
        IF (ICLUE.EQ.O.AND.NLITE1.LE.LILG)  NLITE1 = NLITE1 + LADD           FLSL       72
        IF(NLITE1.GT.LILG)NLITE1=O                                           FLSL       73
        WRITE (ITAPEW,804)  FMACH, RHOP                                      FLSL       74
        WRITE (ITAPEW,805)  (ROBT(J),FREQ(J),FLSP(J),VFLSP(J),J=1,NQ)        FLSL       75
75      IF(NOD.NE.O)WRITE (ITAPEW,221)                                       FLSL       76
        IF(QUO.GT.O.001)WRITE (ITAPEW,222)                                   FLSL       77
        IF(ICLUE.EQ.O)WRITE (ITAPEW,223)                                     FLSL       78
        IF(ICLUE.EQ.O)GO TO 12                                               FLSL       79
        WRITE (ITAPEW,224)                                                   FLSL       80
80      WRITE (ITAPEW,225) (ROOT(I),VINFV(I,I),GR(I),GC(I),I=1,NQ)           FLSL       81
        GO TO 12                                                             FLSL       82
      9 IF(ICLUE.NE.O)NLITE1=O                                               FLSL       83
        IF(NLITE1.EQ.O)WRITE (ITAPEW,1138)                                   FLSL       84
        LILG=48-2*NQ                                                         FLSL       85
85      LADD=12+2*NQ                                                         FLSL       86
        IF(ICLUE.EQ.O.AND.NLITE1.LE.LILG)NLITE1=NLITE1+LADD                  FLSL       87
        IF(NLITE1.GT.LILG)NLITE1=O                                           FLSL       88
        WRITE (ITAPEW,307) FMACH,RHOP,VBO(IV),(CFREQ(J),VFLSP(J),DAMP(J),    FLSL       89
       1FREQ(J),FLSP(J),J=1,NQ)                                              FLSL       90
90      IF(NOD.NE.O)WRITE (ITAPEW,221)                                       FLSL       91
        IF(QUO.GT.O.001)WRITE (ITAPEW,222)                                   FLSL       92
        IF(ICLUE.EQ.O)WRITE (ITAPEW,223)                                     FLSL       93
        IF (ICLUE.EQ.O) GO TO 12                                             FLSL       94
        WRITE (ITAPEW,224)                                                   FLSL       95
95      WRITE (ITAPEW,225) (ROOT(I),VINFV(I,I),GR(I),GC(I),I=1,NQ)           FLSL       96
        NLITE1=O                                                             FLSL       97
C       CALCULATE MODE SHAPES IN A PARTICULAR FREQUENCY BAND FOR             FLSL       98
C       SELECTED V/BO VALUES - M. CHERNOFF 1968                              FLSL       99
     12 IF ( LC(28) .EQ. O )    GO TO 347                                    FLSL      100
100     IF (LC(1) .EQ. 2) GO TO 1                                            FLSL      101
        IF ( VBO(IV) .LT. VL .OR. VBO(IV) .GT. VH )      GO TO 347           FLSL      102
C        ********   CALCULATION OF EIGENVECTORS  **********************      FLSL      103
      1 CONTINUE                                                             FLSL      104
        NQM1  =   NQ -   1                                                   FLSL      105
105     LIN = O                                                              FLSL      106
        IF (JSS .NE. O)          WRITE (ITAPEW,11)                           FLSL      107
        IF (JSS .EQ. O)          WRITE (ITAPEW,100)  VBO(IV)                 FLSL      108
        DO 470     K = 1, NQ                                                 FLSL      109
        IF (LC(1) .EQ. 2)  GO TO 10                                          FLSL      110
110     IF (CFREQ(K).LT.FLO.OR.CFREQ(K).GT.FHI) GOTO 470                     FLSL      111
     10 DO 230  I = 1,NQ                                                     FLSL      112
        XR(I) =  REAL (VECT(I,K))                                            FLSL      113
        XI(I) = AIMAG (VECT(I,K))                                            FLSL      114
    230 CONTINUE                                                             FLSL      115
```

```
115                VALMAX        = 0.0                                          FLSL      116
                   DO 460      I = 1, NQ                                        FLSL      117
                   VALUE(1)= SQRT(XR(I)**2 + XI(I)**2)                          FLSL      118
                   IF (VALUE(1)- VALMAX) 460, 460, 455                          FLSL      119
                455 VALMAX = VALUE(1)                                           FLSL      120
120                MAX           = I                                            FLSL      121
                460 CONTINUE                                                    FLSL      122
                   XRR           = XR(MAX)                                      FLSL      123
                   XRI           = XI(MAX)                                      FLSL      124
                   DENOM=XRR*XRR+XRI*XRI                                        FLSL      125
125                DO 465      I = 1, NQ                                        FLSL      126
                   VALUE(MMOD+1) = (XR(I) *XRR + XI(I) *XRI) /DENOM             FLSL      127
                   XI(I)         = (XI(I) *XRR - XR(I) *XRI) /DENOM             FLSL      128
                   XR(I)          = VALUE(MMOD+1)                               FLSL      129
                   VALUE(I) = SQRT(XR(I)**2 + XI(I)**2)                         FLSL      130
130             465 CONTINUE                                                    FLSL      131
                   LIN  =  LIN + 8 + NQ                                         FLSL      132
                   IF (LIN.GT.45) LIN = 0                                       FLSL      133
                   IF ( LIN .NE. 0 )        GO TO 14                            FLSL      134
                   IF (JSS.NE. 0)      WRITE (ITAPEW,11)                        FLSL      135
135                IF (JSS.NE. 0)      WRITE (ITAPEW,100)  VBO(IV)              FLSL      136
                 14 IF (JSS .NE. 0)    WRITE (ITAPEW,13)  K                     FLSL      137
                   IF (JSS .EQ. 0)     WRITE (ITAPEW,6)   K , CFREQ(K)          FLSL      138
                   WRITE (ITAPEW,611)(XR(I), XI(I), VALUE(I), I = 1, NQ)        FLSL      139
                C                                                               FLSL      140
140                IF (LC(29).EQ.0) GOTO 470                                    FLSL      141
                   DO 456  I=1,NPOINT                                           FLSL      142
                   ZR(I) = 0.0                                                  FLSL      143
                456 ZI(I) = 0.0                                                 FLSL      144
                   LC2 = LC(2)                                                  FLSL      145
145                II = 1                                                       FLSL      146
                   REWIND MTAP49                                                FLSL      147
                   DO 466 J = 1,LC2                                             FLSL      148
                   CALL RNRW (-MTAP49,QQZ,NPOINT)                               FLSL      149
                   IF (IE.EQ.1) GOTO 469                                        FLSL      150
150                DO 467 JJ = 1,NOMI                                           FLSL      151
                   IF (J.EQ.NIND(JJ)) GOTO 466                                  FLSL      152
                467 CONTINUE                                                    FLSL      153
                469 DO 468 I = 1,NPOINT                                         FLSL      154
                   ZR(I) = ZR(I) + QQZ(I)*XR(II)                                FLSL      155
155             468 ZI(I) = ZI(I) + QQZ(I)*XI(II)                               FLSL      156
                   II = II + 1                                                  FLSL      157
                466 CONTINUE                                                    FLSL      158
                   REWIND MTAP49                                                FLSL      159
                   LIN  =  LIN + 8 + LC2                                        FLSL      160
160                IF (LIN.GT.45) LIN = 0                                       FLSL      161
                   IF (LIN.EQ.0) WRITE (ITAPEW,100) VBO(IV)                     FLSL      162
                   WRITE (ITAPEW,609) ((ZR(I),ZI(I)),I = 1,NPOINT)              FLSL      163
                470 CONTINUE                                                    FLSL      164
                347 CONTINUE                                                    FLSL      165
165             C                                                               FLSL      166
                C                                                               FLSL      167
                C                                                               FLSL      168
                C FORMATS                                                       FLSL      169
                C                                                               FLSL      170
170                 6 FORMAT (//15X,10HMODE NO. =,I3,10X,18HFREQUENCY IN CPS =,F10.3,/) FLSL  171
                   11 FORMAT (1H1/15X,32HDIVERGENCE ANALYSIS EIGENVECTORS//)    FLSL      172
```

```
                13 FORMAT (//15X,11HMODE NO. = ,I3/)                                  FLSL      173
               100 FORMAT (1H1,/15X,26HFLUTTER VECTORS FOR VBO = ,F11.4//)            FLSL      174
               214 FORMAT (1H1, 4X, 27HSOLUTION FAILED TO PRODUCE ,I5,2X,5HROOTS, //  FLSL      175
   175            1        5X, 29HROOTS OBTAINED ARE AS FOLLOWS, //)                  FLSL      176
               215 FORMAT(2H (,1PE12.4,2H, ,E12.4,2H) )                               FLSL      177
               221 FORMAT (//5X, 62HTHE PRINCIPAL VECTORS DO NOT FORM A LINEARLY INDE FLSL      178
                  1PENDENT ARRAY, /5X, 23HMATRIX IS NEAR SINGULAR,/)                  FLSL      179
               222 FORMAT (/5X, 54HTHE SIMILARITY TRANSFORMATION TO DIAGONAL FORM IS  FLSL      180
   180            1POOR,/)                                                           FLSL      181
               223 FORMAT (//5X, 30HALL ROOTS CHECK AND ARE UNIQUE,/)                 FLSL      182
               224 FORMAT (/10X, 61HGERSCHGORIN CIRCLE RADII REPRESENT MAX. ERROR DUE FLSL      183
                  1 TO NUMERICS,/5X, 20HCOMPUTED EIGENVALUES, 5X, 26HGERSCHGORIN CIRC FLSL      184
                  2LE CENTERS,12X, 24HGERSCHGORIN CIRCLE RADII,/, 72X,                FLSL      185
   185            3 7HROW SUM, 5X, 7HCOL SUM,/)                                      FLSL      186
               225 FORMAT (2(2H (,1PE12.4,2H, ,E12.4,2H) ),9X,E12.4,3X,E12.4)         FLSL      187
               307 FORMAT (//5X9HMACH NO =,F6.3,5X13HRHO/RHO(SL) =F11.4,5X,           FLSL      188
                  1        5HVBO =,F11.4,//3X, 6HC.P.S.,5X, 8HV,EQUIV., 3X,        FLSL      189
                  2        7HDAMPING,5X, 7HRAD/SEC,3X, 5HVTRUE,/(1HO,F11.4,F11.4,   FLSL      190
   190            3        F11.6,F11.4,F11.4))                                      FLSL      191
               609 FORMAT (// 30H  PHYSICAL FLUTTER MODE SHPAES, /                    FLSL      192
                  1        36H       REAL                IMAGINARY,/               FLSL      193
                  2        (9X,E15.4,5X,E15.4))                                     FLSL      194
               611 FORMAT (//5X,4HREAL,11X,9HIMAGINARY,9X,7HMODULUS,//                FLSL      195
   195            1        (1PE14.5,2E17.5))                                        FLSL      196
               804 FORMAT (/32X,10HMACH NO = ,F6.3,10X, 14HRHO/RHO(SL) = ,F6.3//      FLSL      197
                  1         28X, 5HROOTS,41X, 10HVELOCITIES, //                     FLSL      198
                  2         19X, 18H( REAL   ,   IMAG ),17X,6HFT/SEC,12X,           FLSL      199
                  3         11HKNOTS(TRUE), 9X, 9HKNOTS(EQ), //)                    FLSL      200
   200            805 FORMAT (/(10X,2H (,E15.7,2H, ,E15.7,2H) ,3(5X,E15.7)))         FLSL      201
              1138 FORMAT( 1H1,28X,17HFLUTTER SOLUTIONS )                           FLSL      202
              1139 FORMAT (1H1,41X, 19HDIVERGENCE ANALYSIS,//)                       FLSL      203
                C                                                                   FLSL      204
                     RETURN                                                         FLSL      205
   205               END                                                            FLSL      206
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	FLSL	1	204

VARIABLES

		SN	TYPE		RELOCATION							
1503	A		COMPLEX	ARRAY		REFS	19	30	50			
10524	AR		REAL	ARRAY		REFS	9	50				
0	B		COMPLEX	ARRAY	MODD	REFS	16	25	29			
0	BB		COMPLEX	ARRAY	FLEXT	REFS	16	23				
1	BETA		REAL		FLUTAN	REFS	21					
17500	BMG		REAL	ARRAY	MODD	REFS	11	25				
50	BR		REAL		COMA	REFS	26	59				
10213	CFREQ		REAL	ARRAY		REFS	8	59	62	63	65	66	88
						2*110	137						
10073	DAMP		REAL	ARRAY		REFS	7	59	62	63	65	66	88
1477	DENOM		REAL			REFS	126	127	DEFINED	124			
6200	DETAD		COMPLEX	ARRAY	MODD	REFS	16	25					

VARIABLES	SN	TYPE		RELOCATION							
3	FM'	REAL		FLUTV	REFS	24	110				
2	FLO	REAL		FLUTV	REFS	24	110				
10023	FLSP	REAL	ARRAY		REFS	7	59	63	66	74	88	
0	FMACH	REAL		FLUTAN	REFS	21	73	88				
7703	FREQ	REAL	ARRAY		REFS	7	59	74	88			
7753	GC	REAL	ARRAY		REFS	7	56	80	95			
10143	GR	REAL	ARRAY		REFS	8	56	80	95			
1454	I	INTEGER			REFS	2*47	54	3*62	3*63	3*65	3*66	5*80
						5*95	2*112	2*113	2*117	120	2*126	3*127	128
						3*129	3*138	142	143	3*154	3*155	2*162	
					DEFINED	45	54	62	63	65	66	80
						95	111	116	125	138	141	153	162
1464	IB	INTEGER			REFS	2*58	DEFINED	57				
1462	ICLUE	INTEGER			REFS	56	71	77	78	82	86	92
						93						
4	IE	INTEGER		FLUTV	REFS	24	149					
1501	II	INTEGER			REFS	154	155	156	DEFINED	145	156	
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	14	27	32	33	34	35	
1442	ITAPEW	INTEGER			DEFINED	32	I/O REFS	53	54	68	73	74
						75	76	77	79	80	83	88	90
						91	92	94	95	106	107	134	135
						136	137	138	161	162			
1465	ITCH3	* INTEGER			REFS	59						
0	IV	INTEGER		F.P.	REFS	59	88	2*101	107	135	161	
					DEFINED	1						
1455	J	INTEGER			REFS	2*47	4*74	5*88	151	DEFINED	46	74
						88	147					
1502	JJ	INTEGER			REFS	151	DEFINED	150				
1447	JSS	INTEGER			REFS	59	61	67	106	107	134	135
						136	137	DEFINED	38	39		
1472	K	INTEGER			REFS	2*110	112	113	136	2*137		
					DEFINED	108						
1467	LADD	INTEGER			REFS	71	86	DEFINED	70	85		
0	LC	INTEGER	ARRAY	COMA	REFS	12	26	39	43	48	49	62
						63	64	65	66	99	100	109	140
						144						
1500	LC2	INTEGER			REFS	147	159	DEFINED	144			
1466	LILG	INTEGER			REFS	71	72	86	87	DEFINED	69	84
1471	LIN	INTEGER			REFS	131	132	133	159	160	161	
					DEFINED	105	131	132	159	160		
1474	MAX	INTEGER			REFS	122	123	DEFINED	120			
0	MMOD	INTEGER		F.P.	REFS	16	50	56	126	128		
					DEFINED	1						
1456	MQ	INTEGER			REFS	50	DEFINED	48	49			
1444	MTAP1	INTEGER			DEFINED	34	I/O REFS	65	66			
1443	MTAP2	INTEGER			DEFINED	33	I/O REFS	62	63			
1445	MTAP49	INTEGER			REFS	148	DEFINED	35	I/O REFS	146	158	
17550	NC	INTEGER		MODD	REFS	25	42					
1	NIND	INTEGER	ARRAY	FITR	REFS	11	22	151				
1457	NIX	INTEGER			REFS	50	51	52	53			
1453	NLITE1	INTEGER			REFS	68	2*71	72	83	2*86	87	
					DEFINED	44	71	72	82	86	87	96
1463	NOD	INTEGER			REFS	56	75	90				
0	NOMI	INTEGER		FITR	REFS	22	150					
1451	NPOINT	INTEGER			REFS	141	148	153	162	DEFINED	42	
1446	NQ	INTEGER			REFS	45	46	48	49	50	52	56
						57	59	62	63	65	66	69	70

VARIABLES	SN	TYPE		RELOCATION								
					74	80	84	85	88	95	104	108
					111	116	125	131	138	DEFINED	37	
1470	NQM1	* INTEGER			DEFINED	104						
5	NQZ	INTEGER		FLUTV	REFS	24	37					
1452	NREFO	INTEGER			REFS	59	DEFINED	43				
1460	NRTS	INTEGER			REFS	54	DEFINED	52				
57	NRVBO	INTEGER		FLUTAN	REFS	21						
6	NVTOT	INTEGER		FLUTV	REFS	24						
6200	OMG	REAL	ARRAY	FLEXT	REFS	7	23	59				
0	Q	COMPLEX	ARRAY	F.P.	REFS	16	47	50	56	DEFINED	1	
10575	QQZ	REAL	ARRAY		REFS	10	148	154	155			
1461	QUO	REAL			REFS	56	76	91				
6250	RHO	REAL		FLEXT	REFS	23						
0	RHOP	REAL		F.P.	REFS	59	73	88	DEFINED	1		
20461	ROBT	COMPLEX	ARRAY		REFS	18	59	74				
12021	ROOT	COMPLEX	ARRAY		REFS	17	50	54	56	58	80	95
20341	RORT	COMPLEX	ARRAY		REFS	18	59	DEFINED	58			
0	RQ	COMPLEX	ARRAY	MODD	REFS	17	29	56	DEFINED	47		
40	RVBO	REAL	ARRAY	FLUTAN	REFS	13	21					
1450	TOLR	REAL			REFS	56	DEFINED	40				
1473	VALMAX	REAL			REFS	118	DEFINED	115	119			
10453	VALUE	REAL	ARRAY		REFS	9	118	119	128	138		
					DEFINED	117	126	129				
6251	VB	REAL		FLEXT	REFS	23						
2	VBO	REAL	ARRAY	FLUTAN	REFS	13	21	59	88	2*101	107	135
					161							
12141	VEC	COMPLEX	ARRAY		REFS	17	50	56	59			
0	VECT	COMPLEX	ARRAY	MODD	REFS	18	29	59	112	113		
10263	VFLSP	REAL	ARRAY		REFS	8	59	62	65	74	88	
1	VH	REAL		FLUTV	REFS	24	101					
1503	VINFV	COMPLEX	ARRAY		REFS	17	30	56	80	95		
0	VL	REAL		FLUTV	REFS	24	101					
14400	WW	REAL	ARRAY	MODD	REFS	11	25					
10333	XI	REAL	ARRAY		REFS	8	117	123	126	127	129	138
					155	DEFINED	113	127				
10403	XR	REAL	ARRAY		REFS	8	117	122	126	127	129	138
					154	DEFINED	112	128				
1476	XRI	REAL			REFS	2*124	126	127	DEFINED	123		
1475	XRR	REAL			REFS	2*124	126	127	DEFINED	122		
11465	ZI	REAL	ARRAY		REFS	10	155	162	DEFINED	143	155	
11131	ZR	REAL	ARRAY		REFS	10	154	162	DEFINED	142	154	

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES	
BUCK		11		50	
GGCHK		13		56	
RNRW		3		148	
SQRT	REAL	1	LIBRARY	117	129
TRFR		16		59	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
AIMAG	REAL	1	INTRIN		113
REAL	REAL	1	INTRIN		112

STATEMENT LABELS		DEF LINE	REFERENCES
420	1	103	100
0	2	58	57

STATEMENT LABELS			DEF LINE	REFERENCES			
211	4		67	61	64		
1204	6	FMT	170	137			
307	9		82	67			
442	10		111	109			
1213	11	FMT	171	106	134		
410	12		99	78	81	93	
1221	13	FMT	172	136			
532	14		136	133			
1225	100	FMT	173	107	135	161	
74	213		56	51			
1233	214	FMT	174	53			
1245	215	FMT	176	54			
1251	221	FMT	177	75	90		
1265	222	FMT	179	76	91		
1275	223	FMT	181	77	92		
1302	224	FMT	182	79	94		
1326	225	FMT	186	80	95		
0	230		114	111			
1334	307	FMT	187	88			
665	347		164	55	99	101	
0	348		47	45	46		
0	455	INACTIVE	119	118			
0	456		143	141			
467	460		121	116	2*118		
0	465		130	125			
627	466		157	147	151		
0	467		152	150			
0	468		155	153			
610	469		153	149			
662	470		163	108	110	140	
1355	609	FMT	191	162			
1370	611	FMT	194	138			
1377	804	FMT	196	73			
1417	805	FMT	200	74			
1425	1138	FMT	201	83			
1431	1139	FMT	202	68			

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
31	348	I	45 47	17B		NOT INNER	
41	348	J	46 47	3B	INSTACK		
105	2	IB	57 58	3B	INSTACK		
124		I	62 62	11B		EXT REFS	
142		I	63 63	11B		EXT REFS	
161		I	65 65	11B		EXT REFS	
177		I	66 66	11B		EXT REFS	
234		J	74 74	13B		EXT REFS	
270		I	80 80	15B		EXT REFS	
334		J	88 88	14B		EXT REFS	
371		I	95 95	15B		EXT REFS	
434	470	K	108 163	231B		EXT REFS	NOT INNER
450	230	I	111 114	4B	INSTACK		
457	460	I	116 121	13B		EXT REFS	
477	465	I	125 130	15B		EXT REFS	
546		I	138 138	11B		EXT REFS	
564	456	I	141 143	3B	INSTACK		
575	466	J	147 157	35B		EXT REFS	NOT INNER
603	467	JJ	150 152	5B	INSTACK	EXITS	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
617	468	I	153 155	5B	INSTACK
651		I	162 162	10B	

EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)						
FLUTAN	48	0	FMACH	(1)	1	BETA	(1)	2	VBO	(30)
		32	RVBO	(15)	47	NRVBO	(1)			
FITR	41	0	NOMI	(1)	1	NIND	(40)			
FLEXT	3242	0	BB	(3200)	3200	OMG	(40)	3240	RHO	(1)
		3241	VB	(1)						
FLUTV	7	0	VL	(1)	1	VH	(1)	2	FLO	(1)
		3	FHI	(1)	4	IE	(1)	5	NQZ	(1)
		6	NVTOT	(1)						
MODD	8041	0	B	(3200)	3200	DETAD	(3200)	6400	WW	(1600)
		8000	BMG	(40)	8040	NC	(1)			
COMA	41	0	LC	(40)	40	BR	(1)			
CTAPES	50	0	ITAPES	(50)						

	EQUIV CLASSES	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)			
	A	3200	0	VINFV	(3200)			
B	B	3200	0	RQ	(3200)	0	VECT	(3200)

STATISTICS

PROGRAM LENGTH	20606B	8582
CM LABELED COMMON LENGTH	26316B	11470
52000B CM USED		

```
                      SUM = P*A(1,I,N) + HOLD*A(2,I,N)                    CQR      59
                      SUN = -P*A(2,I,N) + HOLD*A(1,I,N)                   CQR      60
   60                 A(1,I,N) = SNGL(SUN)                                CQR      61
                  210 A(2,I,N) = SNGL(SUM)                                CQR      62
                      RETURN                                              CQR      63
                      END                                                 CQR      64
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CQR	1	62

VARIABLES

		SN	TYPE		RELOCATION							
0	A		REAL	ARRAY	F.P.	REFS	3	3*17	18	19	20	3*26	3*27
						3*28	3*29	2*34	35	37	38	41	42
						43	3*45	3*46	3*47	3*48	53	54	55
						56	2*58	2*59	DEFINED	1	21	22	23
						24	30	31	32	33	36	37	39
						43	49	50	51	52	53	54	55
						60	61						
0	DIM		INTEGER		F.P.	REFS	2	3	DEFINED	1			
212	HOLD		REAL			REFS	58	59	DEFINED	35			
205	I		INTEGER			REFS	3*26	3*27	3*28	3*29	30	31	32
						33	3*45	3*46	3*47	3*48	49	50	51
						52	2*58	2*59	60	61	DEFINED	25	44
						57							
0	INTER		INTEGER	ARRAY	F.P.	REFS	2	DEFINED	1				
200	K		INTEGER			REFS	6*17	2*18	2*19	2*20	2*21	2*22	2*23
						2*24	25	3*26	3*27	3*28	3*29	30	31
						32	33	2*41	2*42	4*43	44	3*45	3*46
						3*47	3*48	49	50	51	52	4*53	4*54
						4*55	2*56	DEFINED	16	40			
0	M		INTEGER		F.P.	REFS	14	DEFINED	1				
176	N		INTEGER			REFS	15	4*34	2*35	2*36	4*37	57	2*58
						2*59	60	61	DEFINED	14			
177	N1		INTEGER			REFS	16	25	40	DEFINED	15		
202	P		REAL			REFS	22	26	27	28	29	45	46
						47	48	55	58	59	DEFINED	18	38
						56							
203	Q		REAL			REFS	23	26	27	28	29	45	46
						47	48	54	DEFINED	19	41		
204	R		REAL			REFS	24	26	27	28	29	45	46
						47	48	53	DEFINED	20	42		
201	S		REAL			REFS	18	19	20	21	35	36	37
						DEFINED	17	34					
206	SUM		REAL			REFS	30	49	61	DEFINED	26	45	58
207	SUN		REAL			REFS	31	50	60	DEFINED	27	46	59
210	SUO		REAL			REFS	32	51	DEFINED	28	47		
211	SUP		REAL			REFS	33	52	DEFINED	29	48		

EXTERNALS

	TYPE	ARGS		REFERENCES	
SQRT	REAL	1	LIBRARY	17	34

```
      SUBROUTINE CQR(A,M,DIM,INTER)                                     CQR        2
      INTEGER DIM,INTER(1)                                              CQR        3
      DIMENSION A(2,DIM,1)                                              CQR        4
C                                                                       CQR        5
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     CQR        6
C     DOUBLE PRECISION SUM,SUN,SUO,SUP                                  CQR        7
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        CQR        8
C                                                                       CQR        9
C                                                                       CQR       10
CCDC                                                                    CQR       11
      SNGL(X) = X                                                       CQR       12
CCDC                                                                    CQR       13
C                                                                       CQR       14
      N = M                                                             CQR       15
      N1 = N - 1                                                        CQR       16
      DO 100  K = 1,N1                                                  CQR       17
      S = SQRT(A(1,K,K)**2 + A(2,K,K)**2 + A(1,K+1,K)**2)               CQR       18
      P = A(1,K,K) / S                                                  CQR       19
      Q = A(2,K,K) / S                                                  CQR       20
      R = A(1,K+1,K) / S                                                CQR       21
      A(1,K,K) = S                                                      CQR       22
      A(2,K,K) = P                                                      CQR       23
      A(1,K+1,K) = Q                                                    CQR       24
      A(2,K+1,K) = R                                                    CQR       25
      DO 100  I = K,N1                                                  CQR       26
      SUM = P*A(1,K,I+1) + Q*A(2,K,I+1) + R*A(1,K+1,I+1)                CQR       27
      SUN = P*A(1,K+1,I+1) - Q*A(2,K+1,I+1) - R*A(1,K,I+1)              CQR       28
      SUO = P*A(2,K,I+1) - Q*A(1,K,I+1) + R*A(2,K+1,I+1)                CQR       29
      SUP = P*A(2,K+1,I+1) + Q*A(1,K+1,I+1) - R*A(2,K,I+1)              CQR       30
      A(1,K,I+1) = SNGL(SUM)                                            CQR       31
      A(1,K+1,I+1) = SNGL(SUN)                                          CQR       32
      A(2,K,I+1) = SNGL(SUO)                                            CQR       33
  100 A(2,K+1,I+1) = SNGL(SUP)                                          CQR       34
      S = SQRT(A(1,N,N)**2 + A(2,N,N)**2) + 1.E-50                      CQR       35
      HOLD = A(1,N,N) / S                                               CQR       36
      A(1,N,N) = S                                                      CQR       37
      A(2,N,N) = A(2,N,N) / S                                           CQR       38
      P = A(2,1,1)                                                      CQR       39
      A(2,1,1) = 0.                                                     CQR       40
      DO 200  K = 1,N1                                                  CQR       41
      Q = A(1,K+1,K)                                                    CQR       42
      R = A(2,K+1,K)                                                    CQR       43
      A(2,K+1,K) = A(2,K+1,K+1)                                         CQR       44
      DO 150  I = 1,K                                                   CQR       45
      SUM = P*A(1,I,K) - Q*A(2,I,K) + R*A(1,I,K+1)                      CQR       46
      SUN = P*A(1,I,K+1) + Q*A(2,I,K+1) - R*A(1,I,K)                    CQR       47
      SUO = P*A(2,I,K) + Q*A(1,I,K) + R*A(2,I,K+1)                      CQR       48
      SUP = P*A(2,I,K+1) - Q*A(1,I,K+1) - R*A(2,I,K)                    CQR       49
      A(1,I,K) = SNGL(SUM)                                              CQR       50
      A(1,I,K+1) = SNGL(SUN)                                            CQR       51
      A(2,I,K) = SNGL(SUO)                                              CQR       52
  150 A(2,I,K+1) = SNGL(SUP)                                            CQR       53
      A(1,K+1,K) = A(1,K+1,K+1) * R                                     CQR       54
      A(2,K+1,K+1) = -A(1,K+1,K+1)*Q                                    CQR       55
      A(1,K+1,K+1) = A(1,K+1,K+1) * P                                   CQR       56
  200 P = A(2,K+1,K)                                                    CQR       57
      DO 210  I = 1,N                                                   CQR       58
```

STATEMENT LABELS			DEF LINE	REFERENCES		
0	130	INACTIVE	48	2*47		
152	140		49	46	47	
0	150	INACTIVE	51	2*50		
0	160	INACTIVE	52	2*51		
163	170		54	51		
0	180	INACTIVE	55	54		
167	185		57	54		
200	190		59	54		
0	200	INACTIVE	62	61		
232	210		64	2*61		
243	220		65	56	58	63
0	230		66	65		
0	240	INACTIVE	67			
0	250	INACTIVE	68			
0	260		69	68		
0	270	INACTIVE	70			
360	280		79	71		
363	290		80	41	44	2*79
0	310		74	73		
0	320		77	75	76	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
22	80	I	18 34	63B	EXT REFS NOT INNER
56	60	J	29 30	5B	INSTACK
73	70	J	32 33	6B	INSTACK
146	140	I	46 49	6B	INSTACK
252	230	I	65 66	4B	INSTACK
300	260	I	68 69	4B	INSTACK
320	310	I	73 74	4B	INSTACK
327	320	I	75 77	20B	NOT INNER
336	320	J	76 77	5B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTAPES	50	0 ITAPES (50)

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
Z	2	0 X	(1)		0 XX	(2)		1 Y	(1)	
W	2	0 U	(1)		0 UU	(2)		1 V	(1)	

STATISTICS

PROGRAM LENGTH	463B	307
CM LABELED COMMON LENGTH	62B	50

52000B CM USED

VARIABLES	SN	TYPE	RELOCATION							
440	J	INTEGER		REFS	2*30	2*33	2*77	DEFINED	29	32	76
446	K	INTEGER		REFS	51	DEFINED	45				
374	LIM	INTEGER		REFS	79	DEFINED	8				
441	LN	INTEGER		REFS	41	3*42	43	44	46	50	6*57
					4*59	4*60	2*62	2*64	65	67	68	73
					75	76	5*78	80	DEFINED	36	43	
442	LO	INTEGER		REFS	67	DEFINED	37	52				
443	L1	INTEGER		REFS	41	45	50	51	52	53	65	
					2*67	68	75	78	DEFINED	38	48	
444	L2	INTEGER		REFS	46	73	DEFINED	39	53			
0	M	INTEGER	F.P.	REFS	11	12	71	DEFINED	1			
436	N	INTEGER		REFS	18	29	6*35	36	DEFINED	12		
0	NIX	INTEGER	F.P.	DEFINED	1	80						
0	ROOT	COMPLEX	ARRAY F.P.	REFS	5	DEFINED	1	42				
0	TOL	REAL	F.P.	REFS	47	DEFINED	1					
447	TOP	REAL		REFS	74	77	78	DEFINED	72	74	77	
452	U	REAL		REFS	6	24	27	28	61			
				DEFINED	21	25	28					
452	UU	REAL	ARRAY	REFS	4	2*6						
453	V	REAL		REFS	6	31	61	DEFINED	22	27	31	
452	W	COMPLEX		REFS	5	6	19	23	30	33	55	
					62	64	66	69	DEFINED	17	35	55
					57	60	62	64				
450	X	REAL		REFS	6	28	61					
450	XX	REAL	ARRAY	REFS	4	2*6						
451	Y	REAL		REFS	6	27	61					
450	Z	COMPLEX		REFS	5	6	21	60	62	64		
				DEFINED	20	59						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
CABS	REAL	1	LIBRARY	21
CQR		4		67
CSQRT	COMPLEX	1	LIBRARY	60

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES					
ABS	REAL	1	INTRIN		47	74	2*77			
AIMAG	REAL	1	INTRIN		77					
AMAX1	REAL	0	INTRIN		74	77				
CMPLX	COMPLEX	2	INTRIN		35	57	60			
CONJG	COMPLEX	1	INTRIN		20	55				
IABS	INTEGER	1	INTRIN		12					
REAL	REAL	1	INTRIN		2*35	47	2*57	60	74	77
SIZE	REAL	1	SF	9	77					

STATEMENT LABELS			DEF LINE	REFERENCES	
411	10	FMT	85	11	
426	20	FMT	88	78	
0	40	INACTIVE	25	24	
44	50		27	2*24	
0	60		30	29	
0	70		33	32	
102	80		34	18	26
117	90		37	2*44	
0	100	INACTIVE	41		
125	110		42	41	50
136	120		45	41	79

```
                    GO TO 220                                                    VALCOM     59
                190 Z = (.5,0.) * (A(LN,LN) - A(LN-1,LN-1))                      VALCOM     60
60                  W = CSQRT(Z**2 + CMPLX(REAL(A(LN,LN-1)),0.)*A(LN-1,LN))      VALCOM     61
                    IF (X*U + Y*V) 200,210,210                                   VALCOM     62
                200 W = A(LN,LN) - Z - W                                         VALCOM     63
                    GO TO 220                                                    VALCOM     64
                210 W = A(LN,LN) - Z + W                                         VALCOM     65
65              220 DO 230  I = L1,LN                                            VALCOM     66
                230 A(I,I) = A(I,I) - W                                          VALCOM     67
                240 CALL CQR(A(L1,L1),LN-LO,DIM,INTER)                           VALCOM     68
                250 DO 260  I = L1,LN                                            VALCOM     69
                260 A(I,I) = A(I,I) + W                                          VALCOM     70
70              270 ITER8 = ITER8 + 1                                            VALCOM     71
                    IF (M .GT. 0) GO TO 280                                      VALCOM     72
                    TOP = 0.                                                     VALCOM     73
                    DO 310  I = L2,LN                                            VALCOM     74
                310 TOP = AMAX1(TOP,ABS(REAL(A(I,I-1))))                         VALCOM     75
75                  DO 320  I = L1,LN                                            VALCOM     76
                    DO 320  J = I,LN                                             VALCOM     77
                320 TOP = AMAX1(TOP,SIZE(A(I,J)))                                VALCOM     78
                    WRITE (ITAPEW,20) ITER8,L1,LN,TOP,A(LN,LN-1),A(LN,LN)        VALCOM     79
                280 IF (ITER8 - LIM) 120,290,290                                 VALCOM     80
80              290 NIX = LN                                                     VALCOM     81
              C                                                                  VALCOM     82
              C                                                                  VALCOM     83
              C FORMATS                                                          VALCOM     84
              C                                                                  VALCOM     85
85             10 FORMAT (1H1, 23HOPTIONAL OUTPUT BY BUCK,/1HO, 28H ITER.  1ST LAST VALCOM     86
                1  MAX. ELT.,13X,  8HA(N,N-1),22X, 6HA(N,N),/,16H  NO.   ROW  ROW, VALCOM     87
                2  /,1HO)                                                        VALCOM     88
               20 FORMAT (3I5,1PE14.4,2(E16.5,E13.5))                            VALCOM     89
              C                                                                  VALCOM     90
90                  RETURN                                                       VALCOM     91
                    END                                                          VALCOM     92
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	VALCOM	1	90

VARIABLES

		SN	TYPE		RELOCATION								
0	A		COMPLEX	ARRAY	F.P.	REFS	5	19	20	30	33	3*35	42
							47	3*57	2*59	2*60	62	64	66	67
							69	74	2*77	2*78	DEFINED	1	19	23
							30	33	66	69				
0	DIM		INTEGER		F.P.	REFS	2	5	67	DEFINED	1			
437	I		INTEGER			REFS	4*19	2*20	2*23	29	2*30	32	2*33	
							2*47	48	4*66	4*69	2*74	76	2*77	
						DEFINED	18	46	65	68	73	75		
0	INTER		INTEGER		F.P.	REFS	67	DEFINED	1					
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	3	7	10					
435	ITAPEW		INTEGER			DEFINED	10	I/O REFS	11	78				
445	ITER8		INTEGER			REFS	54	70	78	79	DEFINED	40	70	

```
      SUBROUTINE VALCOM(A,M,ROOT,INTER,DIM,TOL,NIX)                    VALCOM     2
      INTEGER DIM                                                      VALCOM     3
      DIMENSION ITAPES(50)                                             VALCOM     4
      DIMENSION          XX(2) ,        UU(2)                          VALCOM     5
      COMPLEX A(DIM,1),ROOT(1),Z,W                                     VALCOM     6
      EQUIVALENCE  (Z,X,XX(1)) , (Y,XX(2)) , (W,U,UU(1)) , (V,UU(2))   VALCOM     7
      COMMON /CTAPES/ ITAPES                                           VALCOM     8
      DATA LIM /50/                                                    VALCOM     9
      SIZE(W) = ABS(REAL(W)) + ABS(AIMAG(W))                           VALCOM    10
      ITAPEW =  ITAPES(6)                                              VALCOM    11
      IF (M .LT. 0) WRITE (ITAPEW,10)                                  VALCOM    12
      N = IABS(M)                                                      VALCOM    13
C                                                                      VALCOM    14
C BEGIN BY SCALING TO INSURE REAL SUBDIAGONAL ELEMENTS. THE QR FACTORI- VALCOM    15
C  ZATION WILL KEEP THESE ELEMENTS REAL.                               VALCOM    16
C                                                                      VALCOM    17
      W = (1.,0.)                                                      VALCOM    18
      DO 80  I = 2,N                                                   VALCOM    19
      A(I,I-1) = A(I,I-1) * W                                          VALCOM    20
      Z = CONJG(A(I,I-1))                                              VALCOM    21
      U = CABS(Z)                                                      VALCOM    22
      V = 0.                                                           VALCOM    23
      A(I,I-1) = W                                                     VALCOM    24
      IF (U) 50,40,50                                                  VALCOM    25
   40 U = 1.0                                                          VALCOM    26
      GO TO 80                                                         VALCOM    27
   50 V = Y / U                                                        VALCOM    28
      U = X / U                                                        VALCOM    29
      DO 60  J = I,N                                                   VALCOM    30
   60 A(I,J) = W * A(I,J)                                              VALCOM    31
      V = -V                                                           VALCOM    32
      DO 70  J = 1,I                                                   VALCOM    33
   70 A(J,I) = A(J,I) * W                                              VALCOM    34
   80 CONTINUE                                                         VALCOM    35
      W = A(N,N) + CMPLX(.5*REAL(A(N,N-1)),.25*REAL(A(N,N-1)))         VALCOM    36
      LN = N                                                           VALCOM    37
   90 LO = 0                                                           VALCOM    38
      L1 = 1                                                           VALCOM    39
      L2 = 2                                                           VALCOM    40
      ITER8 = -1                                                       VALCOM    41
  100 IF (LN - L1) 290,110,120                                         VALCOM    42
  110 ROOT(LN) = A(LN,LN)                                              VALCOM    43
      LN = LN - 1                                                      VALCOM    44
      IF (LN)  90,290,90                                               VALCOM    45
  120 K = L1                                                           VALCOM    46
      DO 140  I = L2,LN                                                VALCOM    47
      IF (ABS(REAL(A(I,I-1))) - TOL) 130,130,140                       VALCOM    48
  130 L1 = I                                                           VALCOM    49
  140 CONTINUE                                                         VALCOM    50
      IF (LN - L1) 150,110,150                                         VALCOM    51
  150 IF (L1 - K) 160,170,160                                          VALCOM    52
  160 LO = L1 - 1                                                      VALCOM    53
      L2 = L1 + 1                                                      VALCOM    54
  170 IF (ITER8) 180,185,190                                           VALCOM    55
  180 W = CONJG(W)                                                     VALCOM    56
      GO TO 220                                                        VALCOM    57
  185 W = A(LN,LN) + CMPLX( .25*REAL(A(LN,LN-1)),.25*REAL(A(LN,LN-1))) VALCOM    58
```

```
VARIABLES      SN  TYPE            RELOCATION
     0  N          INTEGER              F.P.        REFS      13      69    DEFINED       1
   242  S          REAL                             REFS      72      73    DEFINED      70
   246  SI         REAL                             REFS      12
   245  SR         REAL         ARRAY               REFS      11      12         26      29      30      31
                                                   DEFINED     22      23
   241  T          REAL                             REFS      67      68         72      73    DEFINED     66      71
   243  X          REAL                             REFS      12      43         48      53      56      60      63
                                                      2*66     67      72         73    DEFINED     39      44      51
                                                        54     58      61         64      67
   243  XX         REAL         ARRAY               REFS      10    2*12
   244  Y          REAL                             REFS      12      43         44    2*66      68      72      73
                                                   DEFINED     42      65         68
   243  Z          REAL                             REFS      12

EXTERNALS           TYPE    ARGS        REFERENCES
     COMSCA                    6             26        29

INLINE FUNCTIONS    TYPE    ARGS        DEF LINE  REFERENCES
     MINO         INTEGER     0  INTRIN                27

STATEMENT LABELS                    DEF LINE    REFERENCES
     0  100          INACTIVE          25          2*24
     0  110          INACTIVE          26          2*25
    37  130                            27          25
     0  140          INACTIVE          29          28
    53  160                            30          24          2*28
     0  170                            32          21
     0  180                            36          33
     0  190          INACTIVE          39          38
     0  200          INACTIVE          44          43
   114  210                            46          41          2*43
     0  220          INACTIVE          49          2*48
     0  230          INACTIVE          50          2*49
     0  240                            56          50
     0  250                            63          57
   157  260                            64          49
     0  270                            74          69
   204  280                            75          16          2*38        48

LOOPS  LABEL   INDEX     FROM-TO     LENGTH     PROPERTIES
    14  280    K          16 75        173B               EXT REFS  NOT INNER
    21  170    I          21 32         42B               EXT REFS
    71  180    I          33 36          3B     INSTACK
   107  210    I          41 46          7B     INSTACK
   133  240    J          50 56          5B     INSTACK
   151  250    I          57 63          5B     INSTACK
   174  270    I          69 74          7B     INSTACK

EQUIV CLASSES   LENGTH      MEMBERS - BIAS NAME(LENGTH)
     Z              2              0 X      (1)              0 XX     (2)              1 Y      (1)
     SR             2              1 SI     (1)

STATISTICS
  PROGRAM LENGTH                 273B      187
        520000B CM USED
```

```
                      X = A(1,I,K+1)                                  FLASH      59
                      A(1,I,K+1) = A(1,I,LOC)                         FLASH      60
   60                 A(1,I,LOC) = X                                  FLASH      61
                      X = A(2,I,K+1)                                  FLASH      62
                      A(2,I,K+1) = A(2,I,LOC)                         FLASH      63
                  250 A(2,I,LOC) = X                                  FLASH      64
                  260 X = A(1,K+1,K)                                  FLASH      65
   65                 Y = -A(2,K+1,K)                                 FLASH      66
                      T = X*X + Y*Y                                   FLASH      67
                      X = X/T                                         FLASH      68
                      Y = Y/T                                         FLASH      69
                      DO 270  I = K2,N                                FLASH      70
   70                 S = A(1,I,K)                                    FLASH      71
                      T = A(2,I,K)                                    FLASH      72
                      A(1,I,K) = X*S - Y*T                            FLASH      73
                      A(2,I,K) = X*T + Y*S                            FLASH      74
                  270 CONTINUE                                        FLASH      75
   75             280 CONTINUE                                        FLASH      76
                      RETURN                                          FLASH      77
                      END                                             FLASH      78
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	FLASH	1	76

VARIABLES	SN	TYPE		RELOCATION							
0	A	REAL	ARRAY	F.P.	REFS	10	22	23	2*26	2*29	34	35
					2*42	51	52	54	55	58	59	61
					62	64	65	70	71	DEFINED	1	30
					31	34	35	52	53	55	56	59
					60	62	63	72	73			
0	DIM	INTEGER		F.P.	REFS	9	10	26	29	DEFINED	1	
235	I	INTEGER			REFS	22	23	26	27	29	30	31
					2*34	2*35	2*42	45	58	2*59	60	61
					2*62	63	70	71	72	73		
					DEFINED	21	33	41	57	69		
0	INTER	INTEGER	ARRAY	F.P.	REFS	10	DEFINED	1	17	47		
236	I2	INTEGER			REFS	28	29	DEFINED	27			
240	J	INTEGER			REFS	51	2*52	53	54	2*55	56	
					DEFINED	50						
231	K	INTEGER			REFS	17	18	19	20	22	23	29
					30	31	2*34	2*35	2*42	47	51	52
					54	55	58	59	61	62	2*64	2*65
					70	71	72	73	DEFINED	16		
234	KL1	INTEGER			REFS	24	26	27	DEFINED	20		
232	K1	INTEGER			REFS	2*26	40	41	49	DEFINED	18	
233	K2	INTEGER			REFS	69	DEFINED	19				
237	LOC	INTEGER			REFS	47	49	52	53	55	56	59
					60	62	63	DEFINED	40	45		
227	M	INTEGER			REFS	15	16	21	33	41	50	57
					DEFINED	13						
230	MK	INTEGER			REFS	25	26	37	38	DEFINED	15	37

```
      SUBROUTINE FLASH(A,N,DIM,INTER)                                   FLASH     2
     COMPLEX REDUCTION TO HESSENBERG FORM BY ELEMENTARY SIMILARITY TRANSFORM- FLASH     3
     C  ATIONS, WITH INTERCHANGES AND D.P. INNER PRODUCT ACCUMULATION.  FLASH     4
     C                                                                  FLASH     5
     CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS FLASH     6
     C     DOUBLE PRECISION SR                                          FLASH     7
     CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   FLASH     8
     C                                                                  FLASH     9
           INTEGER DIM                                                  FLASH    10
           DIMENSION     A(2,DIM,1) ,     INTER(1) ,        XX(2)       FLASH    11
           DIMENSION SR(2)                                              FLASH    12
           EQUIVALENCE   (SI,SR(2)) , (Z,X,XX(1)) , (Y,XX(2))           FLASH    13
           M = N                                                        FLASH    14
     C                                                                  FLASH    15
           MK = M - 1                                                   FLASH    16
           DO 280  K = 1,M                                              FLASH    17
           INTER(K) = 1                                                 FLASH    18
           K1 = K + 1                                                   FLASH    19
           K2 = K + 2                                                   FLASH    20
           KL1 = K - 1                                                  FLASH    21
           DO 170  I = 1,M                                              FLASH    22
           SR(1) = A(1,I,K)                                             FLASH    23
           SR(2) = A(2,I,K)                                             FLASH    24
           IF (KL1) 100,160,100                                         FLASH    25
       100 IF (MK) 110,130,110                                          FLASH    26
       110 CALL COMSCA(A(1,I,K1),A(1,K1,KL1),SR,MK,DIM,1)               FLASH    27
       130 I2 = MINO(I-2,KL1)                                           FLASH    28
           IF (I2) 160,160,140                                          FLASH    29
       140 CALL COMSCA(A(1,I,1),A(1,2,K),SR,I2,DIM,1)                   FLASH    30
       160 A(1,I,K) = -SR(1)                                            FLASH    31
           A(2,I,K) = -SR(2)                                            FLASH    32
       170 CONTINUE                                                     FLASH    33
           DO 180  I = 1,M                                              FLASH    34
           A(1,I,K) = -A(1,I,K)                                         FLASH    35
           A(2,I,K) = -A(2,I,K)                                         FLASH    36
       180 CONTINUE                                                     FLASH    37
           MK = MK - 1                                                  FLASH    38
           IF (MK) 280,280,190                                          FLASH    39
       190 X = 0.0                                                      FLASH    40
           LOC = K1                                                     FLASH    41
           DO 210  I = K1,M                                             FLASH    42
           Y = A(1,I,K)**2 + A(2,I,K)**2                                FLASH    43
           IF (X - Y) 200,210,210                                       FLASH    44
       200 X = Y                                                        FLASH    45
           LOC = I                                                      FLASH    46
       210 CONTINUE                                                     FLASH    47
           INTER(K) = LOC                                               FLASH    48
           IF (X) 220,280,220                                           FLASH    49
       220 IF (LOC - K1) 230,260,230                                    FLASH    50
       230 DO 240 J = 1,M                                               FLASH    51
           X = A(1,K+1,J)                                               FLASH    52
           A(1,K+1,J) = A(1,LOC,J)                                      FLASH    53
           A(1,LOC,J) = X                                               FLASH    54
           X = A(2,K+1,J)                                               FLASH    55
           A(2,K+1,J) = A(2,LOC,J)                                      FLASH    56
       240 A(2,LOC,J) = X                                               FLASH    57
           DO 250 I = 1,M                                               FLASH    58
```

STATEMENT LABELS		DEF LINE	REFERENCES
420	330	112	2*102
0	340	114	83
440	350	122	2*79
236	360	73	64
0	400	71	67
0	450	70	68

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21	130	I	36 41	30B	NOT INNER
36	120	J	39 40	5B	INSTACK
73	140	I	48 49	4B	INSTACK
106		K	52 52	13B	EXT REFS
125		K	53 53	11B	EXT REFS
142	190	K	57 61	22B	NOT INNER
152	180	J	58 60	5B	INSTACK
202	400	I	67 71	22B	NOT INNER
212	450	J	68 70	5B	INSTACK
244	220	I	74 75	5B	INSTACK
270	340	K	83 114	150B	EXT REFS NOT INNER
276		J	86 86	13B	EXT REFS
315		I	87 87	11B	EXT REFS
332	270	I	91 95	22B	NOT INNER
342	260	J	92 94	5B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTAPES	50	0 ITAPES (50)

STATISTICS

PROGRAM LENGTH	634B	412
CM LABELED COMMON LENGTH	62B	50

520000B CM USED

VARIABLES	SN	TYPE	RELOCATION									
					DEFINED	1	112					
573	NUDGE	INTEGER			REFS	110	112	DEFINED	99	110		
556	N1 *	INTEGER			DEFINED	35						
0	ROOT	COMPLEX	ARRAY	F.P.	REFS	23	24	63	72	75	97	2*104
					108	DEFINED	1	113				
551	TILT	COMPLEX			REFS	23	2*106	107	108	DEFINED	105	107
0	TOL	REAL		F.P.	REFS	42	DEFINED	1				
554	TOP	REAL			REFS	41	45	82	DEFINED	33	41	
575	TRACE	COMPLEX	ARRAY		REFS	23	37	49	75	76		
					DEFINED	32	37	47	49	73	75	
547	VALUE	COMPLEX			REFS	23	2*104	113	114	DEFINED	97	108
0	VECTOR	COMPLEX	ARRAY	F.P.	REFS	23	24	114	DEFINED	1		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
COMVEC		7	114
FLASH		4	46
RDM	REAL	1	2*105
VALCOM		7	63
VALROM		7	72

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES			
ABS	REAL	1	INTRIN		2*40	2*104	2*106	
AIMAG	REAL	1	INTRIN		40	104	106	
AMAX1	REAL	0	INTRIN		41	42		
AMIN1	REAL	0	INTRIN		45			
CMPLX	COMPLEX	2	INTRIN		32	47	73	105
IABS	INTEGER	1	INTRIN		34	80	81	
MINO	INTEGER	0	INTRIN		112			
REAL	REAL	1	INTRIN		40	104	106	
SIZE	REAL	1	SF	28	40	104	106	

STATEMENT LABELS			DEF LINE	REFERENCES	
527	10	FMT	119	76	
0	100	INACTIVE	32		
0	110	INACTIVE	33		
0	120		40	39	
0	130		41	36	
0	140		49	48	
0	150	INACTIVE	50		
0	160	INACTIVE	51	50	
140	170		55	50	
0	180		60	58	
0	190		61	57	
164	200		62	50	54
0	210	INACTIVE	74		
0	220		75	74	
260	230		80	31	79
0	240	INACTIVE	85	2*84	
330	250		89	84	
0	260		94	92	
0	270		95	91	
354	280		96	88	
362	290		100	111	
363	300		101	104	
0	310	INACTIVE	104	102	
0	320	INACTIVE	105	2*104	

```
                C                                                                BUCK      116
                C                                                                BUCK      117
                C FORMATS                                                        BUCK      118
                C                                                                BUCK      119
                   10 FORMAT (1HO,6X, 14HORIGINAL TRACE,15X, 16HHESSENBERG TRACE, 16X,  BUCK      120
      120         1         14HEIGENVALUE SUM,//1PE14.6,E14.6,2(E17.6,E14.6))     BUCK      121
                C                                                                BUCK      122
                  350 RETURN                                                     BUCK      123
                      END                                                        BUCK      124
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	BUCK	1	122

VARIABLES

	SN	TYPE		RELOCATION							
0	A	COMPLEX	ARRAY	F.P.	REFS	23	24	37	2*40	46	49	52
						53	59	63	72	114	DEFINED	1	69
						86	87	93				
0	COPY	COMPLEX	ARRAY	F.P.	REFS	23	24	69	93	DEFINED	1	59
0	DIM	INTEGER		F.P.	REFS	22	2*24	46	63	72	114	
					DEFINED	1						
565	EPS	REAL			REFS	40	41	45	63	72	106	109
					DEFINED	38	40	42	45	96	109	
574	FACT	REAL			REFS	107	DEFINED	106				
571	GAP	REAL			REFS	96	104	114	DEFINED	82		
557	I	INTEGER			REFS	2*37	2*40	2*49	59	60	69	71
						75	86	2*87	93	95	101	102	2*104
					DEFINED	36	48	55	60	67	74	86
						87	91	100	101			
572	IJ	INTEGER			REFS	93	94	DEFINED	90	94		
566	IL	INTEGER			REFS	69	70	DEFINED	66	70		
0	INTER	INTEGER	ARRAY	F.P.	REFS	24	46	63	72	114		
					DEFINED	1						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	26	27	29				
553	ITAPEW	INTEGER			DEFINED	29	I/O REFS	76				
561	J	INTEGER			REFS	2*40	52	59	69	2*86	93	
					DEFINED	39	52	58	68	86	92	
563	K	INTEGER			REFS	2*52	2*53	59	61	97	102	105
						108	113	114	DEFINED	52	53	57	83
0	KEY	INTEGER		F.P.	REFS	31	2*79	81	DEFINED	1		
0	KOPY	INTEGER		F.P.	REFS	50	51	80	84	DEFINED	1	
564	L	INTEGER			REFS	58	92	105	DEFINED	56	61	89
						95						
567	LIM1	INTEGER			REFS	81	83	DEFINED	80			
570	LIM2	INTEGER			REFS	83	DEFINED	81				
565	LL	INTEGER			REFS	68	DEFINED	65	71			
562	L1	INTEGER			DEFINED	51	I/O REFS	52	53	85	86	87
0	M	INTEGER		F.P.	REFS	34	63	72	76	DEFINED	1	
555	N	INTEGER			REFS	35	36	39	46	48	52	53
						57	58	67	68	74	86	87	91
						92	114	DEFINED	34			
0	NIX	INTEGER		F.P.	REFS	63	64	72	79	112		

```
                      DO 180  J = L,N                                          BUCK      59
                      COPY(I) = A(K,J)                                         BUCK      60
60                180 I = I + 1                                                BUCK      61
                  190 L = K                                                    BUCK      62
                  200 CONTINUE                                                 BUCK      63
                      CALL VALCOM(A,M,ROOT,INTER,DIM,EPS,NIX)                  BUCK      64
                      IF(NIX.LE.0)GO TO 360                                    BUCK      65
65                    LL = 1                                                   BUCK      66
                      IL = 1                                                   BUCK      67
                      DO 400 I = 1,N                                           BUCK      68
                      DO 450 J = LL,N                                          BUCK      69
                      A(I,J) = COPY(IL)                                        BUCK      70
70                450 IL = IL + 1                                              BUCK      71
                  400 LL = I                                                   BUCK      72
                      CALL VALROM(A,M,ROOT,INTER,DIM,EPS,NIX)                  BUCK      73
                  360 TRACE(3) = CMPLX(0.0,0.0)                                BUCK      74
                  210 DO 220  I = 1,N                                          BUCK      75
75                220 TRACE(3) = TRACE(3) + ROOT(I)                            BUCK      76
                      IF (M .LT. 0) WRITE (ITAPEW,10) TRACE                    BUCK      77
                C  NIX IS SET TO THE NUMBER OF MISSING ROOTS, SO NIX = 0 SHOWS SUCCESS.  BUCK  78
                C  RETURN IF NIX IS POSITIVE (VALCOM FAILURE) OR KEY = 0 (NO VECTORS.)   BUCK  79
                      IF (KEY*NIX - KEY) 230,350,350                           BUCK      80
80                230 LIM1 = IABS(KOPY)                                        BUCK      81
                      LIM2 = IABS(KEY) + LIM1 - 1                              BUCK      82
                      GAP = TOP * 1.E-7                                        BUCK      83
                      DO 340  K = LIM1,LIM2                                    BUCK      84
                      IF (KOPY) 240,240,250                                    BUCK      85
85                240 REWIND L1                                                BUCK      86
                      READ (L1) ((A(I,J), I = 1,J), J = 1,N)                   BUCK      87
                      READ (L1) (A(I,I-1), I = 2,N)                            BUCK      88
                      GO TO 280                                                BUCK      89
                  250 L = 1                                                    BUCK      90
90                    IJ = 1                                                   BUCK      91
                      DO 270  I = 1,N                                          BUCK      92
                      DO 260  J = L,N                                          BUCK      93
                      A(I,J) = COPY(IJ)                                        BUCK      94
                  260 IJ = IJ + 1                                              BUCK      95
95                270 L = I                                                    BUCK      96
                  280 EPS = GAP                                                BUCK      97
                      VALUE = ROOT(K)                                          BUCK      98
                C  MAKE SURE ROOT(K) DIFFERS FROM EARLIER ROOTS BY NOTICEABLE AMOUNT.  BUCK  99
                      NUDGE = 0                                                BUCK     100
100               290 I = 0                                                    BUCK     101
                  300 I = I + 1                                                BUCK     102
                      IF (I - K) 310,330,330                                   BUCK     103
                C  VALUE IS SHIFTED A LITTLE TO GET AWAY FROM ROOT(I).         BUCK     104
                  310 IF (SIZE(VALUE - ROOT(I)) - GAP) 320,320,300             BUCK     105
105               320 TILT = CMPLX(RDM(K)-.5,RDM(L)-.5)                        BUCK     106
                      FACT = EPS / SIZE(TILT)                                  BUCK     107
                      TILT = FACT * TILT                                       BUCK     108
                      VALUE = ROOT(K) + TILT                                   BUCK     109
                      EPS = EPS * 1.2                                          BUCK     110
110                   NUDGE = NUDGE - 1                                        BUCK     111
                      GO TO 290                                                BUCK     112
                  330 NIX = MINO(NIX,NUDGE)                                    BUCK     113
                      ROOT(K) = VALUE                                          BUCK     114
                  340 CALL COMVEC(A,N,VALUE,INTER,DIM,VECTOR(1,K),GAP)         BUCK     115
```

```
      SUBROUTINE BUCK(A,M,ROOT,KEY,INTER,DIM,VECTOR,KOPY,COPY,TOL,NIX)   BUCK        2
C                                                                        BUCK        3
C  MASTER ROUTINE FOR EIGENVALUES AND EIGENVECTORS OF IN-CORE COMPLEX    BUCK        4
C    MATRICES.  VECTOR CALCULATION IS OPTIONAL, AND IF IT IS NOT WANTED, BUCK        5
C    NO SERIOUS STORAGE ALLOCATION NEED BE MADE FOR IT.  THE MATRIX IS   BUCK        6
C    INITIALLY REDUCED TO UPPER HESSENBERG FORM AND ITS ROOTS ARE FOUND  BUCK        7
C    BY THE LR ALGORITHM. IF KEY = 0, VECTORS ARE NOT OBTAINED. OTHER-   BUCK        8
C    WISE, THE ROUTINE SEEKS ABS(KEY) VECTORS, STARTING WITH THE ONE     BUCK        9
C    CORRESPONDING TO ABS(KOPY).  VECTORS ARE FOUND BY THE WIELANDT      BUCK       10
C    ITERATION ON THE HESSENBERG FORM, AND THIS FORM MUST BE RESTORED P  BUCK       11
C    TIMES IF P VECTORS ARE WANTED.  FOR OPTIMUM SPEED, MAKE KOPY POS.   BUCK       12
C    AND THE ARRAY COPY WILL BE USED TO STORE THE HESSENBERG MATRIX. FOR BUCK       13
C    MINIMUM STORAGE USE  SET KOPY NEG. AND THE ARRAY COPY WILL NOT BE   BUCK       14
C    USED (OR NEEDED), AND THE H-MATRIX WILL BE HELD ON TAPE 11. IF KOPY BUCK       15
C    IS POS., THEN COPY MUST BE DIMENSIONED TO AT LEAST 1/2  OF MSQ+3M,  BUCK       16
C    OTHERWISE DIMENSION 1 (COMPLEX) IS O.K.  SIMILARLY, THE ARRAY VEC-  BUCK       17
C    TOR MAY CONSIST OF ONE COLUMN OR MANY.  IF KEY IS NEG., THE HESSEN- BUCK       18
C    BERG REDUCTION AND EIGENVALUE CALCULATION ARE SKIPPED, SO THE ROU-   BUCK       19
C    TINE MAY BE ENTERED MANY TIMES, ONCE FOR THE ROOTS, AND THEN ONCE   BUCK       20
C    FOR EACH DESIRED VECTOR.                                            BUCK       21
C                                                                        BUCK       22
      INTEGER DIM                                                        BUCK       23
      COMPLEX A,ROOT,VECTOR,COPY,TRACE(3),VALUE,TILT                     BUCK       24
      DIMENSION A(DIM,1),ROOT(1),VECTOR(DIM,1),INTER(1),COPY(1)          BUCK       25
C                                                                        BUCK       26
      DIMENSION ITAPES(50)                                               BUCK       27
      COMMON /CTAPES/ ITAPES                                             BUCK       28
      SIZE(VALUE) = ABS(REAL(VALUE)) + ABS(AIMAG(VALUE))                 BUCK       29
      ITAPEW =  ITAPES(6)                                                BUCK       30
C                                                                        BUCK       31
      IF (KEY .LT. 0)  GO TO 230                                         BUCK       32
  100 TRACE(1) = CMPLX(0.0,0.0)                                          BUCK       33
  110 TOP = 0.                                                           BUCK       34
      N = IABS(M)                                                        BUCK       35
      N1 = N - 1                                                         BUCK       36
      DO 130  I = 1,N                                                    BUCK       37
      TRACE(1) = TRACE(1) + A(I,I)                                       BUCK       38
      EPS = 0.                                                           BUCK       39
      DO 120  J = 1,N                                                    BUCK       40
  120 EPS = EPS + SIZE(A(I,J))                                           BUCK       41
  130 TOP = AMAX1(TOP,EPS)                                               BUCK       42
      EPS = AMAX1(TOL,1.E-14)                                            BUCK       43
C  AFTER REDUCTION TO HESSENBERG FORM, SUBDIAGONAL ELEMENTS SMALLER THAN BUCK       44
C    EPS ARE REGARDED AS NEGLIGIBLE.                                     BUCK       45
      EPS = AMIN1(1.E-5,EPS) * TOP                                       BUCK       46
      CALL FLASH(A,N,DIM,INTER)                                          BUCK       47
      TRACE(2) = CMPLX(0.0,0.0)                                          BUCK       48
      DO 140  I = 1,N                                                    BUCK       49
  140 TRACE(2) = TRACE(2) + A(I,I)                                       BUCK       50
  150 IF (KOPY) 160,200,170                                              BUCK       51
  160 L1 = -KOPY                                                         BUCK       52
      WRITE (L1) ((A(J,K), J = 1,K), K = 1,N)                            BUCK       53
      WRITE (L1) (A(K,K-1), K = 2,N)                                     BUCK       54
      GO TO 200                                                          BUCK       55
  170 I = 1                                                              BUCK       56
      L = 1                                                              BUCK       57
      DO 190  K = 1,N                                                    BUCK       58
```

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES						
SNGL	REAL	1	SF	11	30	31	32	33	49	50	51	52
					60	61						

STATEMENT LABELS		DEF LINE	REFERENCES	
0	100	33	16	25
0	150	52	44	
0	200	56	40	
0	210	61	57	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	100	K	16 33	47B	EXT REFS NOT INNER
40	100	I	25 33	20B	OPT
104	200	K	40 56	52B	NOT INNER
121	150	I	44 52	20B	OPT
164	210	I	57 61	7B	INSTACK

STATISTICS

PROGRAM LENGTH		226B	150
	52000B CM USED		

```
      SUBROUTINE VALROM(A,M,ROOT,INTER,DIM,TOL,NIX)                    VALROM     2
      DIMENSION ITAPES(50)                                             VALROM     3
      DIMENSION          XX(2) ,         UU(2)                         VALROM     4
      INTEGER DIM,INTER(1)                                             VALROM     5
      COMPLEX A(DIM,1),ROOT(1),Z,W                                     VALROM     6
      EQUIVALENCE  (Z,X,XX(1)) , (Y,XX(2)) , (W,U,UU(1)) , (V,UU(2))   VALROM     7
      COMMON /CTAPES/ ITAPES                                           VALROM     8
      DATA LIM /50/                                                    VALROM     9
      SIZE(W) = ABS(REAL(W)) + ABS(AIMAG(W))                           VALROM    10
      ITAPEW =  ITAPES(6)                                              VALROM    11
      IF (M .LT. 0) WRITE (ITAPEW,10)                                  VALROM    12
      N = IABS(M)                                                      VALROM    13
      W = A(N,N) - (.5,.25) * A(N,N-1)                                 VALROM    14
      LN = N                                                           VALROM    15
   90 LO = 0                                                           VALROM    16
      L1 = 1                                                           VALROM    17
      L2 = 2                                                           VALROM    18
      ITER8 = -1                                                       VALROM    19
  100 IF (LN - L1) 290,110,120                                         VALROM    20
  110 ROOT(LN) = A(LN,LN)                                              VALROM    21
      LN = LN - 1                                                      VALROM    22
      IF (LN)  90,290,90                                               VALROM    23
  120 K = L1                                                           VALROM    24
      DO 140  I = L2,LN                                                VALROM    25
      IF (SIZE(A(I,I-1)) - TOL) 130,130,140                            VALROM    26
  130 L1 = I                                                           VALROM    27
  140 CONTINUE                                                         VALROM    28
      IF (LN - L1) 150,110,150                                         VALROM    29
  150 IF (L1 - K) 160,170,160                                          VALROM    30
  160 LO = L1 - 1                                                      VALROM    31
      L2 = L1 + 1                                                      VALROM    32
  170 IF (ITER8) 180,185,190                                           VALROM    33
  180 W = CONJG(W)                                                     VALROM    34
      GO TO 220                                                        VALROM    35
  185 W = A(LN,LN) + (0.,.25)*A(LN,LN-1)                               VALROM    36
      GO TO 220                                                        VALROM    37
  190 Z = (.5,0.) * (A(LN,LN) - A(LN-1,LN-1))                          VALROM    38
      W = CSQRT(Z**2 + A(LN,LN-1)*A(LN-1,LN))                          VALROM    39
      IF (X*U + Y*V) 200,210,210                                       VALROM    40
  200 W = A(LN,LN) - Z - W                                             VALROM    41
      GO TO 220                                                        VALROM    42
  210 W = A(LN,LN) - Z + W                                             VALROM    43
  220 DO 230  I = L1,LN                                                VALROM    44
  230 A(I,I) = A(I,I) - W                                              VALROM    45
  240 CALL CLR(A(L1,L1),LN-LO,DIM,INTER)                               VALROM    46
  250 DO 260  I = L1,LN                                                VALROM    47
  260 A(I,I) = A(I,I) + W                                              VALROM    48
  270 ITER8 = ITER8 + 1                                                VALROM    49
      IF (M .GT. 0) GO TO 280                                          VALROM    50
      TOP = 0.                                                         VALROM    51
      DO 310  I = L2,LN                                                VALROM    52
  310 TOP = AMAX1(TOP,SIZE(A(I,I-1)))                                  VALROM    53
      DO 320  I = L1,LN                                                VALROM    54
      DO 320  J = I,LN                                                 VALROM    55
  320 TOP = AMAX1(TOP,SIZE(A(I,J)))                                    VALROM    56
      WRITE (ITAPEW,20) ITER8,L1,LN,TOP,A(LN,LN-1),A(LN,LN)            VALROM    57
  280 IF (ITER8 - LIM) 120,290,290                                     VALROM    58
```

```
                290 NIX = LN                                                    VALROM     59
              C                                                                 VALROM     60
     60       C                                                                 VALROM     61
              C FORMATS                                                         VALROM     62
              C                                                                 VALROM     63
                 10 FORMAT (1H1, 23HOPTIONAL OUTPUT BY BUCK,/1HO, 28H ITER.  1ST LAST  VALROM     64
                   1  MAX. ELT.,13X,  8HA(N,N-1),22X, 6HA(N,N),/,16H  NO.   ROW  ROW,  VALROM     65
     65            2  /,1HO)                                                    VALROM     66
                 20 FORMAT (3I5,1PE14.4,2(E16.5,E13.5))                         VALROM     67
              C                                                                 VALROM     68
                   RETURN                                                       VALROM     69
                    END                                                         VALROM     70
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	VALROM	1	68

VARIABLES	SN	TYPE		RELOCATION								
0	A	COMPLEX	ARRAY	F.P.	REFS	5	2*13	20	2*25	2*35	2*37	2*38
						40	42	44	45	47	2*52	2*55	2*56
					DEFINED	1	44	47				
0	DIM	INTEGER		F.P.	REFS	4	5	45	DEFINED	1		
371	I	INTEGER			REFS	4*25	26	4*44	4*47	4*52	54	2*55
					DEFINED	24	43	46	51	53		
0	INTER	INTEGER	ARRAY	F.P.	REFS	4	45	DEFINED	1			
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	2	7	10				
361	ITAPEW	INTEGER			DEFINED	10	I/O REFS	11	56			
367	ITER8	INTEGER			REFS	32	48	56	57	DEFINED	18	48
373	J	INTEGER			REFS	2*55	DEFINED	54				
370	K	INTEGER			REFS	29	DEFINED	23				
317	LIM	INTEGER			REFS	57	DEFINED	8				
363	LN	INTEGER			REFS	19	3*20	21	22	24	28	4*35
						4*37	4*38	2*40	2*42	43	45	46	51
						53	54	5*56	58	DEFINED	14	21	
364	LO	INTEGER			REFS	45	DEFINED	15	30			
365	L1	INTEGER			REFS	19	23	28	29	30	31	43
						2*45	46	53	56	DEFINED	16	26	
366	L2	INTEGER			REFS	24	51	DEFINED	17	31		
0	M	INTEGER		F.P.	REFS	11	12	49	DEFINED	1		
362	N	INTEGER			REFS	4*13	14	DEFINED	12			
0	NIX	INTEGER		F.P.	DEFINED	1	58					
0	ROOT	COMPLEX	ARRAY	F.P.	REFS	5	DEFINED	1	20			
0	TOL	REAL		F.P.	REFS	25	DEFINED	1				
372	TOP	REAL			REFS	52	55	56	DEFINED	50	52	55
376	U	REAL			REFS	6	39					
376	UU	REAL	ARRAY		REFS	3	2*6					
377	V	REAL			REFS	6	39					
376	W	COMPLEX			REFS	5	6	33	40	42	44	47
					DEFINED	13	33	35	38	40	42	
374	X	REAL			REFS	6	39					
374	XX	REAL	ARRAY		REFS	3	2*6					
375	Y	REAL			REFS	6	39					

VARIABLES	SN	TYPE	RELOCATION					
374	Z	COMPLEX		REFS	5	6	38	40	42
				DEFINED	37				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
CLR		4		45
CSQRT	COMPLEX	1	LIBRARY	38

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES		
ABS	REAL	1	INTRIN		2*25	2*52	2*55
AIMAG	REAL	1	INTRIN		25	52	55
AMAX1	REAL	0	INTRIN		52	55	
CONJG	COMPLEX	1	INTRIN		33		
IABS	INTEGER	1	INTRIN		12		
REAL	REAL	1	INTRIN		25	52	55
SIZE	REAL	1	SF	9	25	52	55

STATEMENT LABELS			DEF LINE	REFERENCES			
334	10	FMT	63	11			
351	20	FMT	66	56			
33	90		15	2*22			
0	100	INACTIVE	19				
41	110		20	19	28		
52	120		23	19	57		
0	130	INACTIVE	26	2*25			
70	140		27	24	25		
0	150	INACTIVE	29	2*28			
0	160	INACTIVE	30	2*29			
100	170		32	29			
0	180	INACTIVE	33	32			
104	185		35	32			
120	190		37	32			
0	200	INACTIVE	40	39			
154	210		42	2*39			
165	220		43	34	36	41	
0	230		44	43			
0	240	INACTIVE	45				
0	250	INACTIVE	46				
0	260		47	46			
0	270	INACTIVE	48				
303	280		57	49			
306	290		58	19	22	2*57	
0	310		52	51			
0	320		55	53	54		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
63	140	I	24 27	6B	INSTACK	
174	230	I	43 44	4B	INSTACK	
222	260	I	46 47	4B	INSTACK	
242	310	I	51 52	5B	INSTACK	
252	320	I	53 55	20B		NOT INNER
261	320	J	54 55	5B	INSTACK	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTAPES	50	0 ITAPES (50)

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
Z	2	0 X	(1)	0 XX	(2)	1 Y	(1)
W	2	0 U	(1)	0 UU	(2)	1 V	(1)

STATISTICS

PROGRAM LENGTH	403B	259
CM LABELED COMMON LENGTH	62B	50

520000B CM USED

```
      SUBROUTINE CLR(A,M,MID,INTER)                                          CLR        2
      COMPLEX  A , Z , W                                                     CLR        3
      DIMENSION          XX(2) ,        UU(2)                                CLR        4
      DIMENSION       A(MID,1) ,     INTER(1)                                CLR        5
      EQUIVALENCE  (Z,X,XX(1)) , (Y,XX(2)) , (W,U,UU(1)) , (V,UU(2))         CLR        6
      N = M                                                                  CLR        7
      N1 = N - 1                                                             CLR        8
      DO 150  I = 1,N1                                                       CLR        9
      X = REAL(A(I,I))**2 + AIMAG(A(I,I))**2                                 CLR       10
      Y = REAL(A(I+1,I))**2  +  AIMAG(A(I+1,I))**2                           CLR       11
      IF (X - Y) 100,120,120                                                 CLR       12
  100 INTER(I) = -INTER(I)                                                   CLR       13
      X = Y                                                                  CLR       14
      DO 110  J = I,N                                                        CLR       15
      W = A(I,J)                                                             CLR       16
      A(I,J) = A(I+1,J)                                                      CLR       17
  110 A(I+1,J) = W                                                           CLR       18
  120 IF (X) 130,150,130                                                     CLR       19
  130 A(I+1,I) = A(I+1,I) / A(I,I)                                           CLR       20
      DO 140  J = I,N1                                                       CLR       21
  140 A(I+1,J+1) = A(I+1,J+1) - A(I+1,I)*A(I,J+1)                            CLR       22
  150 CONTINUE                                                               CLR       23
      DO 210  I = 1,N1                                                       CLR       24
      W = A(I+1,I)                                                           CLR       25
      IF (INTER(I)) 160,180,180                                              CLR       26
  160 DO 170  J = 1,I                                                        CLR       27
      Z = A(J,I)                                                             CLR       28
      A(J,I) = A(J,I+1)                                                      CLR       29
  170 A(J,I+1) = Z                                                           CLR       30
      A(I+1,I) = A(I+1,I+1)                                                  CLR       31
      A(I+1,I+1) = 0.                                                        CLR       32
      INTER(I) = -INTER(I)                                                   CLR       33
      GO TO 190                                                              CLR       34
  180 A(I+1,I) = W*A(I+1,I+1)                                                CLR       35
  190 DO 200  J = 1,I                                                        CLR       36
  200 A(J,I) = A(J,I) + W*A(J,I+1)                                           CLR       37
  210 CONTINUE                                                               CLR       38
      RETURN                                                                 CLR       39
       END                                                                   CLR       40
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CLR	1	38

VARIABLES

		SN	TYPE		RELOCATION							
0	A		COMPLEX	ARRAY	F.P.	REFS	2	4	2*9	2*10	15	16	2*19
							3*21	24	27	28	30	34	2*36	
						DEFINED	1	16	17	19	21	28	29
							30	31	34	36			
172	I		INTEGER			REFS	4*9	4*10	2*12	14	15	2*16	17
							6*19	20	5*21	2*24	25	26	27	2*28
							29	4*30	2*31	2*32	4*34	35	3*36	

VARIABLES	SN	TYPE		RELOCATION								
					DEFINED	8	23					
0	INTER	INTEGER	ARRAY	F.P.	REFS	4	12	25	32	DEFINED	1	12
					32							
173	J	INTEGER			REFS	15	2*16	17	3*21	27	2*28	29
					3*36	DEFINED	14	20	26	35		
0	M	INTEGER		F.P.	REFS	6	DEFINED	1				
0	MID	INTEGER		F.P.	REFS	4	DEFINED	1				
170	N	INTEGER			REFS	7	14	DEFINED	6			
171	N1	INTEGER			REFS	8	20	23	DEFINED	7		
176	U	REAL			REFS	5						
176	UU	REAL	ARRAY		REFS	3	2*5					
177	V	REAL			REFS	5						
176	W	COMPLEX			REFS	2	5	17	34	36		
					DEFINED	15	24					
174	X	REAL			REFS	5	11	18	DEFINED	9	13	
174	XX	REAL	ARRAY		REFS	3	2*5					
175	Y	REAL			REFS	5	11	13	DEFINED	10		
174	Z	COMPLEX			REFS	2	5	29	DEFINED	27		

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
AIMAG	REAL	1	INTRIN		9	10
REAL	REAL	1	INTRIN		9	10

STATEMENT LABELS			DEF LINE	REFERENCES	
0	100	INACTIVE	12	11	
0	110		17	14	
43	120		18	2*11	
0	130	INACTIVE	19	2*18	
0	140		21	20	
74	150		22	8	18
0	160	INACTIVE	26	25	
0	170		29	26	
135	180		34	2*25	
145	190		35	33	
0	200		36	35	
0	210		37	23	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	150	I	8 22	63B	NOT INNER
35	110	J	14 17	5B	INSTACK
64	140	J	20 21	7B	INSTACK
100	210	I	23 37	66B	NOT INNER
116	170	J	26 29	6B	INSTACK
154	200	J	35 36	7B	INSTACK

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
Z	2	0 X	(1)		0 XX	(2)		1 Y	(1)	
W	2	0 U	(1)		0 UU	(2)		1 V	(1)	

STATISTICS

PROGRAM LENGTH 223B 147

52000B CM USED

```
      SUBROUTINE COMVEC(A,M,ROOT,INTER,DIM,VECTOR,EPS)                  COMVEC     2
      INTEGER DIM,INTER(1)                                              COMVEC     3
      COMPLEX A(DIM,1),ROOT,VECTOR(1),W                                 COMVEC     4
C                                                                       COMVEC     5
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     COMVEC     6
C     COMPLEX*16 G                                                      COMVEC     7
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        COMVEC     8
C                                                                       COMVEC     9
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     COMVEC    10
      COMPLEX G                                                         COMVEC    11
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        COMVEC    12
      DIMENSION ITAPES(50)                                              COMVEC    13
      COMMON / CTAPES / ITAPES                                          COMVEC    14
      SIZE(W) = ABS(REAL(W)) + ABS(AIMAG(W))                            COMVEC    15
C                                                                       COMVEC    16
C                                                                       COMVEC    17
      ITAPEW  =  ITAPES(6)                                              COMVEC    18
C                                                                       COMVEC    19
C                                                                       COMVEC    20
      BIG = .002 / EPS                                                  COMVEC    21
      DELTA = 0.01 * EPS                                                COMVEC    22
      N = M                                                             COMVEC    23
      N1 = N - 1                                                        COMVEC    24
      A(1,1) = A(1,1) - ROOT                                            COMVEC    25
      VECTOR(1)=CMPLX(1.0,0.0)                                          COMVEC    26
      DO 150  I = 1,N1                                                  COMVEC    27
      VECTOR(I+1)=CMPLX(1.0,0.0)                                        COMVEC    28
      A(I+1,I+1) = A(I+1,I+1) - ROOT                                    COMVEC    29
      X = REAL(A(I,I))**2  +  AIMAG(A(I,I))**2                          COMVEC    30
      Y = REAL(A(I+1,I))**2  +  AIMAG(A(I+1,I))**2                      COMVEC    31
      IF (X - Y) 100,120,120                                            COMVEC    32
  100 X = Y                                                             COMVEC    33
      INTER(I) = -INTER(I)                                              COMVEC    34
      DO 110  J = I,N                                                   COMVEC    35
      W = A(I,J)                                                        COMVEC    36
      A(I,J) = A(I+1,J)                                                 COMVEC    37
  110 A(I+1,J) = W                                                      COMVEC    38
  120 IF (SIZE(A(I,I)) - DELTA) 130,130,140                             COMVEC    39
  130 A(I,I) = CMPLX(DELTA,0.)                                          COMVEC    40
  140 W = A(I+1,I)/A(I,I)                                               COMVEC    41
      A(I+1,I) = W                                                      COMVEC    42
      DO 150  J = I,N1                                                  COMVEC    43
  150 A(I+1,J+1) = A(I+1,J+1) - W*A(I,J+1)                              COMVEC    44
      IF (SIZE(A(N,N)) - DELTA) 160,160,170                             COMVEC    45
  160 A(N,N) = CMPLX(DELTA,0.)                                          COMVEC    46
  170 L = 1                                                             COMVEC    47
  190 KEY = 10                                                          COMVEC    48
  200 VECTOR(N) = VECTOR(N) / A(N,N)                                    COMVEC    49
      I1 = N                                                            COMVEC    50
      DO 220  K = 1,N1                                                  COMVEC    51
      W = -VECTOR(I1-1)                                                 COMVEC    52
      G = W                                                             COMVEC    53
      CALL COMSCA(A(I1-1,I1),VECTOR(I1),G,K,DIM,1)                      COMVEC    54
      VECTOR(I1-1) = -G / A(I1-1,I1-1)                                  COMVEC    55
  220 I1 = I1 - 1                                                       COMVEC    56
  230 X = 0.                                                            COMVEC    57
      DO 250  I = 1,N                                                   COMVEC    58
```

```
                      ORDER = SIZE(VECTOR(I))                                  COMVEC     59
                      IF (X - ORDER) 240,250,250                               COMVEC     60
60                240 L = I                                                    COMVEC     61
                      X = ORDER                                                COMVEC     62
                  250 CONTINUE                                                 COMVEC     63
                      W = VECTOR(L)                                            COMVEC     64
                      DO 260  I = 1,N                                          COMVEC     65
65                260 VECTOR(I) = VECTOR(I) / W                                COMVEC     66
                      IF (KEY) 360,300,270                                     COMVEC     67
                  270 IF (X - BIG) 274,274,272                                 COMVEC     68
                  272 KEY = 0                                                  COMVEC     69
                      GO TO 276                                                COMVEC     70
70                274 KEY = KEY - 1                                            COMVEC     71
                      IF (KEY) 300,278,276                                     COMVEC     72
                  278 WRITE (ITAPEW,10) K, X, ROOT                             COMVEC     73
                  276 DO 290  I = 1,N1                                         COMVEC     74
                      IF (INTER(I)) 280,290,290                                COMVEC     75
75                280 INTER(I) = -INTER(I)                                     COMVEC     76
                      W = VECTOR(I)                                            COMVEC     77
                      VECTOR(I) = VECTOR(I+1)                                  COMVEC     78
                      VECTOR(I+1) = W                                          COMVEC     79
                  290 VECTOR(I+1) = VECTOR(I+1) - A(I+1,I)*VECTOR(I)           COMVEC     80
80                    GO TO 200                                                COMVEC     81
                  300 K1 = N1                                                  COMVEC     82
                  310 IF (K1 .LT. 2) GO TO 330                                 COMVEC     83
                      G = VECTOR(K1+1)                                         COMVEC     84
                      CALL COMSCA(A(K1+1,1),VECTOR(2),G,K1-1,DIM,1)            COMVEC     85
85                    VECTOR(K1+1) = G                                         COMVEC     86
                      K1 = K1 - 1                                              COMVEC     87
                      GO TO 310                                                COMVEC     88
                  330 K1 = N1                                                  COMVEC     89
                  340 W = VECTOR(K1)                                           COMVEC     90
90                    IF (K1 .LT. 2) GO TO 350                                 COMVEC     91
                      L = INTER(K1-1)                                          COMVEC     92
                      VECTOR(K1) = VECTOR(L)                                   COMVEC     93
                      VECTOR(L) = W                                            COMVEC     94
                      K1 = K1 - 1                                              COMVEC     95
95                    GO TO 340                                                COMVEC     96
                  350 KEY = -1                                                 COMVEC     97
                      GO TO 230                                                COMVEC     98
                C                                                              COMVEC     99
                C                                                              COMVEC    100
100             C FORMATS                                                      COMVEC    101
                C                                                              COMVEC    102
                   10 FORMAT (1HO, 29HCOMVEC FAILURE.  K,X,ROOT = /,I3,1P3E20.8)  COMVEC  103
                C                                                              COMVEC    104
                  360 RETURN                                                   COMVEC    105
105                   END                                                      COMVEC    106
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

84 I VECTOR ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
3 COMVEC 1 104

VARIABLES SN TYPE RELOCATION

0	A	COMPLEX	ARRAY	F.P.	REFS	3	24	28	2*29	2*30	35	36
					2*38	2*40	2*43	2*44	48	53	54	79
					84	DEFINED	1	24	28	36	37	39
					41	43	45					
431	BIG	REAL			REFS	67	DEFINED	20				
432	DELTA	REAL			REFS	38	39	44	45	DEFINED	21	
0	DIM	INTEGER		F.P.	REFS	2	3	53	84	DEFINED	1	
0	EPS	REAL		F.P.	REFS	20	21	DEFINED	1			
426	G	COMPLEX			REFS	10	53	54	84	85		
					DEFINED	52	83					
435	I	INTEGER			REFS	27	4*28	4*29	4*30	2*33	34	35
					2*36	37	4*38	2*39	4*40	2*41	42	3*43
					2*58	60	2*65	74	2*75	76	2*77	78
					5*79	DEFINED	26	57	64	73		
0	INTER	INTEGER	ARRAY	F.P.	REFS	2	33	74	75	91		
					DEFINED	1	33	75				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	12	13	17				
430	ITAPEW	INTEGER			DEFINED	17	I/O REFS	72				
443	I1	INTEGER			REFS	51	3*53	3*54	55	DEFINED	49	55
440	J	INTEGER			REFS	35	2*36	37	3*43	DEFINED	34	42
444	K	INTEGER			REFS	53	72	DEFINED	50			
442	KEY	INTEGER			REFS	66	70	71	DEFINED	47	68	70
					96							
446	K1	INTEGER			REFS	82	83	2*84	85	86	89	90
					91	92	94	DEFINED	81	86	88	94
441	L	INTEGER			REFS	63	92	93	DEFINED	46	60	91
0	M	INTEGER		F.P.	REFS	22	DEFINED	1				
433	N	INTEGER			REFS	23	34	4*44	2*45	4*48	49	57
					64	DEFINED	22					
434	N1	INTEGER			REFS	26	42	50	73	81	88	
					DEFINED	23						
445	ORDER	REAL			REFS	59	61	DEFINED	58			
0	ROOT	COMPLEX		F.P.	REFS	3	24	28	72	DEFINED	1	
0	VECTOR	COMPLEX	ARRAY	F.P.	REFS	3	48	51	53	2*58	63	65
					76	77	2*79	83	84	89	92	
					DEFINED	1	25	27	48	54	65	77
					78	79	85	92	93			
424	W	COMPLEX			REFS	3	37	41	43	52	65	78
					93	DEFINED	35	40	51	63	76	89
436	X	REAL			REFS	31	59	67	72	DEFINED	29	32
					56	61						
437	Y	REAL			REFS	31	32	DEFINED	30			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS TYPE ARGS REFERENCES
COMSCA 6 53 84

INLINE FUNCTIONS TYPE ARGS DEF LINE REFERENCES

ABS	REAL	1	INTRIN	2*38	2*44	2*58			
AIMAG	REAL	1	INTRIN	29	30	38	44	58	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES				
CMPLX	COMPLEX	2	INTRIN		25	27	39	45	
REAL	REAL	1	INTRIN		29	30	38	44	58
SIZE	REAL	1	SF	14	38	44	58		

STATEMENT LABELS			DEF LINE	REFERENCES	
412	10 FMT		102	72	
0	100	INACTIVE	32	31	
0	110		37	34	
64	120		38	2*31	
0	130	INACTIVE	39	2*38	
75	140		40	38	
0	150		43	26	42
0	160	INACTIVE	45	2*44	
140	170		46	44	
0	190	INACTIVE	47		
142	200		48	80	
0	220		55	50	
210	230		56	97	
0	240	INACTIVE	60	59	
224	250		62	57	2*59
0	260		65	64	
0	270	INACTIVE	67	66	
0	272	INACTIVE	68	67	
257	274		70	2*67	
263	276		73	69	71
0	278	INACTIVE	72	71	
0	280	INACTIVE	75	74	
302	290		79	73	2*74
313	300		81	66	71
315	310		82	87	
337	330		88	82	
341	340		89	95	
360	350		96	90	
362	360		104	66	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
27	150	I	26 43	77B	NOT INNER
56	110	J	34 37	5B	INSTACK
114	150	J	42 43	7B	INSTACK
157	220	K	50 55	31B	EXT REFS
216	250	I	57 62	10B	OPT
242	260	I	64 65	7B	INSTACK
273	290	I	73 79	16B	OPT

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)
CTAPES	50	0 ITAPES (50)

STATISTICS

PROGRAM LENGTH	470B	312
CM LABELED COMMON LENGTH	62B	50

52000B CM USED

```
      SUBROUTINE GGCHK (NQ,RQ,VEC,RORT,QUO,VINFV,GR,GC,ICLUE,NOD,Q,TOL,   GGCHK     2
     1                  MMOD)                                             GGCHK     3
C                                                                         GGCHK     4
      DIMENSION TILDA (40,40), VINF(40,40), GR(1), GC(1)                  GGCHK     5
C                                                                         GGCHK     6
      COMPLEX RQ(MMOD,1), VEC(MMOD,1), RORT(1), VINFV(MMOD,1), Z(40)      GGCHK     7
C                                                                         GGCHK     8
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS       GGCHK     9
C     COMPLEX*16 COMSCA,VINF  ,TILDA ,SUM   ,DCMPLF                       GGCHK    10
C                                                                         GGCHK    11
C     DOUBLE PRECISION    SAM ,           RAD ,       DSCAPR              GGCHK    12
C     DOUBLE PRECISION     CAD                                            GGCHK    13
C     DOUBLE PRECISION ARG1,ARG2                                          GGCHK    14
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS          GGCHK    15
C                                                                         GGCHK    16
C                                                                         GGCHK    17
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS       GGCHK    18
      COMPLEX COMSCA,VINF  ,TILDA ,SUM   ,DCMPLF                          GGCHK    19
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS          GGCHK    20
C                                                                         GGCHK    21
      ARG1 = 0.0                                                          GGCHK    22
      ARG2 = 0.0                                                          GGCHK    23
      DO 1 I=1,NQ                                                         GGCHK    24
      DO 2 J=1,NQ                                                         GGCHK    25
      SUM = DCMPLF(ARG1,ARG2)                                             GGCHK    26
      TILDA(I,J) = VEC(I,J)                                               GGCHK    27
    2 VINF(I,J) = COMSCA (RQ(I,1),VEC(1,J),SUM,NQ,MMOD,1)                 GGCHK    28
    1 CONTINUE                                                            GGCHK    29
C     ---- VEC(INVERSE) X Q X VEC = ROOTS    ----------------------       GGCHK    30
      CALL CLINEQ (TILDA,VINF,NQ,NQ,MMOD,NOD)                             GGCHK    31
      DO 10 I = 1,NQ                                                      GGCHK    32
      DO 10 J = 1,NQ                                                      GGCHK    33
   10 VINFV(I,J) = VINF(I,J)                                              GGCHK    34
      SAM = 0.0                                                           GGCHK    35
      NQ2=2*NQ                                                            GGCHK    36
      BOTTOM = DSQRTF(DSCAPR(RORT,RORT,SAM,NQ2,1,1))                      GGCHK    37
      DO 3 I=1,NQ                                                         GGCHK    38
      VINFV(I,I)=VINFV(I,I)-RORT(I)                                       GGCHK    39
    3 Z(I)=VINFV(I,I)                                                     GGCHK    40
      SAM = 0.0                                                           GGCHK    41
      DO 4 I=1,NQ                                                         GGCHK    42
    4 SAM = DSCAPR(VINFV(1,I),VINFV(1,I),SAM,NQ2,1,1)                     GGCHK    43
      TOP = DSQRTF(SAM)                                                   GGCHK    44
      QUO = TOP /BOTTOM                                                   GGCHK    45
      DO 5 I=1,NQ                                                         GGCHK    46
      VINFV(I,I)=VINFV(I,I)+RORT(I)                                       GGCHK    47
      RAD = 0.0                                                           GGCHK    48
      CAD = 0.0                                                           GGCHK    49
      DO 6 J=1,NQ                                                         GGCHK    50
      IF(I.EQ.J)GO TO 6                                                   GGCHK    51
      SAM = 0.0                                                           GGCHK    52
      RAD = RAD + DSQRTF(DSCAPR(VINFV(I,J),VINFV(I,J),SAM,2,1,1))         GGCHK    53
      SAM = 0.0                                                           GGCHK    54
      CAD = CAD + DSQRTF(DSCAPR(VINFV(J,I),VINFV(J,I),SAM,2,1,1))         GGCHK    55
    6 CONTINUE                                                            GGCHK    56
      GC(I)=CAD                                                           GGCHK    57
    5 GR(I)=RAD                                                           GGCHK    58
```

```
                      ICLUE=0                                                  GGCHK      59
                      DO 7 I=1,NQ                                              GGCHK      60
   60                 ZR1=REAL(VINFV(I,I))                                     GGCHK      61
                      ZI1=AIMAG(VINFV(I,I))                                    GGCHK      62
                      ZRI1 = CABS(VINFV(I,I))                                  GGCHK      63
                      DO 8 J=1,NQ                                              GGCHK      64
                      IF(J.LE.I)GO TO 8                                        GGCHK      65
   65                 ZR2=REAL(VINFV(J,J))                                     GGCHK      66
                      ZI2=AIMAG(VINFV(J,J))                                    GGCHK      67
                      ZRI2 = CABS(VINFV(J,J))                                  GGCHK      68
                      IF (ZRI1.LE.TOL.AND.ZRI2 LE.TOL) GO TO 8                 GGCHK      69
                      DIFR=ABS(ZR1-ZR2)                                        GGCHK      70
   70                 DIFI=ABS(ZI1-ZI2)                                        GGCHK      71
                      DIF=SQRT(DIFR**2+DIFI**2)                                GGCHK      72
                      RM=GR(I)+GR(J)                                           GGCHK      73
                      CM=GC(I)+GC(J)                                           GGCHK      74
                      RCM  =  AMIN1(RM,CM)                                     GGCHK      75
   75                 IF (DIF.LE.RCM) ICLUE = ICLUE + 1                        GGCHK      76
                    8 CONTINUE                                                 GGCHK      77
                    7 CONTINUE                                                 GGCHK      78
                      RETURN                                                   GGCHK      79
                      END                                                      GGCHK      80
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	GGCHK	1	78

VARIABLES

		SN	TYPE		RELOCATION								
346	ARG1		REAL			REFS	25	DEFINED	21				
347	ARG2		REAL			REFS	25	DEFINED	22				
354	BOTTOM		REAL			REFS	44	DEFINED	36				
357	CAD		REAL			REFS	54	56	DEFINED	48	54		
372	CM		REAL			REFS	74	DEFINED	73				
370	DIF		REAL			REFS	75	DEFINED	71				
367	DIFI		REAL			REFS	71	DEFINED	70				
366	DIFR		REAL			REFS	71	DEFINED	69				
0	GC		REAL	ARRAY	F.P.	REFS	4	2*73	DEFINED	1	56		
0	GR		REAL	ARRAY	F.P.	REFS	4	2*72	DEFINED	1	57		
350	I		INTEGER			REFS	2*26	2*27	2*33	5*38	3*39	2*42	5*46
							50	2*52	2*54	56	57	2*60	2*61	2*62
							64	72	73	DEFINED	23	31	37	41
							45	59						
0	ICLUE		INTEGER		F.P.	REFS	75	DEFINED	1	58	75		
351	J		INTEGER			REFS	2*26	2*27	2*33	50	2*52	2*54	64
							2*65	2*66	2*67	72	73	DEFINED	24	32
							49	63						
0	MMOD		INTEGER		F.P.	REFS	3*6	27	30	DEFINED	1		
0	NOD		INTEGER		F.P.	REFS	30	DEFINED	1				
0	NQ		INTEGER		F.P.	REFS	23	24	27	2*30	31	32	35
							37	41	45	49	59	63		
						DEFINED	1						
353	NQ2		INTEGER			REFS	36	42	DEFINED	35			

```
VARIABLES      SN  TYPE          RELOCATION
     0  Q          REAL       *UNUSED     F.P.      DEFINED        1
     0  QUO        REAL                   F.P.      DEFINED        1        44
   356  RAD        REAL                                REFS         52        57     DEFINED        47        52
   373  RCM        REAL                                REFS         75     DEFINED         74
   371  RM         REAL                                REFS         74     DEFINED         72
     0  RORT       COMPLEX    ARRAY       F.P.        REFS          6       2*36         38        46     DEFINED         1
     0  RQ         COMPLEX    ARRAY       F.P.        REFS          6        27      DEFINED          1
   352  SAM        REAL                                REFS         36        42         43        52        54
                                                     DEFINED        34        40         42        51        53
   344  SUM        COMPLEX                             REFS         18        27      DEFINED         25
   374  TILDA      COMPLEX    ARRAY                    REFS          4        18         30     DEFINED         26
     0  TOL        REAL                   F.P.        REFS       2*68     DEFINED          1
   355  TOP        REAL                                REFS         44     DEFINED         43
     0  VEC        COMPLEX    ARRAY       F.P.        REFS          6        26         27     DEFINED          1
  6574  VINF       COMPLEX    ARRAY                   REFS          4        18         30        33     DEFINED         27
     0  VINFV      COMPLEX    ARRAY       F.P.        REFS          6        38         39       2*42        46      2*52      2*54
                                                       60        61         62         65        66        67
                                                     DEFINED         1        33         38        46
 14774  Z          COMPLEX    ARRAY                    REFS          6     DEFINED         39
   361  ZI1        REAL                                REFS         70     DEFINED         61
   364  ZI2        REAL                                REFS         70     DEFINED         66
   362  ZRI1       REAL                                REFS         68     DEFINED         62
   365  ZRI2       REAL                                REFS         68     DEFINED         67
   360  ZR1        REAL                                REFS         69     DEFINED         60
   363  ZR2        REAL                                REFS         69     DEFINED         65

EXTERNALS            TYPE    ARGS        REFERENCES
       CABS          REAL       1 LIBRARY      62        67
       CLINEO                   6              30
       COMSCA        COMPLEX    6              18        27
       DCMPLF        COMPLEX    2              18        25
       DSCAPR        REAL       6              36        42        52        54
       DSQRTF        REAL       1              36        43        52        54
       SQRT          REAL       1 LIBRARY      71

INLINE FUNCTIONS     TYPE    ARGS        DEF LINE  REFERENCES
       ABS           REAL       1  INTRIN              69        70
       AIMAG         REAL       1  INTRIN              61        66
       AMIN1         REAL       0  INTRIN              74
       REAL          REAL       1  INTRIN              60        65

STATEMENT LABELS                    DEF LINE   REFERENCES
     0  1                              28         23
     0  2                              27         24
     0  3                              39         37
     0  4                              42         41
     0  5                              57         45
   200  6                              55         49        50
     0  7                              77         59
   260  8                              76         63        64        68
     0  10                             33         31        32

LOOPS  LABEL    INDEX     FROM-TO    LENGTH    PROPERTIES
    13  1        I          23 28       318              EXT REFS  NOT INNER
    14  2        J          24 27        .3B             EXT REFS
    53  10       I          31 33       178              NOT INNER
    63  10       J          32 33        3B     INSTACK
```

VARIABLES	SN	TYPE		RELOCATION							
3	LINEST	INTEGER		CLIST	REFS	24	DEFINED	40	184		
536	MID	INTEGER			REFS	59	173	DEFINED	39		
26	MORBAL	INTEGER		KLUES	REFS	21					
5	MSADD	INTEGER		KLUES	REFS	21					
540	MTAP2	INTEGER			DEFINED	56	I/O REFS	65	75	92	93
13	NBAR	INTEGER		KLUES	REFS	21					
3	NCOLS	INTEGER		CTABLE	REFS	26	DEFINED	103	118	135	150
4	NCOLST	INTEGER		CTABLE	REFS	26					
20	NCYC	INTEGER		KLUES	REFS	21					
14	NFIX	INTEGER		KLUES	REFS	21					
21	NNN	INTEGER		KLUES	REFS	21					
6	NPAGE	INTEGER		CLIST	REFS	24					
6	NPAGEA	INTEGER		CTABLE	REFS	26					
6	NPAS	INTEGER		KLUES	REFS	21					
1	NPASS	INTEGER		CTABLE	REFS	26					
543	NPTS	INTEGER			REFS	108	123	140	155	181	
					DEFINED	63					
5	NQZ	INTEGER		FLUTV	REFS	19	61	63	75	76	89
2	NROWS	INTEGER		CTABLE	REFS	26	DEFINED	104	119	136	151
57	NRVBO	INTEGER		FLUTAN	REFS	18					
50006	NSYM	INTEGER	ARRAY		REFS	8	108	123	140	155	174
					177	181	DEFINED	60	61		
541	NVBO	INTEGER			REFS	61	63	74	77	DEFINED	57
6	NVTOT	INTEGER		FLUTV	REFS	19	57	90	91		
50136	RELLOC	REAL	ARRAY		REFS	10	181	DEFINED	33		
0	RHO	REAL	*UNUSED	F.P.	DEFINED	1					
40	RVBO	REAL	ARRAY	FLUTAN	REFS	5	18				
2	VBO	REAL	ARRAY	FLUTAN	REFS	5	18				
10	VDES	REAL		KLUES	REFS	21					
556	VEQ	REAL	ARRAY		REFS	7	108	123	140	155	
					DEFINED	80	92				
1	VH	REAL		FLUTV	REFS	19					
0	VL	REAL		FLUTV	REFS	19					
4	VMAX	REAL		PRPL	REFS	17	108	123	140	155	
5	VMIN	REAL		PRPL	REFS	17	108	123	140	155	
50072	VNAME1	REAL	ARRAY		REFS	9	108	123	DEFINED	30	
50106	VNAME2	REAL	ARRAY		REFS	9	140	155	DEFINED	31	

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES				
PICTUR		14	108	123	140	155	181
PTABLE		3	106	121	138	153	170
TITLES		1	100	115	132	147	164

STATEMENT LABELS			DEF LINE	REFERENCES	
0	1		62	59	
247	7		180	173	174
235	8		177	175	
0	9		179	178	
70	10		89	73	
0	15		81	74	76
0	20		92	89	
155	100		130	98	
211	200		161	125	
115	500		93	82	
253	1000		183	162	
455	1610	FMT	190	133	

VARIABLES	SN	TYPE		RELOCATION								
0	DUMD1	REAL	ARRAY	PRPL	REFS	12	14					
12	DWMAX	REAL		KLUES	REFS	21						
11	EPS1	REAL		KLUES	REFS	21						
17	EPS2	REAL		KLUES	REFS	21						
3	FHI	REAL		FLUTV	REFS	19						
2	FLO	REAL		FLUTV	REFS	19						
0	FMACH	REAL		FLUTAN	REFS	18						
2	FRMAX	REAL		PRPL	REFS	17	123	155				
3	FRMIN	REAL		PRPL	REFS	17	123	155				
50056	FRNAME	REAL	ARRAY		REFS	9	123	155	DEFINED	29		
10416	GD	REAL	ARRAY		REFS	7	108	140	179	DEFINED	79	92
37756	GDD	REAL	ARRAY		REFS	7	181	DEFINED	179			
50122	GDNAME	REAL	ARRAY		REFS	10	108	140	DEFINED	32		
0	GMAX	REAL		PRPL	REFS	14	17	108	140			
1	GMIN	REAL		PRPL	REFS	17	108	140				
542	I	INTEGER			REFS	60	2*61	75	3*92	174	175	176
						177	DEFINED	59	75	92	173	
30116	IAUX	INTEGER	ARRAY		REFS	7	108	123	140	155	181	
22	IBAND	INTEGER		KLUES	REFS	21						
554	IBEGIN	INTEGER			REFS	176	177	178	DEFINED	172	176	
7	IDNOPT	INTEGER		KLUES	REFS	21						
4	IE	INTEGER		FLUTV	REFS	19						
555	IEND	INTEGER			REFS	178	DEFINED	177				
23	IFIN	INTEGER		KLUES	REFS	21						
551	IM	INTEGER			REFS	90	91	DEFINED	89			
550	INDX	INTEGER			REFS	78	79	80	DEFINED	77		
544	IPLOT	INTEGER			REFS	98	DEFINED	64				
2	IRED	INTEGER		KLUES	REFS	21						
0	ISAVFO	INTEGER	*UNUSED	F.P.	DEFINED	1						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	11	20	55	56			
7	ITAPET	INTEGER		CTABLE	REFS	26						
537	ITAPEW	INTEGER			DEFINED	55	I/O REFS	101	116	133	148	165
545	IV	INTEGER			REFS	77	DEFINED	74				
547	IZ	INTEGER			REFS	77	78	79	80	DEFINED	76	
546	J	INTEGER			REFS	75	3*179	DEFINED	75	178		
552	J1	INTEGER			REFS	92	DEFINED	90				
553	J2	INTEGER			REFS	92	DEFINED	91				
7	KBPAGE	INTEGER		CLIST	REFS	24						
4	KLABEL	INTEGER		CLIST	REFS	24						
24	KLUB	INTEGER		KLUES	REFS	21						
4	KLUBAL	INTEGER		KLUES	REFS	21						
3	KLUMD	INTEGER		KLUES	REFS	21						
1	KLUNAL	INTEGER		KLUES	REFS	21						
25	KLUQ	INTEGER		KLUES	REFS	21						
0	KLUSE	INTEGER		KLUES	REFS	21						
0	KOUNT	INTEGER		CLIST	REFS	24	102	117	134	149	166	
					DEFINED	99	102	114	117	131	134	146
						149	163	166	185			
11	KOUNTH	INTEGER		CLIST	REFS	24						
12	KOUNTI	INTEGER		CLIST	REFS	24						
1	KPAGE	INTEGER		CLIST	REFS	24						
0	KTABLE	INTEGER		CTABLE	REFS	26	DEFINED	105	120	137	152	169
5	KTABLO	INTEGER		CTABLE	REFS	26						
5	KTPAGE	INTEGER		CLIST	REFS	24						
0	LC	INTEGER	ARRAY	COMA	REFS	6	16	57	2*58	64	73	162
2	LINES	INTEGER		CLIST	REFS	24	99	114	131	146	163	185
10	LINESG	INTEGER		CLIST	REFS	24						

```
                      IBEGIN   =  1                                                    PRPLT     173
                      DO 7 I=1,MID                                                     PRPLT     174
                      IF( NSYM(I) .EQ. 0 )          GO TO 7                            PRPLT     175
     175              IF ( I .EQ. 1 )               GO TO 8                            PRPLT     176
                      IBEGIN   =  IBEGIN + NSYM(I-1)                                   PRPLT     177
                    8 IEND     =  IBEGIN + NSYM(I) - 1                                PRPLT     178
                      DO 9  J = IBEGIN , IEND                                          PRPLT     179
                    9 GDD(J)   =  GD(J) * CPS(J)                                       PRPLT     180
     180              7 CONTINUE                                                       PRPLT     181
                      CALL PICTUR (CPS,GDD,NPTS,AIMLOC,RELLOC,100.0,1.0,2.0,50.0,2.0,1.0 PRPLT     182
                     1            ,NSYM,1,IAUX)                                       PRPLT     183
                 1000 CONTINUE                                                         PRPLT     184
                      LINEST =  4                                                      PRPLT     185
     185              KOUNT  =  LINES                                                  PRPLT     186
                C                                                                      PRPLT     187
                C                                                                      PRPLT     188
                C FORMATS                                                              PRPLT     189
                C                                                                      PRPLT     190
     190          1610 FORMAT (10X,41                                                  PRPLT     191
                     1   HPRINT-PLOT OF DAMPING VS VELOCITY (TRUE )                    PRPLT     192
                     2      ,/10X,41(1H-))                                             PRPLT     193
                  1620 FORMAT (10X,43                                                  PRPLT     194
                     1   HPRINT-PLOT OF FREQUENCY VS VELOCITY (TRUE )                  PRPLT     195
     195             2      ,/10X,43(1H-))                                             PRPLT     196
                  1660 FORMAT (10X,41                                                  PRPLT     197
                     1   HPRINT-PLOT OF DAMPING VS VELOCITY (EQUIV)                    PRPLT     198
                     2      ,/10X,41(1H-))                                             PRPLT     199
                  1670 FORMAT (10X,43                                                  PRPLT     200
     200             1   HPRINT-PLOT OF FREQUENCY VS VELOCITY (EQUIV)                  PRPLT     201
                     2      ,/10X,43(1H-))                                             PRPLT     202
                  1680 FORMAT (10X,44                                                  PRPLT     203
                     1   HPRINT-PLOT OF ROOT LOCUS OF FLUTTER SOLUTION                 PRPLT     204
                     2      ,/10X,44(1H-))                                             PRPLT     205
     205          C                                                                    PRPLT     206
                      RETURN                                                           PRPLT     207
                      END                                                              PRPLT     208
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES							
3	PRPLT	1	206							
VARIABLES	**SN**	**TYPE**	**RELOCATION**							
47616	A	REAL	ARRAY		REFS	8	78	79	80	DEFINED 75
0	ACH	REAL	*UNUSED	F.P.	DEFINED	1				
50152	AIMLOC	REAL	ARRAY		REFS	10	181	DEFINED	34	
1	BETA	REAL		FLUTAN	REFS	18				
50	BR	REAL		COMA	REFS	16				
20256	CPS	REAL	ARRAY		REFS	7	123	155	179	181
					DEFINED	78	92			
15	D	REAL		KLUES	REFS	21				
27	DBAL	REAL		KLUES	REFS	21				
16	DEL	REAL		KLUES	REFS	21				

```
115                CALL TITLES (-1)                                                PRPLT    116
                   WRITE (ITAPEW,1670)                                             PRPLT    117
                   KOUNT  =  KOUNT + 2                                             PRPLT    118
                   NCOLS  =  4                                                     PRPLT    119
                   NROWS  =  0                                                     PRPLT    120
120                KTABLE =  2                                                     PRPLT    121
                   CALL PTABLE (2,43,43                                            PRPLT    122
                  1   HPRINT-PLOT OF FREQUENCY VS VELOCITY (EQUIV))                PRPLT    123
                   CALL PICTUR (CPS,VEQ,NPTS,FRNAME,VNAME1,-100.0,VMIN,VMAX,-50.0, PRPLT    124
                  1FRMAX,FRMIN,NSYM,1,IAUX)                                       PRPLT    125
125                GO TO 200                                                       PRPLT    126
             C                                                                     PRPLT    127
             C                                                                     PRPLT    128
             C PRINT PLOT OF DAMPING VERSUS VELOCITY (TRUE)                        PRPLT    129
             C                                                                     PRPLT    130
130            100 CONTINUE                                                        PRPLT    131
                   KOUNT  =  LINES                                                 PRPLT    132
                   CALL TITLES (-1)                                                PRPLT    133
                   WRITE (ITAPEW,1610)                                             PRPLT    134
                   KOUNT  =  KOUNT + 2                                             PRPLT    135
135                NCOLS  =  4                                                     PRPLT    136
                   NROWS  =  0                                                     PRPLT    137
                   KTABLE =  2                                                     PRPLT    138
                   CALL PTABLE (2,41,41                                            PRPLT    139
                  1   HPRINT-PLOT OF DAMPING VS VELOCITY (TRUE ))                  PRPLT    140
140                CALL PICTUR (GD,VEQ,NPTS,GDNAME,VNAME2,-100.0,VMIN,VMAX,-50.0,GMAX PRPLT    141
                  1,GMIN,NSYM,1,IAUX)                                             PRPLT    142
             C                                                                     PRPLT    143
             C                                                                     PRPLT    144
             C PRINT PLOT OF FREQUENCY VERSUS VELOCITY (TRUE)                      PRPLT    145
145          C                                                                     PRPLT    146
                   KOUNT  =  LINES                                                 PRPLT    147
                   CALL TITLES (-1)                                                PRPLT    148
                   WRITE (ITAPEW,1620)                                             PRPLT    149
                   KOUNT  =  KOUNT + 2                                             PRPLT    150
150                NCOLS  =  4                                                     PRPLT    151
                   NROWS  =  0                                                     PRPLT    152
                   KTABLE =  2                                                     PRPLT    153
                   CALL PTABLE (2,43,43                                            PRPLT    154
                  1   HPRINT-PLOT OF FREQUENCY VS VELOCITY (TRUE ))                PRPLT    155
155                CALL PICTUR (CPS,VEQ,NPTS,FRNAME,VNAME2,-100.0,VMIN,VMAX,-50.0, PRPLT    156
                  1FRMAX,FRMIN,NSYM,1,IAUX)                                       PRPLT    157
             C                                                                     PRPLT    158
             C                                                                     PRPLT    159
             C PRINT PLOT OF ROOT LOCUS OF FLUTTER SOLOTION (FREQUENCY VS DAMPING) PRPLT    160
160          C                                                                     PRPLT    161
               200 CONTINUE                                                        PRPLT    162
                   IF (LC(1) .NE. -1) GO TO 1000                                   PRPLT    163
                   KOUNT  =  LINES                                                 PRPLT    164
                   CALL TITLES (-1)                                                PRPLT    165
165                WRITE (ITAPEW,1680)                                             PRPLT    166
                   KOUNT  =  KOUNT + 2                                             PRPLT    167
                   NCOLS  =  4                                                     PRPLT    168
                   NROWS  =  0                                                     PRPLT    169
                   KTABLE =  2                                                     PRPLT    170
170                CALL PTABLE (2,44,44                                            PRPLT    171
                  1   HPRINT-PLOT OF ROOT LOCUS OF FLUTTER SOLUTION)               PRPLT    172
```

```
                IF (LC(1).NE.-1)  NVBO = LC(4)                                  PRPLT      59
                DO 1 I=1,MID                                                    PRPLT      60
60              NSYM (I) = 0                                                    PRPLT      61
                IF (I .LE. NQZ) NSYM(I) = NVBO                                  PRPLT      62
              1 CONTINUE                                                        PRPLT      63
                NPTS  =  NVBO * NQZ                                             PRPLT      64
                IPLOT = LC(15)                                                  PRPLT      65
65              REWIND MTAP2                                                    PRPLT      66
          C                                                                     PRPLT      67
          C                                                                     PRPLT      68
          C READ DATA FROM UNIT MTAP2 AND PLOT FOR                              PRPLT      69
          C   1.  PRESSURE CALCULATIONS  (LCC1) = 0)                           PRPLT      70
70        C   2.  K - FLUTTER ANALYSIS   (CL(1) = 1)                          PRPLT      71
          C   3.  DIVERGENCE ANALYSIS    (LC(1) = 2)                          PRPLT      72
          C                                                                     PRPLT      73
                IF (LC(1).EQ.-1) GOTO 10                                        PRPLT      74
                DO 15 IV=1,NVBO                                                 PRPLT      75
75              READ (MTAP2) ((A(I,J), I=1,3), J=1,NQZ)                         PRPLT      76
                DO 15 IZ=1,NQZ                                                  PRPLT      77
                INDX = (IZ-1)*NVBO + IV                                         PRPLT      78
                CPS(INDX) = A(1,IZ)                                             PRPLT      79
                GD (INDX) = A(2,IZ)                                             PRPLT      80
80              VEQ(INDX) = A(3,IZ)                                             PRPLT      81
             15 CONTINUE                                                        PRPLT      82
                GOTO 500                                                        PRPLT      83
          C                                                                     PRPLT      84
          C                                                                     PRPLT      85
85        C READ DATA FROM UNIT MTAP2 AND PLOT FOR                              PRPLT      86
          C   1.  P - K FLUTTER ANALYSIS AND/OR  (LC(1) = -1)                  PRPLT      87
          C   2.  FLUTTER REDESIGN               (LC(1) = -1)                  PRPLT      88
          C                                                                     PRPLT      89
             10 DO 20 IM=1,NQZ                                                  PRPLT      90
90              J1 = (IM-1)*NVTOT + 1                                           PRPLT      91
                J2 = IM* NVTOT                                                  PRPLT      92
             20 READ(MTAP2)  (CPS(I), GD(I), VEQ(I), I=J1,J2)                   PRPLT      93
            500 REWIND MTAP2                                                    PRPLT      94
          C                                                                     PRPLT      95
95        C                                                                     PRPLT      96
          C PRINT PLOT OF DAMPING VERSUS VELOCITY (EQUIVALENT)                  PRPLT      97
          C                                                                     PRPLT      98
                IF (IPLOT.NE.0) GO TO 100                                       PRPLT      99
                KOUNT  =  LINES                                                 PRPLT     100
100             CALL TITLES (-1)                                                PRPLT     101
                WRITE (ITAPEW,1660)                                             PRPLT     102
                KOUNT  =  KOUNT + 2                                             PRPLT     103
                NCOLS  =  4                                                     PRPLT     104
                NROWS  =  0                                                     PRPLT     105
105             KTABLE =  2                                                     PRPLT     106
                CALL PTABLE (2,41,41                                            PRPLT     107
               1   HPRINT-PLOT OF DAMPING VS VELOCITY (EQUIV))                  PRPLT     108
                CALL PICTUR (GD,VEQ,NPTS,GDNAME,VNAME1,-100.0,VMIN,VMAX,-50.0,GMAX PRPLT     109
               1,GMIN,NSYM,1,IAUX)                                              PRPLT     110
110       C                                                                     PRPLT     111
          C                                                                     PRPLT     112
          C PRINT PLOT OF FREQUENCY VERSUS VELOCITY (EQUIVALENT)                PRPLT     113
          C                                                                     PRPLT     114
                KOUNT  =  LINES                                                 PRPLT     115
```

```
1                SUBROUTINE PRPLT (ACH, RHO, ISAVFO)                                PRPLT      2
           C                                                                        PRPLT      3
           C     ROUTINE FOR PRINT-PLOT DISPLAY OF FLUTTER SOLUTION                 PRPLT      4
           C                                                                        PRPLT      5
5                DIMENSION VBO(30), RVBO(15)                                        PRPLT      6
                 DIMENSION         LC(40)                                           PRPLT      7
                 DIMENSION VEQ(4000), GD(4000), CPS(4000), IAUX(4000), GDD(4000)    PRPLT      8
                 DIMENSION A(3,40), NSYM(40)                                        PRPLT      9
                 DIMENSION     FRNAME(12) ,   VNAME1(12) ,   VNAME2(12)             PRPLT     10
10               DIMENSION     GDNAME(12) ,   RELLOC(12) ,   AIMLOC(12)             PRPLT     11
                 DIMENSION ITAPES(50)                                               PRPLT     12
                 DIMENSION DUMD1(1)                                                 PRPLT     13
           C                                                                        PRPLT     14
                 EQUIVALENCE (GMAX,DUMD1(1))                                        PRPLT     15
15         C                                                                        PRPLT     16
                 COMMON /COMA  / LC, BR                                             PRPLT     17
                 COMMON /PRPL  / GMAX,GMIN,FRMAX,FRMIN,VMAX,VMIN                    PRPLT     18
                 COMMON /FLUTAN/ FMACH ,BETA  ,VBO   ,RVBO  ,NRVBO                  PRPLT     19
                 COMMON /FLUTV / VL,VH,FLO,FHI,IE,NQZ,NVTOT                         PRPLT     20
20               COMMON / CTAPES / ITAPES                                           PRPLT     21
                 COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUMD,KLUBAL,MSADD,NPAS, IDNOPT,   PRPLT     22
                1              VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND, PRPLT     23
                2              IFIN,KLUB,KLUQ,MORBAL,DBAL                          PRPLT     24
                 COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE    PRPLT     25
25              1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                       PRPLT     26
                 COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLO,NPAGEA   PRPLT     27
                1               ,ITAPET                                            PRPLT     28
           C                                                                        PRPLT     29
                 DATA     FRNAME/1H ,1H ,1HF,1HR,1HE,1HQ,1H-,1HC,1HP,1HS,1H ,1H /  PRPLT     30
30               DATA     VNAME1/1HV,1HE,1HL,1H(,1HE,1HQ,1H),1H-,1HK,1HT,1HS,1H /  PRPLT     31
                 DATA     VNAME2/1HV,1HE,1HL,1H(,1HT,1HR,1H),1H-,1HK,1HT,1HS,1H /  PRPLT     32
                 DATA     GDNAME/1H ,1HD,1HA,1HM,1HP,1HI,1HN,1HG,1H-,1HG,1H ,1H /  PRPLT     33
                 DATA     RELLOC/1HR,1HE,1HA,1HL,1H ,1H(,1HD,1HA,1HM,1HP,1H),1H /  PRPLT     34
                 DATA     AIMLOC/1HI,1HM,1HA,1HG,1H ,1H(,1HF,1HR,1HE,1HQ,1H),1H /  PRPLT     35
35         C                                                                        PRPLT     36
           C                                                                        PRPLT     37
           C INITIAL CONDITIONS                                                     PRPLT     38
           C                                                                        PRPLT     39
                 MID = 40                                                           PRPLT     40
40               LINEST =  1                                                        PRPLT     41
           C  ******************************************************              PRPLT     42
           C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE      *              PRPLT     43
           C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT      *              PRPLT     44
           C  *       USED IN THE CURRENT VERSION OF ESP.          *              PRPLT     45
45         C  ******************************************************              PRPLT     46
           C     IF (KLUSE .EQ. 0)  GO TO 12                                      PRPLT     47
           C     IF (NCYC .GT. 0 )  GO TO 11                                      PRPLT     48
           C     WRITE (ISAVFO)  (DUMD1(I),I=1,6)                                 PRPLT     49
           C     GO TO 12                                                         PRPLT     50
50         C  11 READ (ISAVFO)  (DUMD1(I),I=1,6)                                  PRPLT     51
           C  12 CONTINUE                                                         PRPLT     52
           C  ******************************************************              PRPLT     53
           C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.     *              PRPLT     54
           C  ******************************************************              PRPLT     55
55               ITAPEW = ITAPES(6)                                                 PRPLT     56
                 MTAP2  =  ITAPES(22)                                               PRPLT     57
                 IF (LC(1).EQ.-1) NVBO = NVTOT                                      PRPLT     58
```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
172	12	I	69 78	16B	OPT

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)			
COMA	41	0 LC	(40)	40 CR	(1)

STATISTICS

PROGRAM LENGTH	1023B	531
CM LABELED COMMON LENGTH	51B	41

520000B CM USED

VARIABLES	SN	TYPE	RELOCATION										
236	L	INTEGER			REFS	2*64	DEFINED	63					
0	LC	INTEGER	ARRAY	COMA	REFS	6	11	13					
0	NIV	INTEGER		F.P.	REFS	46	51	65	75	DEFINED	1		
0	NQ	INTEGER		F.P.	REFS	15	24	56	57	63	69		
					DEFINED	1							
0	OMGR	REAL		F.P.	REFS	27	44	DEFINED	1				
237	REQ	REAL	ARRAY		REFS	4	76	DEFINED	66				
0	RHQ	REAL		F.P.	REFS	50	DEFINED	1					
0	ROBT	COMPLEX	ARRAY	F.P.	REFS	9	DEFINED	1	74				
0	ROOT	COMPLEX	ARRAY	F.P.	REFS	9	16	21	22	25	30	62	
					DEFINED	1	18	23					
617	ROPT	COMPLEX	ARRAY		REFS	9	74	DEFINED	62				
231	RTIM	REAL			REFS	23	DEFINED	22					
230	RTRE	REAL			REFS	23	DEFINED	21					
233	TESTR	REAL			REFS	28	DEFINED	27					
0	VBR	REAL		F.P.	REFS	47	DEFINED	1					
0	VEC	COMPLEX	ARRAY	F.P.	REFS	9	64	DEFINED	1				
0	VECT	COMPLEX	ARRAY	F.P.	REFS	9	DEFINED	1	64				
0	VFLSP	REAL	ARRAY	F.P.	REFS	7	59	DEFINED	1	36	42	50	
					70								
307	VLSP	REAL	ARRAY		REFS	4	70	DEFINED	59				
427	ZFLSP	REAL	ARRAY		REFS	4	73	DEFINED	61				
357	ZFREQ	REAL	ARRAY		REFS	4	71	DEFINED	60				
234	ZI	REAL			REFS	40	52	DEFINED	30				
232	ZR	REAL			REFS	26	27	31	44	52			
					DEFINED	25	28						

EXTERNALS	TYPE	ARGS		REFERENCES		
AORDER		4		56		
CABS	REAL	1	LIBRARY	16		
SQRT	REAL	1	LIBRARY	27	44	50

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
AIMAG	REAL	1	INTRIN		22	30
CMPLX	COMPLEX	2	INTRIN		18	23
REAL	REAL	1	INTRIN		21	25

STATEMENT LABELS			DEF LINE	REFERENCES			
33	2		24	14			
25	3		23	15	19		
114	4		55	24	37	43	51
0	5	INACTIVE	32	31			
55	6		38	31			
63	7		44	31			
76	9		49	46			
101	10		50	48			
157	11		68	57	65		
206	12		78	69	75		
45	20		29	26			
0	40		64	63			
21	50		20	17			

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	3	I	15 23	21B	EXT REFS
34	4	I	24 55	63B	EXT REFS
124	11	I	57 68	36B	NOT INNER
147	40	L	63 64	3B	INSTACK

```
                      J=IPERM(I)                                                TRFR      59
                      VLSP(I)=VFLSP(J)                                          TRFR      60
   60                 ZFREQ(I)=FREQ(J)                                          TRFR      61
                      ZFLSP(I)=FLSP(J)                                          TRFR      62
                      ROPT(I)=ROOT(J)                                           TRFR      63
                      DO 40 L = 1,NQ                                            TRFR      64
                   40 VECT(L,I) = VEC(L,J)                                      TRFR      65
   65                 IF(NIV.NE.0)GO TO 11                                      TRFR      66
                      REQ(I)=CFREQ(J)                                           TRFR      67
                      AMP(I)=DAMP(J)                                            TRFR      68
                   11 CONTINUE                                                  TRFR      69
                      DO 12 I=1,NQ                                              TRFR      70
   70                 VFLSP(I)=VLSP(I)                                          TRFR      71
                      FREQ(I)=ZFREQ(I)                                          TRFR      72
                      IF(FREQ(I).EQ.1.0E+45)FREQ(I)=-0.0                        TRFR      73
                      FLSP(I)=ZFLSP(I)                                          TRFR      74
                      ROBT(I)=ROPT(I)                                           TRFR      75
   75                 IF(NIV.NE.0)GO TO 12                                      TRFR      76
                      CFREQ(I)=REQ(I)                                           TRFR      77
                      DAMP(I)=AMP(I)                                            TRFR      78
                   12 CONTINUE                                                  TRFR      79
                      RETURN                                                    TRFR      80
   80                 END                                                       TRFR      81
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	TRFR	1	79

VARIABLES	SN	TYPE		RELOCATION								
547	AMP	REAL	ARRAY		REFS	5	77	DEFINED	67			
0	BR	REAL		F.P.	REFS	47	DEFINED	1				
0	CFREQ	REAL	ARRAY	F P.	REFS	7	66	DEFINED	1	35	41	54
					76							
50	CR	REAL		COMA	REFS	11						
0	DAMP	REAL	ARRAY	F.P.	REFS	7	67	DEFINED	1	34	40	52
					53	77						
227	DENOM	REAL			REFS	17	21	22	DEFINED	16		
0	FLSP	REAL	ARRAY	F.P.	REFS	7	50	61	DEFINED	1	33	39
					47	49	73					
0	FREQ	REAL	ARRAY	F.P.	REFS	7	45	47	49	53	54	56
					60	72	DEFINED	1	32	38	44	45
					71	72						
226	I	INTEGER			REFS	16	18	21	22	23	25	30
					32	33	34	35	36	38	39	40
					41	42	44	2*45	2*47	2*49	2*50	52
					2*53	2*54	58	59	60	61	62	64
					66	67	2*70	2*71	2*72	2*73	2*74	2*76
					2*77	DEFINED	15	24	57	69		
477	IPERM	INTEGER	ARRAY		REFS	5	56	58				
0	ITCH3	INTEGER		F.P.	REFS	14	DEFINED	1	13			
235	J	INTEGER			REFS	59	60	61	62	64	66	67
					DEFINED	58						

```
      SUBROUTINE TRFR(ROOT,ITCH3,NIV,FREQ,FLSP,DAMP,CFREQ,VFLSP,NQ,BR,     TRFR      2
     1                ROBT,OMGR,RHQ,VBR,VECT,VEC)                          TRFR      3
C                                                                          TRFR      4
      DIMENSION REQ(40), VLSP(40), ZFREQ(40), ZFLSP(40)                    TRFR      5
      DIMENSION IPERM(40), AMP(40)                                         TRFR      6
      DIMENSION LC(40)                                                     TRFR      7
      DIMENSION FREQ(1), FLSP(1), DAMP(1), CFREQ(1), VFLSP(1)              TRFR      8
C                                                                          TRFR      9
      COMPLEX ROOT(40), ROPT(40), ROBT(40), VECT(40,40), VEC(40,40)        TRFR     10
C                                                                          TRFR     11
      COMMON /COMA  / LC, CR                                               TRFR     12
C                                                                          TRFR     13
      ITCH3 = LC(12)                                                       TRFR     14
      IF(ITCH3.GT.0)GO TO 2                                                TRFR     15
      DO 3 I=1,NQ                                                          TRFR     16
      DENOM=CABS(ROOT(I))**2                                               TRFR     17
      IF(DENOM.NE.0.0)GO TO 50                                             TRFR     18
      ROOT(I)=CMPLX(0.0,0.0)                                               TRFR     19
      GO TO 3                                                              TRFR     20
   50 CONTINUE                                                             TRFR     21
      RTRE=REAL(ROOT(I))/DENOM                                             TRFR     22
      RTIM=-AIMAG(ROOT(I))/DENOM                                           TRFR     23
    3 ROOT(I)=CMPLX(RTRE,RTIM)                                             TRFR     24
    2 DO 4 I=1,NQ                                                          TRFR     25
      ZR=REAL(ROOT(I))                                                     TRFR     26
      IF(ZR.LE.0.0)GO TO 20                                                TRFR     27
      TESTR=OMGR/(SQRT(ZR)*6.2832)                                         TRFR     28
      IF(TESTR.LE.0.01)ZR=0.0                                              TRFR     29
   20 CONTINUE                                                             TRFR     30
      ZI=AIMAG(ROOT(I))                                                    TRFR     31
      IF(ZR)5,6,7                                                          TRFR     32
    5 FREQ(I)=1.0E+45                                                      TRFR     33
      FLSP(I)=-0.0                                                         TRFR     34
      DAMP(I)=-0.0                                                         TRFR     35
      CFREQ(I)=-0.0                                                        TRFR     36
      VFLSP(I)=-0.0                                                        TRFR     37
      GO TO 4                                                              TRFR     38
    6 FREQ(I)=1.0E+35                                                      TRFR     39
      FLSP(I)=1.0E+35                                                      TRFR     40
      DAMP(I)=ZI*1.0E+15                                                   TRFR     41
      CFREQ(I)=1.0E+35                                                     TRFR     42
      VFLSP(I)=1.0E+35                                                     TRFR     43
      GO TO 4                                                              TRFR     44
    7 FREQ(I)=OMGR/SQRT(ZR)                                                TRFR     45
      IF (FREQ(I).LE.1.0E-05) FREQ(I) = 0.0                                TRFR     46
      IF (NIV.NE.0) GO TO 9                                                TRFR     47
      FLSP(I)=VBR*BR*FREQ(I)/1.6878                                        TRFR     48
      GO TO 10                                                             TRFR     49
    9 FLSP(I)=FREQ(I)/1.6878                                               TRFR     50
   10 VFLSP(I)=FLSP(I)*SQRT(RHQ)                                           TRFR     51
      IF(NIV.NE.0)GO TO 4                                                  TRFR     52
      DAMP(I)=ZI/ZR                                                        TRFR     53
      IF (FREQ(I).EQ.0.0)     DAMP(I) = 0.0                                TRFR     54
      CFREQ(I)=FREQ(I)/6.2832                                              TRFR     55
    4 CONTINUE                                                             TRFR     56
      CALL AORDER(FREQ,NQ,IPERM,1)                                         TRFR     57
      DO 11 I=1,NQ                                                        TRFR     58
```

STATEMENT LABELS			DEF LINE	REFERENCES		
37	120		30	2*29	48	
41	130		32	29		
0	140		35	32		
0	143		39	36		
0	146		43	42		
0	150		45	20	40	44
0	160	INACTIVE	49	2*48		
0	165		51	50		
0	170		59	58		
0	180		60	52	56	
271	190		61	31		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES				
14	150	K	20 45	144B		EXT REFS	ENTRIES	EXITS	NOT INNER
20	110	I	23 28	16B		EXT REFS			
51	140	J	32 35	6B	INSTACK				
70	143	J	36 39	6B	INSTACK				
100	150	I	40 45	55B		NOT INNER			
123	146	J	42 43	7B	INSTACK				
143	150	J	44 45	7B	INSTACK				
207	165	J	50 51	5B	INSTACK				
216	180	I	52 60	53B		NOT INNER			
230	180	L	56 60	37B		NOT INNER			
242	170	J	58 59	7B	INSTACK				

STATISTICS

PROGRAM LENGTH	343B	227

52000B CM USED

```
                      DO 170  J = KP,M                                  CLINEQ     59
                  170 X = X + A(K,J)*Y(J,L)                             CLINEQ     60
      60          180 Y(K,L) = (Y(K,L) - X) * Z                         CLINEQ     61
                  190 RETURN                                            CLINEQ     62
                      END                                               CLINEQ     63
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

62 I 20 NON-INNER LOOP BEGINNING AT THIS CARD IS ENTERED FROM OUTSIDE ITS RANGE.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
3 CLINEQ 1 61

VARIABLES	SN	TYPE			RELOCATION							
0	A	COMPLEX	ARRAY	F.P.	REFS	14	17	24	33	34	2*41	2*45
					47	49	55	59	DEFINED	1	34	35
					45							
307	G	REAL			REFS	25	26	DEFINED	24			
306	I	INTEGER			REFS	24	27	41	2*43	2*45		
					DEFINED	23	40	52				
311	J	INTEGER			REFS	33	2*34	35	37	2*38	39	3*43
					3*45	2*51	2*59	DEFINED	32	36	42	44
					50	58						
303	K	INTEGER			REFS	21	23	24	30	33	34	37
					38	3*41	43	45	53	54	2*55	59
					2*60	DEFINED	20	46	54			
304	KP	INTEGER			REFS	40	44	58	DEFINED	21	53	
310	L	INTEGER			REFS	34	35	38	39	59	2*60	
					DEFINED	27	56					
0	M	INTEGER		F.P.	REFS	19	23	32	40	44	46	2*47
					2*49	2*51	58	DEFINED	1			
0	MID	INTEGER		F.P.	REFS	2*17	DEFINED	1				
302	M1	INTEGER			REFS	20	52	DEFINED	19			
0	N	INTEGER		F.P.	REFS	36	42	50	56	DEFINED	1	
0	NIX	INTEGER		F.P.	DEFINED	1	18	30				
305	T	REAL			REFS	25	29	48	DEFINED	22	26	47
276	X	COMPLEX			REFS	14	35	39	43	45	59	60
					DEFINED	33	37	41	57	59		
0	Y	COMPLEX	ARRAY	F.P.	REFS	14	17	37	38	2*43	51	59
					60	DEFINED	1	38	39	43	51	60
300	Z	COMPLEX			REFS	14	51	60	DEFINED	49	55	

EXTERNALS	TYPE	ARGS	REFERENCES	
CDABSF	REAL	1	24	47

STATEMENT LABELS			DEF LINE	REFERENCES	
0	100	INACTIVE	26	25	
33	110		28	23	2*25

```
      SUBROUTINE CLINEQ(A,Y,M,N,MID,NIX)                                CLINEQ     2
C                                                                       CLINEQ     3
C                                                                       CLINEQ     4
C     SINGLE PRECISION VERSION                                          CLINEQ     5
C     LINEAR SYSTEM SOLVER FOR COMPLEX ARRAYS                           CLINEQ     6
C                                                                       CLINEQ     7
C                                                                       CLINEQ     8
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     CLINEQ     9
C     COMPLEX*16 A      ,X       ,Y       ,Z                           CLINEQ    10
C     DOUBLE PRECISION       T ,            G                          CLINEQ    11
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        CLINEQ    12
C                                                                       CLINEQ    13
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     CLINEQ    14
      COMPLEX A       ,X       ,Y       ,Z                           CLINEQ    15
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        CLINEQ    16
C                                                                       CLINEQ    17
      DIMENSION A(MID,1) , Y(MID,1)                                     CLINEQ    18
         NIX = 0                                                        CLINEQ    19
      M1 = M - 1                                                        CLINEQ    20
      DO 150  K = 1,M1                                                  CLINEQ    21
      KP = K + 1                                                        CLINEQ    22
      T = 0.00                                                          CLINEQ    23
      DO 110  I = K,M                                                   CLINEQ    24
      G  =  CDABSF(A(I,K))                                              CLINEQ    25
      IF (G - T) 110,110,100                                            CLINEQ    26
  100 T = G                                                             CLINEQ    27
      L = I                                                             CLINEQ    28
  110 CONTINUE                                                          CLINEQ    29
      IF (T) 120,120,130                                                CLINEQ    30
  120 NIX = -K                                                          CLINEQ    31
      GO TO 190                                                         CLINEQ    32
  130 DO 140  J = 1,M                                                   CLINEQ    33
      X = A(K,J)                                                        CLINEQ    34
      A(K,J) = A(L,J)                                                   CLINEQ    35
  140 A(L,J) = X                                                        CLINEQ    36
      DO 143  J = 1,N                                                   CLINEQ    37
      X = Y(K,J)                                                        CLINEQ    38
      Y(K,J) = Y(L,J)                                                   CLINEQ    39
  143 Y(L,J) = X                                                        CLINEQ    40
      DO 150  I = KP,M                                                  CLINEQ    41
      X = A(I,K) / A(K,K)                                               CLINEQ    42
      DO 146  J = 1,N                                                   CLINEQ    43
  146 Y(I,J) = Y(I,J) - Y(K,J)*X                                        CLINEQ    44
      DO 150  J = KP,M                                                  CLINEQ    45
  150 A(I,J) = A(I,J) - A(K,J)*X                                        CLINEQ    46
      K = M                                                             CLINEQ    47
      T  =  CDABSF(A(M,M))                                              CLINEQ    48
      IF (T) 160,120,160                                                CLINEQ    49
  160  Z = (1.00,0.00) / A(M,M)                                         CLINEQ    50
      DO 165  J = 1,N                                                   CLINEQ    51
  165 Y(M,J) = Y(M,J) * Z                                               CLINEQ    52
      DO 180  I = 1,M1                                                  CLINEQ    53
      KP = K                                                            CLINEQ    54
      K = K - 1                                                         CLINEQ    55
      Z = (1.00,0.00) / A(K,K)                                          CLINEQ    56
      DO 180  L = 1,N                                                   CLINEQ    57
      X = (0.00,0.00)                                                   CLINEQ    58
```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
113	3	I	37 39	6B	INSTACK		
124	4	I	41 42	11B		EXT REFS	
141	5	I	45 57	47B		EXT REFS	NOT INNER
152	6	J	49 55	31B		EXT REFS	
212	7	I	59 77	53B		EXT REFS	NOT INNER
222	8	J	63 76	41B		EXT REFS	

STATISTICS
PROGRAM LENGTH 15153B 6763
52000B CM USED

STATEMENT LABELS			DEF LINE	REFERENCES
464	1620	FMT	193	148
474	1660	FMT	196	101
503	1670	FMT	199	116
513	1680	FMT	202	165

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
23	1	I	59 62	5B	INSTACK
41	15	IV	74 81	27B	EXT REFS NOT INNER
56	15	IZ	76 81	6B	INSTACK
71	20	IM	89 92	24B	EXT REFS NOT INNER
100		I	92 92	11B	EXT REFS
230	7	I	173 180	22B	NOT INNER
243	9	J	178 179	3B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
COMA	41	0	LC	(40)	40	BR	(1)			
PRPL	6	0	GMAX	(1)	1	GMIN	(1)	2	FRMAX	(1)
		3	FRMIN	(1)	4	VMAX	(1)	5	VMIN	(1)
FLUTAN	48	0	FMACH	(1)	1	BETA	(1)	2	VBQ	(30)
		32	RVBO	(15)	47	NRVBO	(1)			
FLUTV	7	0	VL	(1)	1	VH	(1)	2	FLQ	(1)
		3	FHI	(1)	4	IE	(1)	5	NQZ	(1)
		6	NVTOT	(1)						
CTAPES	50	0	ITAPES	(50)						
KLUES	24	0	KLUSE	(1)	1	KLUNAL	(1)	2	IRED	(1)
		3	KLUMD	(1)	4	KLUBAL	(1)	5	MSADD	(1)
		6	NPAS	(1)	7	IDNOPT	(1)	8	VDES	(1)
		9	EPS1	(1)	10	DWMAX	(1)	11	NBAR	(1)
		12	NFIX	(1)	13	D	(1)	14	DEL	(1)
		15	EPS2	(1)	16	NCYC	(1)	17	NNN	(1)
		18	IBAND	(1)	19	IFIN	(1)	20	KLUB	(1)
		21	KLUQ	(1)	22	MORBAL	(1)	23	DBAL	(1)
CLIST	11	0	KOUNT	(1)	1	KPAGE	(1)	2	LINES	(1)
		3	LINEST	(1)	4	KLABEL	(1)	5	KTPAGE	(1)
		6	NPAGE	(1)	7	KBPAGE	(1)	8	LINESG	(1)
		9	KOUNTH	(1)	10	KOUNTI	(1)			
CTABLE	8	0	KTABLE	(1)	1	NPASS	(1)	2	NROWS	(1)
		3	NCOLS	(1)	4	NCOLST	(1)	5	KTABLO	(1)
		6	NPAGEA	(1)	7	ITAPET	(1)			

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
GMAX GMAX	1	0 DUMD1 (1)

STATISTICS

PROGRAM LENGTH	50224B	20628
CM LABELED COMMON LENGTH	3038	195

520008 CM USED

```
      SUBROUTINE FLUTAP (KPLOTV,KPLOTF,NPLOTF)                          FLUTAP     2
C                                                                       FLUTAP     3
      INTEGER YES                                                       FLUTAP     4
C                                                                       FLUTAP     5
C                                                                       FLUTAP     6
CIBM                                                                    FLUTAP     7
C     DIMENSION BUFFER(1512)                                            FLUTAP     8
CIBM                                                                    FLUTAP     9
C                                                                       FLUTAP    10
CCDC                                                                    FLUTAP    11
      DIMENSION BUFFER(512)                                             FLUTAP    12
      DIMENSION CNAME(2)                                                FLUTAP    13
CCDC                                                                    FLUTAP    14
C                                                                       FLUTAP    15
      DIMENSION VBO(30), RVBO(15)                                       FLUTAP    16
      DIMENSION     TITLE1(18) ,   TITLE2(18)                           FLUTAP    17
      DIMENSION         LC(40)                                          FLUTAP    18
      DIMENSION ITAPES(50)                                              FLUTAP    19
      DIMENSION        TSHF(1)                                          FLUTAP    20
C                                                                       FLUTAP    21
      COMMON /COMAX / LC,BR                                             FLUTAP    22
      COMMON /PRPLX / GMAX,GMIN,FRMAX,FRMIN,VMAX,VMIN                   FLUTAP    23
      COMMON /CTAPES/ ITAPES                                            FLUTAP    24
      COMMON /CTSHF / LTSHF, TSHF                                       FLUTAP    25
      COMMON /CALCPX/ TITLE1,TITLE2,DUB,FUB,VUB,DLB,                    FLUTAP    26
     1                FLB,VLB,IPLOT,LSD,DSCALE,FSCALE,VSCALE,          FLUTAP    27
     2                DPLEN,FRLEN,VLEN,XDT                             FLUTAP    28
      COMMON /FLUTVX/ VL,VH,FLO,FHI,IE,NQZ,NVTOT                        FLUTAP    29
      COMMON /CPLOTS/ KPLOTS                                            FLUTAP    30
      COMMON /CONSTS/ NO    ,YES                                        FLUTAP    31
      COMMON /COMRWP/ ITAPER,ITAPEW,IPUNCH                              FLUTAP    32
      COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE   FLUTAP    33
     1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                       FLUTAP    34
      COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLO,NPAGEA  FLUTAP    35
     1               ,ITAPET                                            FLUTAP    36
C                                                                       FLUTAP    37
CCDC                                                                    FLUTAP    38
      DATA CNAME/4HCALC,4HOMP /                                         FLUTAP    39
CCDC                                                                    FLUTAP    40
C                                                                       FLUTAP    41
C INITIAL CONDITIONS                                                    FLUTAP    42
C                                                                       FLUTAP    43
      MTAP1  =  ITAPES(37)                                              FLUTAP    44
      CALL PROGNA (4H(FLU, 4HTAP))                                      FLUTAP    45
      KOUNT  =  LINES                                                   FLUTAP    46
      KFIRST =  YES                                                     FLUTAP    47
C                                                                       FLUTAP    48
C PLOT FLUTTER RESULTS                                                  FLUTAP    49
C                                                                       FLUTAP    50
      REWIND MTAP1                                                      FLUTAP    51
      READ (MTAP1) (LC(I),I=1,40), BR, GMAX, GMIN, FRMAX, FRMIN,        FLUTAP    52
     1             VMAX, VMIN, FMACH, BETA, VBO, RVBO, NRVBO,           FLUTAP    53
     2             (TITLE1(J),J=1,18), (TITLE2(J),J=1,18),              FLUTAP    54
     3             DUB, FUB, VUB, DLB, FLB, VLB, IPLOT, LSD,            FLUTAP    55
     4             DSCALE, FSCALE, VSCALE, DPLEN, FRLEN, VLEN, XDT      FLUTAP    56
      NRHOV  =  LC(5)                                                   FLUTAP    57
      NSTIV  =  LC(26) + 1                                              FLUTAP    58
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                NMODV  =  LC(25) + 1                                    FLUTAP     59
      C                                                                  FLUTAP     60
60              IF (KPLOTS .EQ. NO) GO TO 25                             FLUTAP     61
                KPLOTS =  NO                                             FLUTAP     62
      C                                                                  FLUTAP     63
                NPLOTF =  0                                              FLUTAP     64
                CALL TITLES(2)                                           FLUTAP     65
65              CALL PLB (1,1,ITAPEW)                                    FLUTAP     66
                WRITE (ITAPEW,1100)                                      FLUTAP     67
                IF (KOUNT .EQ  KOUNTH) KOUNT = KOUNT + 2                 FLUTAP     68
                CALL PLB (1,1,ITAPEW)                                    FLUTAP     69
                WRITE (ITAPEW,2500)                                      FLUTAP     70
70              CALL PLB (1,1,ITAPEW)                                    FLUTAP     71
                KOUNT  =  KOUNT + 3                                      FLUTAP     72
      C                                                                  FLUTAP     73
      CIBM                                                               FLUTAP     74
      C         IBUFD  =  1512                                           FLUTAP     75
75    C         CALL PLOTS (BUFFER,IBUFD)                                FLUTAP     76
      CIBM                                                               FLUTAP     77
      C                                                                  FLUTAP     78
      CCDC                                                               FLUTAP     79
                IBUFD = 512                                              FLUTAP     80
80              ITAP60 = 60                                              FLUTAP     81
                REWIND ITAP60                                            FLUTAP     82
                CALL PLOTS (BUFFER,IBUFD,ITAP60)                         FLUTAP     83
                CALL PLOT (5.0,0.5,-3)                                   FLUTAP     84
      CCDC                                                               FLUTAP     85
85    C                                                                  FLUTAP     86
         25 CONTINUE                                                     FLUTAP     87
      C                                                                  FLUTAP     88
      C CALCOMP PLOT LOOP FOR NUMBER OF DENSITY VARIATIONS               FLUTAP     89
      C                                                                  FLUTAP     90
90              DO 300 IRHOV=1,NRHOV                                     FLUTAP     91
                READ (MTAP1)RHOP, FMACH                                  FLUTAP     92
      C                                                                  FLUTAP     93
      C                                                                  FLUTAP     94
      C CALCOMP PLOT LOOP FOR NUMBER OF STIFFNESS VARIATION CYCLES       FLUTAP     95
95    C                                                                  FLUTAP     96
                DO 200 ISTIV=1,NSTIV                                     FLUTAP     97
      C                                                                  FLUTAP     98
      C                                                                  FLUTAP     99
      C CALCOMP PLOT LOOP FOR NUMBER OF MODAL ELIMINATION CYCLES         FLUTAP    100
100   C                                                                  FLUTAP    101
                DO 100 IMODV=1,NMODV                                     FLUTAP    102
      C                                                                  FLUTAP    103
                READ (MTAP1) VL,VH,FLO,FHI,IE,NQZ,NVTOT                  FLUTAP    104
         50 CONTINUE                                                     FLUTAP    105
105   C                                                                  FLUTAP    106
                CALL VGPT (FMACH,RHOP)                                   FLUTAP    107
      C                                                                  FLUTAP    108
                CALL TITLES (2)                                          FLUTAP    109
                IF (KFIRST .EQ. YES) GO TO 80                            FLUTAP    110
110             IF (KOUNT .GT. KOUNTH) GO TO 90                          FLUTAP    111
         80 CONTINUE                                                     FLUTAP    112
                KFIRST =  NO                                             FLUTAP    113
                CALL PLB (1,1,ITAPEW)                                    FLUTAP    114
                WRITE (ITAPEW,2600)                                      FLUTAP    115
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      115                CALL PLB (1,1,ITAPEW)                                        FLUTAP    116
                         KOUNT  =  KOUNT + 4                                          FLUTAP    117
                      90 CONTINUE                                                     FLUTAP    118
                         KOUNT  =  KOUNT + 1                                          FLUTAP    119
                         NPLOTF =  NPLOTF + 1                                         FLUTAP    120
      120                WRITE (ITAPEW,2700) NPASS,NPLOTF,FMACH,RHOP,IRHOV,ISTIV,IMODV FLUTAP    121
                     100 CONTINUE                                                     FLUTAP    122
                     200 CONTINUE                                                     FLUTAP    123
                     300 CONTINUE                                                     FLUTAP    124
                         REWIND MTAP1                                                 FLUTAP    125
      125            C                                                               FLUTAP    126
                     C                                                               FLUTAP    127
                     C TERMINATE PLOTTING                                            FLUTAP    128
                     C                                                               FLUTAP    129
                         KOUNT  =  KOUNT + 2                                          FLUTAP    130
      130                CALL TITLES (2)                                              FLUTAP    131
                         CALL PLB (1,1,ITAPEW)                                        FLUTAP    132
                         WRITE (ITAPEW,1200)                                          FLUTAP    133
                         IF (KOUNT .EQ. KOUNTH) KOUNT = KOUNT + 2                     FLUTAP    134
                     C                                                               FLUTAP    135
      135                CALL TIMEB (34,34HFROM FLUTAP - PLOT FLUTTER RESULTS)        FLUTAP    136
                     C                                                               FLUTAP    137
                     1100 FORMAT (10X,37HINITIALIZE PLOTTING IN PROGRAM FLUTAP)      FLUTAP    138
                     1200 FORMAT (10X,37HTERMINATE PLOTTING IN PROGRAM FLUTAP )      FLUTAP    139
                     2500 FORMAT (10X,24HSUMMARY OF FLUTTER PLOTS)                   FLUTAP    140
      140            2600 FORMAT (10X,50H PASS PLOT      MACH   DENSITY   DENSITY STIFFNESS FLUTAP    141
                         1            10H     MODAL                                   FLUTAP    142
                         2     ,/,10X,50H   NO   NO        NO     RATIO   LOOP NO   LOOP NO FLUTAP    143
                         3           ,10H   LOOP NO)                                  FLUTAP    144
                     2700 FORMAT (10X,2I5,2F10.5,3I10)                               FLUTAP    145
      145                RETURN                                                       FLUTAP    146
                         END                                                          FLUTAP    147
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	FLUTAP	1	145

VARIABLES

		SN	TYPE		RELOCATION						
361	BETA	*	REAL			DEFINED	51				
50	BR		REAL		COMAX	REFS	21	DEFINED	51		
375	BUFFER		REAL	ARRAY		REFS	11	82			
1375	CNAME		REAL	ARRAY		REFS	12	DEFINED	38		
47	DLB		REAL		CALCPX	REFS	25	DEFINED	51		
57	DPLEN		REAL		CALCPX	REFS	25	DEFINED	51		
54	DSCALE		REAL		CALCPX	REFS	25	DEFINED	51		
44	DUB		REAL		CALCPX	REFS	25	DEFINED	51		
3	FHI		REAL		FLUTVX	REFS	28	DEFINED	103		
50	FLB		REAL		CALCPX	REFS	25	DEFINED	51		
2	FLO		REAL		FLUTVX	REFS	28	DEFINED	103		
360	FMACH		REAL			REFS	106	120	DEFINED	51	91
60	FRLEN		REAL		CALCPX	REFS	25	DEFINED	51		
2	FRMAX		REAL		PRPLX	REFS	22	DEFINED	51		

VARIABLES	SN	TYPE		RELOCATION								
3		FRMIN	REAL		PRPLX	REFS	22	DEFINED	51			
55		FSCALE	REAL		CALCPX	REFS	25	DEFINED	51			
45		FUB	REAL		CALCPX	REFS	25	DEFINED	51			
0		GMAX	REAL		PRPLX	REFS	22	DEFINED	51			
1		GMIN	REAL		PRPLX	REFS	22	DEFINED	51			
357		I	INTEGER			REFS	51	DEFINED	51			
367		IBUFD	INTEGER			REFS	82	DEFINED	79			
4		IE	INTEGER		FLUTVX	REFS	28	DEFINED	103			
374		IMODV	INTEGER			REFS	120	DEFINED	101			
52		IPLOT	INTEGER		CALCPX	REFS	25	DEFINED	51			
2		IPUNCH	INTEGER		COMRWP	REFS	31					
371		IRHOV	INTEGER			REFS	120	DEFINED	90			
373		ISTIV	INTEGER			REFS	120	DEFINED	96			
0		ITAPER	INTEGER		COMRWP	REFS	31					
0		ITAPES	INTEGER	ARRAY	CTAPES	REFS	18	23	43			
7		ITAPET	INTEGER		CTABLE	REFS	34					
1		ITAPEW	INTEGER		COMRWP	REFS	31	65	68	70	113	115	131
						I/O REFS	66	69	114	120	132		
370		ITAP60	INTEGER			REFS	82	DEFINED	80	I/O REFS	81		
363		J	INTEGER			REFS	2*51	DEFINED	2*51				
7		KBPAGE	INTEGER		CLIST	REFS	32						
356		KFIRST	INTEGER			REFS	109	DEFINED	46	112			
4		KLABEL	INTEGER		CLIST	REFS	32						
0		KOUNT	INTEGER		CLIST	REFS	32	2*67	71	110	116	118	129
						2*133	DEFINED	45	67	71	116	118	129
						133							
11		KOUNTH	INTEGER		CLIST	REFS	32	67	110	133			
12		KOUNTI	INTEGER		CLIST	REFS	32						
1		KPAGE	INTEGER		CLIST	REFS	32						
0		KPLOTF	INTEGER	*UNUSED	F.P.	DEFINED	1						
0		KPLOTS	INTEGER		CPLOTS	REFS	29	60	DEFINED	61			
0		KPLOTV	INTEGER	*UNUSED	F.P.	DEFINED	1						
0		KTABLE	INTEGER		CTABLE	REFS	34						
5		KTABLO	INTEGER		CTABLE	REFS	34						
5		KTPAGE	INTEGER		CLIST	REFS	32						
0		LC	INTEGER	ARRAY	COMAX	REFS	17	21	56	57	58		
						DEFINED	51						
2		LINES	INTEGER		CLIST	REFS	32	45					
10		LINESG	INTEGER		CLIST	REFS	32						
3		LINEST	INTEGER		CLIST	REFS	32						
53		LSD	INTEGER		CALCPX	REFS	25	DEFINED	51				
0		LTSHF	INTEGER		CTSHF	REFS	24						
355		MTAP1	INTEGER			DEFINED	43	I/O REFS	50	51	91	103	124
3		NCOLS	INTEGER		CTABLE	REFS	34						
4		NCOLST	INTEGER		CTABLE	REFS	34						
366		NMODV	INTEGER			REFS	101	DEFINED	58				
0		NO	INTEGER		CONSTS	REFS	30	60	61	112			
6		NPAGE	INTEGER		CLIST	REFS	32						
6		NPAGEA	INTEGER		CTABLE	REFS	34						
1		NPASS	INTEGER		CTABLE	REFS	34	120					
0		NPLOTF	INTEGER		F.P.	REFS	119	120	DEFINED	1	63	119	
5		NQZ	INTEGER		FLUTVX	REFS	28	DEFINED	103				
364		NRHOV	INTEGER			REFS	90	DEFINED	56				
2		NROWS	INTEGER		CTABLE	REFS	34						
362	*	NRVBO	INTEGER			DEFINED	51						
365		NSTIV	INTEGER			REFS	96	DEFINED	57				
6		NVTOT	INTEGER		FLUTVX	REFS	28	DEFINED	103				

VARIABLES	SN	TYPE	RELOCATION						
372	RHOP	REAL			REFS	106	120	DEFINED	91
1435	RVBO	REAL	ARRAY		REFS	15	DEFINED	51	
0	TITLE1	REAL	ARRAY	CALCPX	REFS	16	25	DEFINED	51
22	TITLE2	REAL	ARRAY	CALCPX	REFS	16	25	DEFINED	51
1	TSHF	REAL	ARRAY	CTSHF	REFS	19	24		
1377	VBO	REAL	ARRAY		REFS	15	DEFINED	51	
1	VH	REAL		FLUTVX	REFS	28	DEFINED	103	
0	VL	REAL		FLUTVX	REFS	28	DEFINED	103	
51	VLB	REAL		CALCPX	REFS	25	DEFINED	51	
61	VLEN	REAL		CALCPX	REFS	25	DEFINED	51	
4	VMAX	REAL		PRPLX	REFS	22	DEFINED	51	
5	VMIN	REAL		PRPLX	REFS	22	DEFINED	51	
56	VSCALE	REAL		CALCPX	REFS	25	DEFINED	51	
46	VUB	REAL		CALCPX	REFS	25	DEFINED	51	
62	XDT	REAL		CALCPX	REFS	25	DEFINED	51	
1	YES	INTEGER		CONSTS	REFS	3	30	46	109

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES					
PLB		3	65	68	70	113	115	131
PLOT		3	83					
PLOTS		3	82					
PROGNA		2	44					
TIMEB		2	135					
TITLES		1	64	108	130			
VGPT		2	106					

STATEMENT LABELS			DEF LINE	REFERENCES
61	25		86	60
0	50	INACTIVE	104	
100	80		111	109
111	90		117	110
0	100		121	101
0	200		122	96
0	300		123	90
304	1100	FMT	137	66
312	1200	FMT	138	132
320	2500	FMT	139	69
325	2600	FMT	140	114
345	2700	FMT	144	120

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
62	300	IRHOV	90 123	43B	EXT REFS NOT INNER
65	200	ISTIV	96 122	35B	EXT REFS NOT INNER
66	100	IMODV	101 121	32B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
COMAX	41	0 LC (40)	40 BR (1)				
PRPLX	6	0 GMAX (1)	1 GMIN (1)	2 FRMAX (1)			
		3 FRMIN (1)	4 VMAX (1)	5 VMIN (1)			
CTAPES	50	0 ITAPES (50)					
CTSHF	2	0 LTSHF (1)	1 TSHF (1)				
CALCPX	51	0 TITLE1 (18)	18 TITLE2 (18)	36 DUB (1)			
		37 FUB (1)	38 VUB (1)	39 DLB (1)			
		40 FLB (1)	41 VLB (1)	42 IPLOT (1)			
		43 LSD (1)	44 DSCALE (1)	45 FSCALE (1)			
		46 VSCALE (1)	47 DPLEN (1)	48 FRLEN (1)			

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
		49 VLEN (1)	50 XDT (1)				
FLUTVX	7	0 VL (1)	1 VH (1)			2 FLO (1)	
		3 FHI (1)	4 IE (1)			5 NQZ (1)	
		6 NVTOT (1)					
CPLOTS	1	0 KPLOTS (1)					
CONSTS	2	0 NO (1)	1 YES (1)				
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)			2 IPUNCH (1)	
CLIST	11	0 KOUNT (1)	1 KPAGE (1)			2 LINES (1)	
		3 LINEST (1)	4 KLABEL (1)			5 KTPAGE (1)	
		6 NPAGE (1)	7 KBPAGE (1)			8 LINESG (1)	
		9 KOUNTH (1)	10 KOUNTI (1)				
CTABLE	8	0 KTABLE (1)	1 NPASS (1)			2 NROWS (1)	
		3 NCOLS (1)	4 NCOLST (1)			5 KTABLO (1)	
		6 NPAGEA (1)	7 ITAPET (1)				

STATISTICS

PROGRAM LENGTH	14678	823
CM LABELED COMMON LENGTH	2668	182

520008 CM USED

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      SUBROUTINE VGPT (ACH,RHO)                                          VGPT     2
C                                                                        VGPT     3
C     CALCOMP ORDERING ROUTINE FOR MAXIMUM EFFICIENCY ------------------ VGPT     4
C                                                                        VGPT     5
      DIMENSION        VA(100) ,       VB(100) ,       DA(100)           VGPT     6
      DIMENSION        FA(100) ,       FB(100) ,       DB(100)           VGPT     7
      DIMENSION A(3,40), F(4000), D(4000), V(4000)                       VGPT     8
      DIMENSION ITAPES(50)                                               VGPT     9
      DIMENSION   TITLE1(18), TITLE2(18)                                 VGPT    10
C                                                                        VGPT    11
      COMMON /COMAX / LC(40), BR                                         VGPT    12
      COMMON /FLUTVX/ VL,VH,FLO,FHI,IE,NQZ,NVTOT                         VGPT    13
      COMMON / CTAPES / ITAPES                                           VGPT    14
      COMMON /CTSHF / LTSHF, TSHF                                        VGPT    15
      COMMON /CALCPX/ TITLE1,TITLE2,DUB,FUB,VUB,DLB,                     VGPT    16
     1                FLB, VLB, IPLOT, LSD, DSCALE, FSCALE, VSCALE,     VGPT    17
     2                DPLEN, FRLEN, VLEN, XDT                           VGPT    18
C                                                                        VGPT    19
C INITIAL CONDITIONS                                                     VGPT    20
C                                                                        VGPT    21
C     LSD = 1       VERTICAL PLOTS                                       VGPT    22
C     LSD = 2       HORIZONTAL PLOTS                                     VGPT    23
C     LSD = 3       SEPARATE VERTICAL PLOTS                              VGPT    24
C                                                                        VGPT    25
      MTAP1 = ITAPES(37)                                                 VGPT    26
      NV = NVTOT                                                         VGPT    27
      IPLOT  =  LC(15)                                                   VGPT    28
C                                                                        VGPT    29
C                                                                        VGPT    30
C READ DATA FROM UNIT MTAP1 AND PLOT FOR.                                VGPT    31
C   1.  PRESSURE CALCULATIONS (LC(1) = 0)                                VGPT    32
C   2.  K-FLUTTER ANALYSIS     (LC(1) = 1)                               VGPT    33
C   3.  DIVERGENCE ANALYSIS   (LC(1) = 2)                                VGPT    34
C                                                                        VGPT    35
      IF ( LC(1) .EQ. -1 )    GO TO 10                                   VGPT    36
      NVB  =  LC(4)                                                      VGPT    37
      NV = NVB                                                           VGPT    38
      DO 1  IV = 1,NVB                                                   VGPT    39
      READ (MTAP1) ((A(I,J),I=1,3),J=1,NQZ)                              VGPT    40
      DO 1 IZ= 1,NQZ                                                     VGPT    41
      INDX = (IZ-1)*NVB + IV                                             VGPT    42
      F(INDX) = A(1,IZ)                                                  VGPT    43
      D(INDX) = A(2,IZ)                                                  VGPT    44
      V(INDX) = A(3,IZ)                                                  VGPT    45
    1 CONTINUE                                                           VGPT    46
      GO TO 2                                                            VGPT    47
C                                                                        VGPT    48
C                                                                        VGPT    49
C READ DATA FROM UNIT MTAP2 AND PLOT FOR                                 VGPT    50
C   1.  P-K FLUTTER ANALYSIS AND/OR  (LC(1) = -1)                        VGPT    51
C   2.  FLUTTER REDESIGN             (LC(1) = -1)                        VGPT    52
C                                                                        VGPT    53
   10 DO 3  IM = 1,NQZ                                                   VGPT    54
      J1  =  (IM-1) *NVTOT + 1                                           VGPT    55
      J2  =  IM * NVTOT                                                  VGPT    56
    3 READ (MTAP1) (F(I),D(I),V(I),I=J1,J2)                              VGPT    57
    2 CONTINUE                                                           VGPT    58
```

```
      C                                                                 VGPT      59
      C                                                                 VGPT      60
60    C REARRANGE DATA AND BEGIN PLOTTING                               VGPT      61
      C                                                                 VGPT      62
            CALL AXPL (DMPORI,DMPZER,DSTART,FORG,DSV,VOR,VDIS,          VGPT      63
           1           XDNP,ACH,RHO)                                    VGPT      64
      C     DAMPING PLOT ORDERING  ------------------------------       VGPT      65
65          KL       = 0                                                VGPT      66
            DO 5  I = 1,NQZ                                             VGPT      67
            ISYM     = I - 14 * ((I-1)/14) + 1                          VGPT      68
            KL       = KL + 1                                           VGPT      69
            KL       = KL - KL * (KL/2)                                 VGPT      70
70          DO 6  J = 1,NV                                              VGPT      71
            K        = (I-1) * NV + J                                   VGPT      72
            II       = J                                                VGPT      73
            IF ( KL .NE. 0 )   II = NV + 1 - J                          VGPT      74
            DA(II)   = D(K)                                             VGPT      75
75        6 VA(II)   = V(K)                                             VGPT      76
            N        = 0                                                VGPT      77
            DO 7  K = 1,NV                                              VGPT      78
            IF (VA(K).GT.VLB.AND.VA(K).LT.VUB.AND.DA(K).GT.DLB.AND.DA(K).LT.  VGPT  79
           1 DUB )        GO TO 8                                       VGPT      80
80          GO TO 7                                                     VGPT      81
          8 N        = N + 1                                            VGPT      82
            VB(N)    = VA(K)                                            VGPT      83
            DB(N)    = DA(K)                                            VGPT      84
          7 CONTINUE                                                    VGPT      85
85          IF ( N .EQ. 0 )    GO TO 5                                  VGPT      86
            IF ( LSD .EQ. 2 )  GO TO 9                                  VGPT      87
      C                                                                 VGPT      88
      CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS VGPT     89
      C     CALL SCALE (DB,N,DPLEN,DMPZER,DSCALE,1,1)                   VGPT      90
90    C     CALL SCALE (VB,N,VLEN,.0,VSCALE,1,1)                        VGPT      91
      C     CALL LINE (VB,DB,N,1,1,ISYM,1,.1)                           VGPT      92
      CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   VGPT      93
      C                                                                 VGPT      94
      CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS VGPT     95
95          DB(N+1) = DMPZER                                            VGPT      96
            DB(N+2) = DSCALE                                            VGPT      97
            VB(N+1) = 0.0                                               VGPT      98
            VB(N+2) = VSCALE                                            VGPT      99
            CALL LINE (VB, DB, N, 1, -1, ISYM)                          VGPT     100
100   CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS    VGPT     101
      C                                                                 VGPT     102
            GO TO 5                                                     VGPT     103
      C                                                                 VGPT     104
      CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS VGPT     105
105   C   9 CALL SCALE (DB,N,DPLEN,DMPZER,-DSCALE,1,1)                  VGPT     106
      C     CALL SCALE (VB,N,VLEN,.0,VSCALE,1,1)                        VGPT     107
      C     CALL LINE (DB,VB,N,1,1,ISYM,1,.1)                           VGPT     108
      CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   VGPT     109
      C                                                                 VGPT     110
110   CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS VGPT     111
          9 CONTINUE                                                    VGPT     112
            DB(N+1) = DMPZER                                            VGPT     113
            DB(N+2) =-DSCALE                                            VGPT     114
            VB(N+1) = 0.0                                               VGPT     115
```

```
115               VB(N+2) = VSCALE                                                  VGPT      116
                  CALL LINE (DB, VB, N, 1, -1, ISYM)                                VGPT      117
                CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS    VGPT      118
                C                                                                   VGPT      119
                    5 CONTINUE                                                      VGPT      120
120               IF  (  LSD .EQ. 3 )     CALL PLOT (XDNP,0.0,-3)                   VGPT      121
                  CALL TIPL (FORG,VOR,ACH,RHO,DSV,VDIS)                             VGPT      122
                  DO 19  I=1,NQZ                                                    VGPT      123
                  ISYM    =  I - 14 * ((I-1)/14) + 1                                VGPT      124
                  KL      =  KL + 1                                                 VGPT      125
125               KL      =  KL - KL * (KL/2)                                       VGPT      126
                  DO 20  J = 1,NV                                                   VGPT      127
                  K       =  (I-1) * NV + J                                         VGPT      128
                  II      =  J                                                      VGPT      129
                  IF ( KL .NE. 0 )   II = NV + 1 - J                                VGPT      130
130               FA(II)  =  F(K)                                                   VGPT      131
                 20 VA(II)  =  V(K)                                                 VGPT      132
                  N       =  0                                                      VGPT      133
                  DO 21  K = 1,NV                                                   VGPT      134
                  IF (VA(K).GT.VLB.AND.VA(K).LT.VUB.AND.FA(K).GT.FLB.AND.FA(K).LT.  VGPT      135
135              1FUB)     GO TO 22                                                 VGPT      136
                  GO TO 21                                                          VGPT      137
                 22 N       =  N + 1                                               VGPT      138
                  FB(N)   =  FA(K)                                                  VGPT      139
                  VB(N)   =  VA(K)                                                  VGPT      140
140              21 CONTINUE                                                        VGPT      141
                  IF ( N .EQ. 0 )    GO TO 19                                       VGPT      142
                  GO TO ( 31 , 32 , 33 ) , LSD                                      VGPT      143
                C                                                                   VGPT      144
                CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS VGPT      145
145             C  31 CALL SCALE (VB,N,VLEN,.0,VSCALE,1,1)                          VGPT      146
                C     CALL SCALE (FB,N,FRLEN,.0,FSCALE,1,1)                         VGPT      147
                C     CALL LINE (VB,FB,N,1,1,ISYM,1,.1)                             VGPT      148
                CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS    VGPT      149
                C                                                                   VGPT      150
150             CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS VGPT      151
                  31 CONTINUE                                                       VGPT      152
                  VB(N+1) = 0.0                                                     VGPT      153
                  VB(N+2) = VSCALE                                                  VGPT      154
                  FB(N+1) = 0.0                                                     VGPT      155
155               FB(N+2) = FSCALE                                                  VGPT      156
                  CALL LINE (VB, FB, N, 1, -1, ISYM)                                VGPT      157
                CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS    VGPT      158
                C                                                                   VGPT      159
                  GO TO 19                                                          VGPT      160
160             C                                                                   VGPT      161
                CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS VGPT      162
                C  32 CALL SCALE (FB,N,FRLEN,VOR,-FSCALE,1,1)                       VGPT      163
                C     CALL SCALE (VB,N,VLEN,.0,VSCALE,1,1)                          VGPT      164
                C     CALL LINE (FB,VB,N,1,1,ISYM,1,.1)                             VGPT      165
165             CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS    VGPT      166
                C                                                                   VGPT      167
                CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS VGPT      168
                  32 CONTINUE                                                       VGPT      169
                  FB(N+1) = VOR                                                     VGPT      170
170               FB(N+2) =-FSCALE                                                  VGPT      171
                  VB(N+1) = 0.0                                                     VGPT      172
```

```
                      VB(N+2) = VSCALE                                                  VGPT      173
                      CALL LINE (FB, VB, N, 1, -1, ISYM)                                VGPT      174
                CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        VGPT      175
     175        C                                                                       VGPT      176
                      GO TO 19                                                          VGPT      177
                C                                                                       VGPT      178
                CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS     VGPT      179
                C  33 CALL SCALE (VB,N,VLEN,VOR,VSCALE,1,1)                             VGPT      180
     180        C     CALL SCALE (FB,N,FRLEN,.O,FSCALE,1,1)                             VGPT      181
                C     CALL LINE (VB,FB,N,1,1,ISYM,1,.1)                                 VGPT      182
                CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS        VGPT      183
                C                                                                       VGPT      184
                CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS     VGPT      185
     185           33 CONTINUE                                                        VGPT      186
                      VB(N+1) = VOR                                                     VGPT      187
                      VB(N+2) = VSCALE                                                  VGPT      188
                      FB(N+1) = O.O                                                     VGPT      189
                      FB(N+2) = FSCALE                                                  VGPT      190
     190              CALL LINE (VB, FB, N,1, -1,ISYM)                                  VGPT      191
                CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS        VGPT      192
                C                                                                       VGPT      193
                   19 CONTINUE                                                          VGPT      194
                C     SPECIFY DISTANCE TO NEXT PLOT                                     VGPT      195
     195              XDNP     =  XDT + 1.5                                             VGPT      196
                      CALL PLOT (XDNP,O.O,-3)                                           VGPT      197
                C                                                                       VGPT      198
                      RETURN                                                            VGPT      199
                      END                                                               VGPT      200
```

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CARD NR. SEVERITY  DETAILS    DIAGNOSIS OF PROBLEM

     142    I               AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	VGPT	1	198

VARIABLES	SN	TYPE	RELOCATION									
1612	A	REAL	ARRAY		REFS	7	42	43	44	DEFINED	39	
0	ACH	REAL		F.P.	REFS	62	121	DEFINED	1			
50	BR	REAL		COMAX	REFS	11						
11642	D	REAL	ARRAY		REFS	7	74	DEFINED	43	56		
772	DA	REAL	ARRAY		REFS	5	2*78	83	DEFINED	74		
1446	DB	REAL	ARRAY		REFS	6	99	116	DEFINED	83	95	96
						112	113					
47	DLB	REAL		CALCPX	REFS	15	78					
445	DMPORI *	REAL			REFS	62						
446	DMPZER	REAL			REFS	62	95	112				
57	DPLEN	REAL		CALCPX	REFS	15						

VARIABLES		SN	TYPE		RELOCATION							
54	DSCALE		REAL		CALCPX	REFS	15	96	113			
447	DSTART	*	REAL			REFS	62					
451	DSV		REAL			REFS	62	121				
44	DUB		REAL		CALCPX	REFS	15	78				
2002	F		REAL	ARRAY		REFS	7	130	DEFINED	42	56	
1136	FA		REAL	ARRAY		REFS	6	2*134	138	DEFINED	130	
1302	FB		REAL	ARRAY		REFS	6	156	173	190	DEFINED	138
							154	155	169	170	188	189
3	FHI		REAL		FLUTVX	REFS	12					
50	FLB		REAL		CALCPX	REFS	15	134				
2	FLO		REAL		FLUTVX	REFS	12					
450	FORG		REAL			REFS	62	121				
60	FRLEN		REAL		CALCPX	REFS	15					
55	FSCALE		REAL		CALCPX	REFS	15	155	170	189		
45	FUB		REAL		CALCPX	REFS	15	134				
436	I		INTEGER			REFS	39	3*56	2*67	71	2*123	127
						DEFINED	39	56	66	122		
4	IE		INTEGER		FLUTVX	REFS	12					
460	II		INTEGER			REFS	74	75	130	131	DEFINED	72
						73	128	129				
442	IM		INTEGER			REFS	54	55	DEFINED	53		
441	INDX		INTEGER			REFS	42	43	44	DEFINED	41	
52	IPLOT		INTEGER		CALCPX	REFS	15	DEFINED	27			
456	ISYM		INTEGER			REFS	99	116	156	173	190	
						DEFINED	67	123				
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	8	13	25			
435	IV		INTEGER			REFS	41	DEFINED	38			
440	IZ		INTEGER			REFS	41	42	43	44	DEFINED	40
437	J		INTEGER			REFS	39	71	72	73	127	128
						DEFINED	39	70	126			129
443	J1		INTEGER			REFS	56	DEFINED	54			
444	J2		INTEGER			REFS	56	DEFINED	55			
457	K		INTEGER			REFS	74	75	4*78	82	83	130
						4*134	138	139	DEFINED	71	77	127
455	KL		INTEGER			REFS	68	3*69	73	124	3*125	129
						DEFINED	65	68	69	124	125	
0	LC		INTEGER	ARRAY	COMAX	REFS	11	27	35	36		
53	LSD		INTEGER		CALCPX	REFS	15	86	120	142		
0	LTSHF		INTEGER		CTSHF	REFS	14					
432	MTAP1		INTEGER			DEFINED	25	I/O REFS	39	56		
461	N		INTEGER			REFS	81	82	83	85	95	96
						97	98	99	112	113	114	115
						116	137	138	139	141	152	153
						154	155	156	169	170	171	172
						173	186	187	188	189	190	DEFINED
						76	81	132	137			
5	NQZ		INTEGER		FLUTVX	REFS	12	39	40	53	66	122
433	NV		INTEGER			REFS	70	71	73	77	126	127
						129	133	DEFINED	26	37		
434	NVB		INTEGER			REFS	37	38	41	DEFINED	36	
6	NVTOT		INTEGER		FLUTVX	REFS	12	26	54	55		
0	RHO		REAL		F.P.	REFS	62	121	DEFINED	1		
0	TITLE1		REAL	ARRAY	CALCPX	REFS	9	15				
22	TITLE2		REAL	ARRAY	CALCPX	REFS	9	15				
1	TSHF		REAL		CTSHF	REFS	14					
21502	V		REAL	ARRAY		REFS	7	75	131	DEFINED	44	56
462	VA		REAL	ARRAY		REFS	5	2*78	82	2*134	139	
						DEFINED	75	131				

VARIABLES	SN	TYPE	RELOCATION								
626	VB	REAL	ARRAY		REFS	5	99	116	156	173	190	
					DEFINED	82	97	98	114	115	139	152
					153	171	172	186	187			
453	VDIS	REAL			REFS	62	121					
1	VH	REAL		FLUTVX	REFS	12						
0	VL	REAL		FLUTVX	REFS	12						
51	VLB	REAL		CALCPX	REFS	15	78	134				
61	VLEN	REAL		CALCPX	REFS	15						
452	VOR	REAL			REFS	62	121	169	186			
56	VSCALE	REAL		CALCPX	REFS	15	98	115	153	172	187	
46	VUB	REAL		CALCPX	REFS	15	78	134				
454	XDNP	REAL			REFS	62	120	196	DEFINED	195		
62	XDT	REAL		CALCPX	REFS	15	195					

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES				
AXPL		10	62				
LINE		6	99	116	156	173	190
PLOT		3	120	196			
TIPL		6	121				

STATEMENT LABELS		DEF LINE	REFERENCES			
0	1	45	38	40		
72	2	57	46			
0	3	56	53			
173	5	119	66	85	102	
0	6	75	70			
145	7	84	77	80		
142	8	81	78			
163	9	111	86			
45	10	53	35			
320	19	193	122	141	159	176
0	20	131	126			
254	21	140	133	136		
251	22	137	134			
267	31	151	142			
277	32	168	142			
310	33	185	142			

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
16	1	IV	38 45	27B		EXT REFS NOT INNER
33	1	IZ	40 45	6B	INSTACK	
46	3	IM	53 56	24B		EXT REFS NOT INNER
55		I	56 56	11B		EXT REFS
100	5	I	66 119	76B		EXT REFS NOT INNER
114	6	J	70 75	10B	OPT	
133	7	K	77 84	13B	OPT	
207	19	I	122 193	114B		EXT REFS NOT INNER
223	20	J	126 131	10B	OPT	
242	21	K	133 140	13B	OPT	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
COMAX	41	0 LC	(40)	40 BR	(1)		
FLUTVX	7	0 VL	(1)	1 VH	(1)	2 FLO	(1)
		3 FHI	(1)	4 IE	(1)	5 NQZ	(1)
		6 NVTOT	(1)				
CTAPES	50	0 ITAPES	(50)				

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

CTSHF	2	0	LTSHF (1)	1	TSHF (1)			
CALCPX	51	0	TITLE1 (18)	18	TITLE2 (18)	36	DUB (1)	
		37	FUB (1)	38	VUB (1)	39	DLB (1)	
		40	FLB (1)	41	VLB (1)	42	IPLOT (1)	
		43	LSD (1)	44	DSCALE (1)	45	FSCALE (1)	
		46	VSCALE (1)	47	DPLEN (1)	48	FRLEN (1)	
		49	VLEN (1)	50	XDT (1)			

STATISTICS

PROGRAM LENGTH	31342B	13026
CM LABELED COMMON LENGTH	227B	151

520000B CM USED

```
      COMMON /CTSH  / KTSH  ,LTSH  ,TSH                                  AFOM       59
      COMMON /CTSHFO/ LTSHFO,TSHFO                                       AFOM       60
      COMMON /CONSTS/ NO    ,YES                                         AFOM       61
      COMMON /CFMTA / FMTA                                               AFOM       62
      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                               AFOM       63
      COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUMC,KLUBAL,MSADD,NPASS,IDNOPT,   AFOM       64
     1              VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND, AFOM       65
     2              IFIN,KLUB,KLUQ,MORBAL,CBAL                           AFOM       66
      COMMON /PLUG/ EMP(3,3),PHP(3,40)                                   AFOM       67
      COMMON /KLUFF/ KFREE                                               AFOM       68
      COMMON /PLAYFF/ IUMDFF,IFMDFF,IUDLTI,IFDLTI,IUSLTI,IFSLTI          AFOM       69
     1               ,IUMPLI,IFMPLI,IUTPGT,IFTPGT,IUPATF,IFPATF          AFOM       70
     2               ,IUMPL,IFMPL,IUSLT,IFSLT,IUDLT,IFDLT                AFOM       71
     3               ,IUQA,IFQA,IUQAT,IFQAT,IUPHA,IFPHA,IUPHAT,IFPHAT    AFOM       72
      COMMON/PLACES/ IUIN1,IUIN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4,  AFOM       73
     1               IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,          AFOM       74
     2               IUA,IFA,IUY,IFY,IUMEMN,IFMEMN,IUSTFN,IFSTFN,        AFOM       75
     3               IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,                    AFOM       76
     4               IUMDBI,IFMDBI,IUADDI,IFADDI,IUBALI,IFBALI,          AFOM       77
     5               IUDESI,IFDESI,IUWTI,IFWTI,                          AFOM       78
     6               IUMEMO,IFMEMO,IUBT,IFBT,                            AFOM       79
     7               IUDESN,IFDESN,IUMD,IFMD,                            AFOM       80
     8               IUMEMF,IFMEMF,                                      AFOM       81
     9               IUSTFO,IFSTFO,IUMDB,IFMDB,IUADD,IFADD,IUBAL,IFBAL,  AFOM       82
     A               IUDESF,IFDESF,IUWT,IFWT,                            AFOM       83
     B               IUDUM1,IFDUM1,IUDUM2,IFDUM2,IUDUM3,IFDUM3,          AFOM       84
     C               IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IULR,IFLR,      AFOM       85
     D               IUBR,IFBR,                                          AFOM       86
     E               IUPHTF,IFPHTF,IUMODM,IFMODM,                        AFOM       87
     F               IUMODK,IFMODK,IUPHT,IFPHT,IUQT,IFQT,IUQ,IFQ,        AFOM       88
     G               IUPH,IFPH,IUINCM,IFINCM,IUINCK,IFINCK               AFOM       89
      COMMON /FLUT/ UMOD(40),VMOD(40),VF,WW,CSCL,NMODE,IDMODE(40)        AFOM       90
      COMMON/COLS/ IT,IMINT,IMAXT,IDENS,IOLDT,IOLDW,ISRAT,IMINTO,        AFOM       91
     A             IINITT,IWPUT,                                        AFOM       92
     1             NVAR,JWPUT,JINITT,JMINT,JMAXT,JOLDT,JNEWT,JDRV,      AFOM       93
     2             JDRVO,JSPR1,JSPR2,JSPR3                              AFOM       94
      COMMON /FILE  / IPOS                                               AFOM       95
      COMMON/WAYTS/ WINITT,WST,WMB,WBOTH,WPRES,DW                        AFOM       96
      COMMON /CORE  / KORE  ,KOREDP                                      AFOM       97
      COMMON /CLIST / KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE       AFOM       98
     1              ,KBPAGE,LINESG,KOUNTH,KOUNTI                        AFOM       99
      COMMON /CLUFO/ LKLUFO,KLUFO(20)                                    AFOM      100
      COMMON /STORES/ NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)     AFOM      101
     A               ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)   AFOM      102
     B               ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)        AFOM      103
     C               ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)        AFOM      104
     D               ,STRRDO(5,3),STRRDN(5,3),SCALE(5,7)                 AFOM      105
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD       AFOM      106
      COMMON /LOCSTR/ IUSTRI,IFSTRI,IUMREF,IFMREF                        AFOM      107
     1              ,IUMOD,IFMOD                                        AFOM      108
      COMMON /FITR/ NOMI,NIND(40)                                        AFOM      109
      COMMON /QELIM/ QDW,VQDW,LC38                                       AFOM      110
C                                                                        AFOM      111
C  ******************************************************              AFOM      112
C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE      *              AFOM      113
C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT      *              AFOM      114
C  *       USED IN THE CURRENT VERSION OF ESP           *              AFOM      115
```

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      C                                                                       AFOM        2
      C45700, SUB. AFOM (AUTOMATED FLUTTER OPTIMIZATION MODULE)               AFOM        3
      C                                                                       AFOM        4
      C                                                                     * AFOM        5
      C*********************************************************************** AFOM        6
      C*********************************************************************** AFOM        7
      C*********************************************************************** AFOM        8
      C*********************************************************************** AFOM        9
      C*********************************************************************** AFOM       10
      C*****                                                          ****** AFOM       11
      C*****                  AAA    FFFFF    OOO    M   M            ****** AFOM       12
      C*****                 A   A   F       O   O   MM MM           ****** AFOM       13
      C*****                 AAAAA - FFFF  - O   O - M M M           ****** AFOM       14
      C*****                 A   A   F       O   O   M M M           ****** AFOM       15
      C*****                 A   A   F        OOO    M M M           ****** AFOM       16
      C*****                                                          ****** AFOM       17
      C*********************************************************************** AFOM       18
      C*********************************************************************** AFOM       19
      C*********************************************************************** AFOM       20
      C*********************************************************************** AFOM       21
      C*********************************************************************** AFOM       22
      C                                                                     * AFOM       23
      C                                                                     * AFOM       24
            SUBROUTINE AFOM (KWIT)                                          AFOM       25
      C                                                                     AFOM       26
            INTEGER YES                                                     AFOM       27
      C                                                                     AFOM       28
            COMPLEX UMOD,VMOD                                               AFOM       29
      C                                                                     AFOM       30
            DIMENSION FMTA(1)                                               AFOM       31
            DIMENSION WORK(4000)                                            AFOM       32
      C     ****************************************************            AFOM       33
      C     *       THE DIMENSION OF 'WORK' HAS BEEN REDUCED   *            AFOM       34
      C     *       FROM 24000 IN FASTOP BECAUSE PORTIONS OF   *            AFOM       35
      C     *       CODE NOT USED IN THE CURRENT VERSION OF    *            AFOM       36
      C     *       ESP HAVE BEEN COMMENTED OUT.               *            AFOM       37
      C     ****************************************************            AFOM       38
            DIMENSION BUFFER(210)                                           AFOM       39
            DIMENSION IPOS(20)                                              AFOM       40
            DIMENSION NAME1(2),NAME2(2),NAMPH(2),NAMPHT(2),NAMQ(2),NAMQT(2) AFOM       41
            DIMENSION ALLM(40),ALLK(40)                                     AFOM       42
      C     ****************************************************            AFOM       43
      C     *       THE FOLLOWING LINE OF FASTOP CODE HAS      *            AFOM       44
      C     *       BEEN COMMENTED OUT BECAUSE IT IS NOT       *            AFOM       45
      C     *       USED IN THE CURRENT VERSION OF ESP.        *            AFOM       46
      C     ****************************************************            AFOM       47
      C     DIMENSION ELAM(6000,3),NAMAB(2,2),NAMABT(2,2)                   AFOM       48
            DIMENSION TSH(1)             ,TSHFO(1)                          AFOM       49
            DIMENSION PHPTMP(40)                                            AFOM       50
      C                                                                     AFOM       51
      C     ****************************************************            AFOM       52
      C     *       THE FOLLOWING LINE OF FASTOP CODE HAS      *            AFOM       53
      C     *       BEEN COMMENTED OUT BECAUSE IT IS NOT       *            AFOM       54
      C     *       USED IN THE CURRENT VERSION OF ESP.        *            AFOM       55
      C     ****************************************************            AFOM       56
      C     EQUIVALENCE (WORK(1),ELAM(1,1))                                 AFOM       57
      C                                                                     AFOM       58
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VARIABLES     SN  TYPE          RELOCATION
    0  VDIS      REAL            F.P.      REFS      72  DEFINED      1
   51  VLB       REAL            CALCPX    REFS       5
   61  VLEN      REAL            CALCPX    REFS       5      12       14      73      75      126     128
    0  VOR       REAL            F.P.      REFS      71  DEFINED      1
   56  VSCALE    REAL            CALCPX    REFS       5      12       14      73      75      126     128
   46  VUB       REAL            CALCPX    REFS       5
   62  XDT       REAL            CALCPX    REFS       5      16      130

EXTERNALS          TYPE   ARGS    REFERENCES
    AXIS                   10        11       12       14       16       71      72      73      75      125
                                    126      128      130
    NUMBER                  6        49       59      101      113
    SYMBOL                  6        26       36       46       56       67      86      87      97      109
                                    121

STATEMENT LABELS          DEF LINE   REFERENCES
  155  10                    131        17        77
   15  11                     11         9
   30  12                     18         9
  104  13                     86         9

COMMON BLOCKS    LENGTH    MEMBERS - BIAS NAME(LENGTH)
    CALCPX         51        0 TITLE1 (18)      18 TITLE2 (18)      36 DUB    (1)
                            37 FUB    (1)      38 VUB    (1)       39 DLB    (1)
                            40 FLB    (1)      41 VLB    (1)       42 IPLOT  (1)
                            43 LSD    (1)      44 DSCALE (1)       45 FSCALE (1)
                            46 VSCALE (1)      47 DPLEN  (1)       48 FRLEN  (1)
                            49 VLEN   (1)      50 XDT    (1)

STATISTICS
  PROGRAM LENGTH                  634B      412
  CM LABELED COMMON LENGTH         63B       51
        52000B CM USED
```

```
115          C                                                                  TIPL      116
             CIBM                                                               TIPL      117
             C     CALL SYMBL4 (ACE,8.95,.1,22HFREQUENCY VS. VELOCITY,.0,22)    TIPL      118
             CIBM                                                               TIPL      119
             C                                                                  TIPL      120
120          CCDC                                                               TIPL      121
                   CALL SYMBOL(ACE,8.95,.1,22HFREQUENCY VS. VELOCITY,.0,22)     TIPL      122
             CCDC                                                               TIPL      123
             C                                                                  TIPL      124
             C     DRAW AXES                 ------------------------------   TIPL      125
125                CALL AXIS (DSV,.0,9HFREQ.,HZ.,9,FRLEN,90.,.0,FSCALE,0,1)    TIPL      126
                   IF (IPLOT.NE.0) CALL AXIS(DSV,.0,15HVEL.(TRUE),KTS.,15,VLEN,.0,.0, TIPL      127
                  1VSCALE,0,1)                                                  TIPL      128
                   IF (IPLOT.EQ.0) CALL AXIS (DSV,.0,17HVEL.(EQUIV.),KTS.,17,VLEN,.0, TIPL      129
                  1.0,VSCALE,0,1)                                               TIPL      130
130                CALL AXIS (XDT,.0,1H ,1,FRLEN,90.,.0,1.,3,1)                 TIPL      131
                10 RETURN                                                       TIPL      132
                   END                                                          TIPL      133
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

9 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	TIPL	1	131

VARIABLES		SN TYPE		RELOCATION							
553	ACE	REAL			REFS	26	29	36	39	46	49	56
						59	60	67	97	101	109	113	121
					DEFINED	18	29	39	60	90	100	102
						112	114					
0	ACH	REAL		F.P.	REFS	49	101	DEFINED	1			
47	DLB	REAL		CALCPX	REFS	5						
57	DPLEN	REAL		CALCPX	REFS	5						
54	DSCALE	REAL		CALCPX	REFS	5						
0	DSV	REAL		F.P.	REFS	73	75	86	87	90	100	102
						112	114	125	126	128	DEFINED	1
44	DUB	REAL		CALCPX	REFS	5						
50	FLB	REAL		CALCPX	REFS	5						
0	FORG	REAL		F.P.	REFS	18	71	72	DEFINED	1		
60	FRLEN	REAL		CALCPX	REFS	5	11	16	71	72	125	130
55	FSCALE	REAL		CALCPX	REFS	5	11	71	125			
45	FUB	REAL		CALCPX	REFS	5						
52	IPLOT	INTEGER		CALCPX	REFS	5	12	14	73	75	126	128
53	LSD	INTEGER		CALCPX	REFS	5	9					
0	RHO	REAL		F.P.	REFS	59	113	DEFINED	1			
0	TITLE1	REAL	ARRAY	CALCPX	REFS	3	5	26	86			
22	TITLE2	REAL	ARRAY	CALCPX	REFS	3	5	36	87			

```
      C                                                                 TIPL       59
            CALL NUMBER (ACE,4.6,.1,RHO,90.,3)                          TIPL       60
60          ACE      =  ACE + .15                                       TIPL       61
      C                                                                 TIPL       62
      CIBM                                                              TIPL       63
      C     CALL SYMBL4 (ACE,.25,.1,22HFREQUENCY VS. VELOCITY,90.,22)   TIPL       64
      CIBM                                                              TIPL       65
65    C                                                                 TIPL       66
      CCDC                                                              TIPL       67
            CALL SYMBOL(ACE,.25,.1,22HFREQUENCY VS. VELOCITY,90.,22)    TIPL       68
      CCDC                                                              TIPL       69
      C                                                                 TIPL       70
70    C     DRAW AXES                 ------------------------------    TIPL       71
            CALL AXIS (FORG,.0,9HFREQ.,HZ.,9,FRLEN,.0,VOR,-FSCALE,0,-1) TIPL       72
            CALL AXIS (FORG,VDIS,1H ,1,FRLEN,.0,.0,1.,3,1)              TIPL       73
            IF (IPLOT.NE.0) CALL AXIS (DSV,.0,15HVEL.(TRUE),KTS.,15,VLEN,90.,  TIPL  74
           1.0,VSCALE,4,1)                                              TIPL       75
75          IF (IPLOT.EQ.0) CALL AXIS (DSV,.0,17HVEL.(EQUIV.),KTS.,17,VLEN,  TIPL 76
           190.,.0,VSCALE,4,1)                                          TIPL       77
            GO TO 10                                                    TIPL       78
      C     WRITE TITLES              ------------------------------    TIPL       79
      C                                                                 TIPL       80
80    CIBM                                                              TIPL       81
      C  13 CALL SYMBL4 (DSV,9.4,.1,TITLE1,.0,72)                       TIPL       82
      C     CALL SYMBL4 (DSV,9.25,.1,TITLE2,.0,72)                      TIPL       83
      CIBM                                                              TIPL       84
      C                                                                 TIPL       85
85    CCDC                                                              TIPL       86
         13 CALL SYMBOL(DSV,9.4,.1,TITLE1,.0,72)                        TIPL       87
            CALL SYMBOL(DSV,9.25,.1,TITLE2,.0,72)                       TIPL       88
      CCDC                                                              TIPL       89
      C                                                                 TIPL       90
90          ACE      =  DSV + .25                                       TIPL       91
      C                                                                 TIPL       92
      CIBM                                                              TIPL       93
      C     CALL SYMBL4 (ACE,9.1,.1,9HMACH NO.=,.0,9)                   TIPL       94
      CIBM                                                              TIPL       95
95    C                                                                 TIPL       96
      CCDC                                                              TIPL       97
            CALL SYMBOL(ACE,9.1,.1,9HMACH NO.=,.0,9)                    TIPL       98
      CCDC                                                              TIPL       99
      C                                                                 TIPL      100
100         ACE      =  DSV + 1.                                        TIPL      101
            CALL NUMBER (ACE,9.1,.1,ACH,.0,3)                           TIPL      102
            ACE      =  DSV + 3.25                                      TIPL      103
      C                                                                 TIPL      104
      CIBM                                                              TIPL      105
105   C     CALL SYMBL4 (ACE,9.1,.1,14HDENSITY RATIO=,.0,14)            TIPL      106
      CIBM                                                              TIPL      107
      C                                                                 TIPL      108
      CCDC                                                              TIPL      109
            CALL SYMBOL(ACE,9.1,.1,14HDENSITY RATIO=,.0,14)             TIPL      110
110   CCDC                                                              TIPL      111
      C                                                                 TIPL      112
            ACE      =  DSV + 4.6                                       TIPL      113
            CALL NUMBER (ACE,9.1,.1,RHO,.0,3)                           TIPL      114
            ACE      =  DSV + .25                                       TIPL      115
```

```
      SUBROUTINE TIPL (FORG,VOR,ACH,RHO,DSV,VDIS)                       TIPL       2
C                                                                       TIPL       3
      DIMENSION     TITLE1(18), TITLE2(18)                              TIPL       4
C                                                                       TIPL       5
      COMMON /CALCPX/ TITLE1,TITLE2,DUB,FUB,VUB,DLB,                    TIPL       6
     1   FLB, VLB, IPLOT, LSD, DSCALE, FSCALE, VSCALE, DPLEN,           TIPL       7
     2   FRLEN,  VLEN, XDT                                              TIPL       8
C     FREQUENCY PLOT ORDERING ------------------------------            TIPL       9
      GO TO ( 11 , 12 , 13 ) , LSD                                      TIPL      10
C     DRAW AXES                -------------------------------          TIPL      11
   11 CALL AXIS (.0,.0,9HFREQ.,HZ.,9,FRLEN,90.,.0,FSCALE,0,1)          TIPL      12
      IF (IPLOT.NE.0) CALL AXIS (.0,.0,15HVEL.(TRUE),KTS.,15,VLEN,.0,.0, TIPL      13
     1VSCALE,0,1)                                                       TIPL      14
      IF (IPLOT.EQ.0) CALL AXIS (.0,.0,17HVEL.(EQUIV.),KTS.,17,VLEN,.0, TIPL      15
     1.0,VSCALE,0,1)                                                    TIPL      16
      CALL AXIS (XDT,.0,1H ,1,FRLEN,90.,.0,1.,3,1)                      TIPL      17
      GO TO 10                                                          TIPL      18
   12 ACE      =  FORG - 1.0                                            TIPL      19
C     WRITE TITLES             -------------------------------          TIPL      20
C                                                                       TIPL      21
CIBM                                                                    TIPL      22
C     CALL SYMBL4 (ACE,.0,.1,TITLE1,90.,72)                             TIPL      23
CIBM                                                                    TIPL      24
C                                                                       TIPL      25
CCDC                                                                    TIPL      26
      CALL SYMBOL(ACE,.0,.1,TITLE1,90.,72)                              TIPL      27
CCDC                                                                    TIPL      28
C                                                                       TIPL      29
      ACE      =  ACE + .15                                             TIPL      30
C                                                                       TIPL      31
CIBM                                                                    TIPL      32
C     CALL SYMBL4 (ACE,.0,.1,TITLE2,90.,72)                             TIPL      33
CIBM                                                                    TIPL      34
C                                                                       TIPL      35
CCDC                                                                    TIPL      36
      CALL SYMBOL(ACE,.0,.1,TITLE2,90.,72)                              TIPL      37
CCDC                                                                    TIPL      38
C                                                                       TIPL      39
      ACE      =  ACE + .15                                             TIPL      40
C                                                                       TIPL      41
CIBM                                                                    TIPL      42
C     CALL SYMBL4 (ACE,.25,.1,9HMACH NO.=,90.,9)                        TIPL      43
CIBM                                                                    TIPL      44
C                                                                       TIPL      45
CCDC                                                                    TIPL      46
      CALL SYMBOL(ACE,.25,.1,9HMACH NO.=,90.,9)                         TIPL      47
CCDC                                                                    TIPL      48
C                                                                       TIPL      49
      CALL NUMBER (ACE,1.,.1,ACH,90.,3)                                 TIPL      50
C                                                                       TIPL      51
CIBM                                                                    TIPL      52
C     CALL SYMBL4 (ACE,3.25,.1,14HDENSITY RATIO=,90.,14)                TIPL      53
CIBM                                                                    TIPL      54
C                                                                       TIPL      55
CCDC                                                                    TIPL      56
      CALL SYMBOL(ACE,3.25,.1,14HDENSITY,RATIO=,90.,14)                 TIPL      57
CCDC                                                                    TIPL      58
```

STATEMENT LABELS		DEF LINE	REFERENCES
202	50	69	2*68
224	60	78	68
170	61	67	77
246	80	91	23 68

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
127	20	I	52 60	22B	EXT REFS
203	30	I	70 76	21B	EXT REFS

STATISTICS

PROGRAM LENGTH	354B	236

52000B CM USED

VARIABLES	SN	TYPE	RELOCATION								
				DEFINED	8						
324	CTETA	REAL		REFS	72	88	DEFINED	12	13		
0	DY	REAL	F.P.	REFS	23	42	71	DEFINED	1		
325	EN	REAL		REFS	62	63	DEFINED	14			
350	I	INTEGER		DEFINED	52	70					
347	I3	INTEGER		REFS	53	DEFINED	47	60			
0	KIND	INTEGER	F.P.	REFS	10	2*11	2*23	24	DEFINED	1	11
0	KOSB	INTEGER	F.P.	REFS	8	DEFINED	1				
333	LL	INTEGER		REFS	67	68	DEFINED	24	67		
334	N	INTEGER		REFS	52	66	70	DEFINED	25	66	
0	NC	INTEGER	F.P.	REFS	18	79	88	DEFINED	1		
346	N1	INTEGER		REFS	49	72	DEFINED	45	49		
0	SIZE	REAL	F.P.	REFS	17	25	DEFINED	1			
337	TH	REAL		REFS	35	36	DEFINED	34			
0	THETA	REAL	F.P.	REFS	12	13	26	30	34		
				DEFINED	1						
345	VALUE	REAL		REFS	43	44	48	50	72		
				DEFINED	42	46	50	71	79		
0	X	REAL	F.P.	REFS	37	38	80	DEFINED	1		
340	XA	REAL		REFS	53	57	61	62	72	73	
				DEFINED	37	57	62	73			
335	XB	REAL		REFS	39	55	57	62	63	64	73
				75	80	81	DEFINED	27	31	36	
341	XC	REAL		REFS	54	55	59	64	71	75	88
				DEFINED	38	55	64	75	80		
0	Y	REAL	F.P.	REFS	39	40	81	DEFINED	1		
342	YA	REAL		REFS	53	58	61	63	72	74	
				DEFINED	39	58	63	74			
336	YB	REAL		REFS	37	56	58	62	63	65	74
				76	80	81	DEFINED	28	32	35	
343	YC	REAL		REFS	54	56	59	65	71	76	88
				DEFINED	40	56	65	76	81		
0	YMIN	REAL	F.P.	REFS	41	42	71	DEFINED	1		

EXTERNALS	TYPE	ARGS		REFERENCES				
COS	REAL	1	LIBRARY	36				
NUMBER		6		72				
PLOT		3		53	54	59	61	
SIN	REAL	1	LIBRARY	35				
SYMBOL		6		88				

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
ABS	REAL	1	INTRIN		41	42

STATEMENT LABELS			DEF LINE	REFERENCES	
0	1	INACTIVE	27	26	
64	2		30	26	
77	3		37	29	33
0	4	INACTIVE	31	30	
0	5	INACTIVE	44	43	
116	6		45	2*43	
71	7		34	26	2*30
121	14		48	51	
0	15	INACTIVE	49	48	
126	16		52	2*48	
0	20		60	52	
0	30		76	70	

```
                      YA = YA + YB                                                AXIS      59
                      CALL PLOT (XC,YC,+2)                                        AXIS      60
   60                20 I3 = 2                                                    AXIS      61
                      CALL PLOT (XA,YA,+2)                                        AXIS      62
                      XA = XA - XB*CEN + YB*(EN + BEN)                            AXIS      63
                      YA = YA - YB*CEN + XB*(EN - BEN)                            AXIS      64
                      XC = XC * XB                                                AXIS      65
   65                 YC = YC * YB                                                AXIS      66
                      N  = N + 1                                                  AXIS      67
                     61 LL = LL + 1                                               AXIS      68
                      GO TO (50,60,50,80),LL                                      AXIS      69
                     50 CONTINUE                                                  AXIS      70
   70                 DO 30 I = 1,N                                               AXIS      71
                      VALUE = ((XC+YC)*DY) + YMIN                                 AXIS      72
                      CALL NUMBER (XA,YA,0.10,VALUE,CTETA,N1)                     AXIS      73
                      XA = XA - XB                                                AXIS      74
                      YA = YA - YB                                                AXIS      75
   75                 XC = XC - XB                                                AXIS      76
                     30 YC = YC - YB                                              AXIS      77
                      GO TO 61                                                    AXIS      78
                     60 CONTINUE                                                  AXIS      79
                      VALUE = NC / 2                                              AXIS      80
   80                 XC = X  + XB*(APB-APN) - YB*AND*(.37-APP)                   AXIS      81
                      YC = Y  + YB*(APB-APN) - XB*AND*(.37+APP)                   AXIS      82
                C                                                                 AXIS      83
                CIBM                                                              AXIS      84
                C     CALL SYMBL4 (XC,YC,0.14,BCD,CTETA,NC)                       AXIS      85
   85           CIBM                                                             AXIS      86
                C                                                                 AXIS      87
                CCDC                                                              AXIS      88
                      CALL SYMBOL(XC,YC,0.14,BCD,CTETA,NC)                        AXIS      89
                CCDC                                                              AXIS      90
   90           C                                                                AXIS      91
                     80 CONTINUE                                                  AXIS      92
                      RETURN                                                      AXIS      93
                      END                                                         AXIS      94
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	AXIS	1	92

VARIABLES	SN	TYPE	RELOCATION									
323	AND	REAL		REFS	14	20	37	39	80	81		
				DEFINED	9	10						
330	APB	REAL		REFS	80	81	DEFINED	17				
331	APN	REAL		REFS	19	80	81	DEFINED	18	19		
332	APP	REAL		REFS	80	81	DEFINED	20				
0	BCD	REAL	ARRAY F.P.	REFS	3	88	DEFINED	1				
326	BEN	REAL		REFS	62	63	DEFINED	15				
327	CEN	REAL		REFS	62	63	DEFINED	16				
344	CHAR	REAL		REFS	43	48	DEFINED	41	44			
322	COSB	REAL		REFS	12	13	15	16	19	20		

```
      SUBROUTINE AXIS (X,Y,BCD,NC,SIZE,THETA,YMIN,DY,KIND,KOSB)
C
      DIMENSION BCD(1)
C
C     MODIFIED TO PLOT LEGENDS ON EITHER SIDE OF AXIS
C     NEGATIVE SIGN CHANGES POSITION
C
      COSB = KOSB
      AND = 1.0
      IF (KIND.GT.3) AND = -1.0
      IF (KIND.GT.3) KIND = KIND - 4
      IF (COSB.EQ.1.0) CTETA = THETA
      IF (COSB.EQ.-1.0) CTETA = THETA + 180.0
      EN = -.07 * AND
      BEN = .05 * COSB
      CEN = .12 * COSB
      APB = SIZE / 2.0
      APN = NC / 2
      APN = APN * .12 * COSB
      APP = AND * COSB * .09
C
C
      IF  (DY.EQ.0.0.AND.(KIND.EQ.0.OR.KIND.EQ.2))  GO TO 80
      LL = KIND
      N = SIZE + 0.50
      IF (THETA - 0.0) 7,1,2
    1 XB = 1.0
      YB = 0.0
      GO TO 3
    2 IF (THETA - 90.0) 7,4,7
    4 XB = 0.0
      YB = 1.0
      GO TO 3
    7 TH = THETA / 57.29578
      YB = SIN (TH)
      XB = COS (TH)
    3 XA = X - 0.1 * YB * AND
      XC  = X
      YA = Y - 0.1 * XB * AND
      YC = Y
      CHAR = ABS (YMIN)
      VALUE = ABS (YMIN + DY)
      IF (CHAR - VALUE) 5,6,6
    5 CHAR = VALUE
    6 N1 = +0
      VALUE = 100.0
      I3 = 3
   14 IF (CHAR - VALUE) 15,16,16
   15 N1 = N1 + 1
      VALUE = VALUE / 10.0
      GO TO 14
   16 DO 20 I = 1,N
      CALL PLOT (XA,YA,+I3)
      CALL PLOT (XC,YC,+2)
      XC = XC + XB
      YC = YC + YB
      XA = XA + XB
```

STATEMENT LABELS

	DEF LINE	REFERENCES
177 4	108	37 70

COMMON BLOCKS

	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
CALCPX	51	0 TITLE1 (18)	18 TITLE2 (18)	36 DUB (1)
		37 FUB (1)	38 VUB (1)	39 DLB (1)
		40 FLB (1)	41 VLB (1)	42 IPLOT (1)
		43 LSD (1)	44 DSCALE (1)	45 FSCALE (1)
		46 VSCALE (1)	47 DPLEN (1)	48 FRLEN (1)
		49 VLEN (1)	50 XDT (1)	

STATISTICS

PROGRAM LENGTH	7238	467
CM LABELED COMMON LENGTH	63B	51

52000B CM USED

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

9 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	AXPL	1	108

VARIABLES	SN	TYPE		RELOCATION								
0	ACH	REAL		F.P.	REFS	32	60	93	DEFINED	1		
47	DLB	REAL		CALCPX	REFS	6	10	39	71			
0	DMPORI	REAL		F.P.	REFS	11	14	39	41	68	72	100
					DEFINED	1	10	38	71			
0	DMPZER	REAL		F.P.	REFS	15	69	106	DEFINED	1	11	41
					72							
57	DPLEN	REAL		CALCPX	REFS	6	15	16	67	69	105	106
54	DSCALE	REAL		CALCPX	REFS	6	10	11	15	38	39	41
					69	71	72	106				
0	DSTART	REAL		F.P.	REFS	15	16	DEFINED	1	12		
0	DSV	REAL		F.P.	REFS	42	DEFINED	1	40	74	107	
44	DUB	REAL		CALCPX	REFS	6	38					
50	FLB	REAL		CALCPX	REFS	6						
0	FORG	REAL		F.P.	REFS	40	DEFINED	1	39			
60	FRLEN	REAL		CALCPX	REFS	6	10	12	40			
55	FSCALE	REAL		CALCPX	REFS	6	42					
45	FUB	REAL		CALCPX	REFS	6						
52	IPLOT	INTEGER		CALCPX	REFS	6	101	103				
53	LSD	INTEGER		CALCPX	REFS	6	9					
0	RHO	REAL		F.P.	REFS	34	62	95	DEFINED	1		
0	TITLE1	REAL	ARRAY	CALCPX	REFS	4	6	29	57	90		
22	TITLE2	REAL	ARRAY	CALCPX	REFS	4	6	30	58	91		
0	VDIS	REAL		F.P.	REFS	67	74	105	DEFINED	1	43	73
51	VLB	REAL		CALCPX	REFS	6						
61	VLEN	REAL		CALCPX	REFS	6	14	43	68	73	100	101
					103							
0	VOR	REAL		F.P.	DEFINED	1	42	75				
56	VSCALE	REAL		CALCPX	REFS	6	14	100	101	103		
46	VUB	REAL		CALCPX	REFS	6						
0	XDNP	REAL		F.P.	DEFINED	1	76					
62	XDT	REAL		CALCPX	REFS	6	16	76				

EXTERNALS	TYPE	ARGS	REFERENCES								
AXIS		10	14	15	16	67	68	69	100	101	103
			105	106							
NUMBER		6	32	34	60	62	93	95			
SYMBOL		6	29	30	31	33	57	58	59	61	63
			90	91	92	94	96				

STATEMENT LABELS		DEF LINE	REFERENCES
15	1	10	9
54	2	38	9
125	3	71	9

```
                      CALL SYMBOL(.25,.0,.1,TITLE2,90.,72)                          AXPL      59
                      CALL SYMBOL(.4,.25,.1,9HMACH NO.=,90.,9)                      AXPL      60
60                    CALL NUMBER(.65,1.,.1,ACH,90.,3)                              AXPL      61
                      CALL SYMBOL(.4,3.25,.1,14HDENSITY RATIO=,90.,14)              AXPL      62
                      CALL NUMBER(.65,4.6,.1,RHO,90.,3)                             AXPL      63
                      CALL SYMBOL(.55,.25,.1,20HDAMPING VS. VELOCITY,90.,20)        AXPL      64
                CCDC                                                                AXPL      65
65              C                                                                   AXPL      66
                C     DRAW AXES                 ------------------------------    AXPL      67
                      CALL AXIS (1.0,VDIS,1H ,1,DPLEN,.0,.0,1.,3,1)                 AXPL      68
                      CALL AXIS (DMPORI,.0,1H ,1,VLEN,90.,.0,1.,7,1)                AXPL      69
                      CALL AXIS (1.,.0,9HDAMPING,G,9,DPLEN,.0,DMPZER,-DSCALE,0,-1)  AXPL      70
70                    GO TO 4                                                       AXPL      71
                    3 DMPORI    = -DLB / DSCALE                                     AXPL      72
                      DMPZER    = -DMPORI * DSCALE                                  AXPL      73
                      VDIS      =  VLEN + 0.5                                       AXPL      74
                      DSV       =  VDIS + 1.5                                       AXPL      75
75                    VOR       = 0.0                                               AXPL      76
                      XDNP      =  XDT + 1.5                                        AXPL      77
                C     WRITE TITLES              ------------------------------    AXPL      78
                C                                                                   AXPL      79
                CIBM                                                                AXPL      80
80              C     CALL SYMBL4 (.0,9.4,.1,TITLE1,.0,72)                          AXPL      81
                C     CALL SYMBL4 (.0,9.25,.1,TITLE2,.0,72)                         AXPL      82
                C     CALL SYMBL4 (.25,9.1,.1,9HMACH NO.=,.0,9)                     AXPL      83
                C     CALL NUMBER (1.,9.1,.1,ACH,.0,3)                              AXPL      84
                C     CALL SYMBL4 (3.25,9.1,.1,14HDENSITY RATIO=,.0,14)             AXPL      85
85              C     CALL NUMBER (4.6,9.1,.1,RHO,.0,3)                             AXPL      86
                C     CALL SYMBL4 (.25,8.95,.1,20HDAMPING VS. VELOCITY,.0,20)       AXPL      87
                CIBM                                                                AXPL      88
                C                                                                   AXPL      89
                CCDC                                                                AXPL      90
90                    CALL SYMBOL(.0,9.4,.1,TITLE1,.0,72)                           AXPL      91
                      CALL SYMBOL(.0,9.25,.1,TITLE2,.0,72)                          AXPL      92
                      CALL SYMBOL(.25,9.1,.1,9HMACH NO.=,.0,9)                      AXPL      93
                      CALL NUMBER(1.25,9.1,.1,ACH,.0,3)                             AXPL      94
                      CALL SYMBOL(3.25,9.1,.1,14HDENSITY RATIO=,.0,14)              AXPL      95
95                    CALL NUMBER(4.85,9.1,.1,RHO,.0,3)                             AXPL      96
                      CALL SYMBOL(.25,8.95,.1,20HDAMPING VS. VELOCITY,.0,20)        AXPL      97
                CCDC                                                                AXPL      98
                C                                                                   AXPL      99
                C     DRAW AXES                 ------------------------------    AXPL     100
100                   CALL AXIS (.0,DMPORI,1H ,1,VLEN,.0,.0,VSCALE,3,1)             AXPL     101
                      IF (IPLOT .NE. 0) CALL AXIS (.0,.0,15HVEL.(TRUE),KTS.,15,VLEN,.0,  AXPL  102
                     1.0,VSCALE,0,1)                                                AXPL     103
                      IF (IPLOT.EQ.0) CALL AXIS (.0,.0,17HVEL.(EQUIV.),KTS.,17,VLEN,.0,  AXPL  104
                     1.0,VSCALE,0,1)                                                AXPL     105
105                   CALL AXIS (VDIS,.0,1H ,1,DPLEN,90.,.0,1.,3,1)                 AXPL     106
                      CALL AXIS (.0,.0,9HDAMPING,G,9,DPLEN,90.,DMPZER,DSCALE,0,1)   AXPL     107
                      DSV       =  0.0                                              AXPL     108
                    4 RETURN                                                        AXPL     109
                      END                                                           AXPL     110
```

```
      SUBROUTINE AXPL (DMPORI,DMPZER,DSTART,FORG,DSV,VOR,VDIS,          AXPL      2
     1           XDNP,ACH,RHO)                                          AXPL      3
C                                                                       AXPL      4
      DIMENSION     TITLE1(18), TITLE2(18)                            AXPL      5
C                                                                       AXPL      6
      COMMON /CALCPX/ TITLE1,TITLE2,DUB,FUB,VUB,DLB,                    AXPL      7
     1   FLB, VLB, IPLOT, LSD, DSCALE, FSCALE, VSCALE, DPLEN,          AXPL      8
     2   FRLEN,  VLEN, XDT                                             AXPL      9
      GO TO ( 1 , 2 , 3 ) , LSD                                         AXPL     10
    1 DMPORI   =  FRLEN + 0.5 - DLB / DSCALE                            AXPL     11
      DMPZER   = -DMPORI * DSCALE                                       AXPL     12
      DSTART   =  FRLEN + 0.5                                           AXPL     13
C     DRAW AXES              ------------------------------             AXPL     14
      CALL AXIS (0.0,DMPORI,1H ,1,VLEN,0.0,0.0,VSCALE,3,1)              AXPL     15
      CALL AXIS (0.0,DSTART,9HDAMPING,G,9,DPLEN,90.0,DMPZER,DSCALE,0,1) AXPL     16
      CALL AXIS (XDT,DSTART,1H ,1,DPLEN,90.0,0.0,1.0,3,1)               AXPL     17
C     WRITE TITLES           ------------------------------             AXPL     18
C                                                                       AXPL     19
CIBM                                                                    AXPL     20
C     CALL SYMBL4(0.0,9.15,.1,TITLE1,0.0,72)                            AXPL     21
C     CALL SYMBL4(0.0,9.00,.1,TITLE2,0.0,72)                            AXPL     22
C     CALL SYMBL4(.25,8.85,.1,9HMACH NO.=,0.0,9)                        AXPL     23
C     CALL NUMBER(1.0,8.85,.1,ACH,0.0,3)                                AXPL     24
C     CALL SYMBL4(3.25,8.85,.1,14HDENSITY RATIO=,0.0,14)                AXPL     25
C     CALL NUMBER(4.6,8.85,.1,RHO,0.0,3)                                AXPL     26
CIBM                                                                    AXPL     27
C                                                                       AXPL     28
CCDC                                                                    AXPL     29
      CALL SYMBOL(0.0,9.15,.1,TITLE1,0.0,72)                            AXPL     30
      CALL SYMBOL(0.0,9.00,.1,TITLE2,0.0,72)                            AXPL     31
      CALL SYMBOL(.25,8.85,.1,9HMACH NO.=,0.0,9)                        AXPL     32
      CALL NUMBER(1.25,8.85,.1,ACH,0.0,3)                               AXPL     33
      CALL SYMBOL(3.25,8.85,.1,14HDENSITY RATIO=,0.0,14)                AXPL     34
      CALL NUMBER(4.85,8.85,.1,RHO,0.0,3)                               AXPL     35
CCDC                                                                    AXPL     36
C                                                                       AXPL     37
      GO TO 4                                                           AXPL     38
    2 DMPORI   =  1.0 + DUB / DSCALE                                    AXPL     39
      FORG     =  DMPORI - DLB / DSCALE + 2.0                           AXPL     40
      DSV      =  FORG + FRLEN                                          AXPL     41
      DMPZER   =  DMPORI * DSCALE                                       AXPL     42
      VOR      =  DSV * FSCALE                                          AXPL     43
      VDIS     =  VLEN + 0.5                                            AXPL     44
C     WRITE TITLES           ------------------------------             AXPL     45
C                                                                       AXPL     46
CIBM                                                                    AXPL     47
C     CALL SYMBL4 (.1,.0,.1,TITLE1,90.,72)                              AXPL     48
C     CALL SYMBL4 (.25,.0,.1,TITLE2,90.,72)                             AXPL     49
C     CALL SYMBL4 (.4,.25,.1,9HMACH NO.=,90.,9)                         AXPL     50
C     CALL NUMBER (.4,1.,.1,ACH,90.,3)                                  AXPL     51
C     CALL SYMBL4 (.4,3.25,.1,14HDENSITY RATIO=,90.,14)                 AXPL     52
C     CALL NUMBER (.4,4.6,.1,RHO,90.,3)                                 AXPL     53
C     CALL SYMBL4 (.55,.25,.1,20HDAMPING VS. VELOCITY,90.,20)           AXPL     54
CIBM                                                                    AXPL     55
C                                                                       AXPL     56
CCDC                                                                    AXPL     57
      CALL SYMBOL(.1,.0,.1,TITLE1,90.,72)                               AXPL     58
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      C  ******************************************************        AFOM      116
      C     DATA NAMAB  /4HPHA ,4H     ,4HQA  ,4H     /               AFOM      117
      C     DATA NAMABT /4HPHAT,4H     ,4HQAT ,4H     /               AFOM      118
      C                                                               AFOM      119
            DATA NAMPH/4HPH  ,4H     /,       NAMPHT/4HPHT ,4H     /  AFOM      120
     1     ,NAMQ/4HQ   ,4H     /,         NAMQT/4HQT  ,4H     /      AFOM      121
      C                                                               AFOM      122
            KORE=4000                                                 AFOM      123
      C  ******************************************************        AFOM      124
      C  *       THE VALUE OF 'KORE' HAS BEEN REDUCED          *      AFOM      125
      C  *       FROM 24000 IN FASTOP BECAUSE PORTIONS OF      *      AFOM      126
      C  *       CODE NOT USED IN THE CURRENT VERSION OF       *      AFOM      127
      C  *       ESP HAVE BEEN COMMENTED OUT.                  *      AFOM      128
      C  ******************************************************        AFOM      129
            KOREDP=KORE/2                                             AFOM      130
      CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS AFOM     131
            KOREDP=KORE                                               AFOM      132
      CCDC  ENDING OF PROGRAMS ASSOCIATED WITH CDC COMPUTER PROGRAMS    AFOM      133
      C                                                               AFOM      134
            LTSHR  =  LTSH                                            AFOM      135
            ICYCLE = 1                                                AFOM      136
            IF (KTSH .EQ. YES) LTSHR = LTSH-2                         AFOM      137
      C                                                               AFOM      138
      C                                                               AFOM      139
      C PRINT TITLE FOR AUTOMATED FLUTTER OPTIMIZATION MODULE         AFOM      140
      C                                                               AFOM      141
            CALL TAFOM(1)                                             AFOM      142
      C                                                               AFOM      143
      C                                                               AFOM      144
            KOUNT=LINES                                               AFOM      145
            IF(NCYC.GT.0) GO TO 2                                     AFOM      146
            READ(ITAPER,9000) SOOOR                                   AFOM      147
            READ(ITAPER,FMTA) (TSHFO(L),L=1,LTSHR)                    AFOM      148
          2 CONTINUE                                                  AFOM      149
            DO 4 L=1,LTSH                                             AFOM      150
          4 TSH(L)=TSHFO(L)                                           AFOM      151
      C                                                               AFOM      152
            CALL PROGNA(4H(AFO,4HM  ))                                AFOM      153
            CALL TITLES(2)                                            AFOM      154
            CALL MESAGE(1,4,4HAFOM)                                   AFOM      155
            CALL TIMEB(9,9HFROM AFOM)                                 AFOM      156
      C                                                               AFOM      157
            IF(NCYC.GT.0) GO TO 6                                     AFOM      158
      C                                                               AFOM      159
            NCC=10                                                    AFOM      160
            NKLUFO=LKLUFO                                             AFOM      161
            CALL CLUES(IUCD,NCC,NKLUFO,KLUFO)                         AFOM      162
            IF(KLUSE.NE.2) GO TO 6                                    AFOM      163
      C                                                               AFOM      164
            READ(IUCD,9001) VDES,EPS1,DWMAX                           AFOM      165
            READ(IUCD,9002) NBAR,NFIX                                 AFOM      166
            READ(IUCD,9001) D,DBAL,DEL,EPS2                           AFOM      167
      C                                                               AFOM      168
      C  ******************************************************        AFOM      169
      C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE       *      AFOM      170
      C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT       *      AFOM      171
      C  *       USED IN THE CURRENT VERSION OF ESP.           *      AFOM      172
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      C  ******************************************************              AFOM      173
      C     BOT=VDES                                                         AFOM      174
      C     TOP=(1.0+EPS1)*VDES                                              AFOM      175
  175 C     WRITE(IUPR,9014)                                                 AFOM      176
      C     KOUNT=KOUNT+4                                                    AFOM      177
      C     WRITE(IUPR,9003) VDES,BOT,TOP,DWMAX                              AFOM      178
      C     KOUNT=KOUNT+9                                                    AFOM      179
      C                                                                      AFOM      180
  180 C     WRITE(IUPR,9004) NBAR,NFIX                                       AFOM      181
      C     KOUNT=KOUNT+5                                                    AFOM      182
      C                                                                      AFOM      183
      C     SCUT=(1.0-D)*100.0                                               AFOM      184
      C     BCUT=(1.0-DBAL)*100.0                                            AFOM      185
  185 C     TEST=100.0*EPS2                                                  AFOM      186
      C     WRITE(IUPR,9005) SCUT,BCUT,DEL,TEST                              AFOM      187
      C     KOUNT=KOUNT+8                                                    AFOM      188
      C  ******************************************************              AFOM      189
      C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.     *             AFOM      190
  190 C  ******************************************************              AFOM      191
      C                                                                      AFOM      192
           NNN=NBAR                                                          AFOM      193
      C                                                                      AFOM      194
            6 CONTINUE                                                       AFOM      195
  195 C                                                                      AFOM      196
      C ASSIGN ADDITIONAL UNITS AND FILES.                                   AFOM      197
      C                                                                      AFOM      198
           CALL UNFIL(3)                                                     AFOM      199
      C                                                                      AFOM      200
  200      CALL PROGNA(4H(AFO,4HM  ))                                       AFOM      201
      C                                                                      AFOM      202
      C                                                                      AFOM      203
      C SELECT, FROM MODAL MATRIX PHTF, THOSE MODES WHICH WERE USED IN THE   AFOM      204
      C FLUTTER ANALYSIS. ASSEMBLE THESE MODES INTO MODAL MATRIX PHT.        AFOM      205
  205 C ALSO, SORT MODAL MASS,MODM, AND MODAL STIFFNESS,MODK, SO THAT THEY ARE AFOM      206
      C COMPATIBLE WITH MODAL MATRIX PHT.                                    AFOM      207
      C IF THIS IS A FREE-FREE ANALYSIS, SORT THE PLUG MODES.                AFOM      208
      C                                                                      AFOM      209
      C                                                                      AFOM      210
  210      CALL GEDLAB(8HAFOM  O1,IUPHTF,NAME1,IFPHTF,KROW,KCOL)            AFOM      211
           NQZ = NMODE                                                       AFOM      212
           IF (LC38.EQ.1)  NQZ = NMODE - NOMI                                AFOM      213
           CALL PUDLAB(8HAFOM  O1,IUPHT,NAMPHT,IFPHT,NQZ,KCOL)              AFOM      214
      C                                                                      AFOM      215
  215      KS=1                                                              AFOM      216
           DO 20 I=1,NMODE                                                   AFOM      217
           KF=IDMODE(I)                                                      AFOM      218
           DO 10 J=KS,KF                                                     AFOM      219
        10 CALL GETROW(IUPHTF,1,WORK,KCOL)                                   AFOM      220
  220      KS=IDMODE(I)+1                                                    AFOM      221
           IF (LC38.NE.1.OR.NOMI.EQ.0)  GO TO 14                             AFOM      222
           DO 8 K=1,NOMI                                                     AFOM      223
           IF (NIND(K).EQ.I)  GO TO 20                                       AFOM      224
         8 CONTINUE                                                          AFOM      225
  225    14 CALL PUTROW(IUPHT,2,WORK,KCOL)                                   AFOM      226
        20 CONTINUE                                                          AFOM      227
      C                                                                      AFOM      228
           CALL DCLOSE(IUPHTF)                                               AFOM      229
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                      CALL DCLOSE(IUPHT)                                                AFOM      230
230             C                                                                       AFOM      231
                C                                                                       AFOM      232
                      IPOS(IUPHT)=IFPHT                                                 AFOM      233
                      IPOS(IUMOD)=IFMOD                                                 AFOM      234
                      IPOS(IUGO1)=IFS1                                                  AFOM      235
235                   IPOS(IUGO2)=IFS2                                                  AFOM      236
                      JUNITF=IUPHT+1                                                    AFOM      237
                      CALL TRAN(KORE,WORK,WORK,IUPHT,IUMOD,IUGO1,IUGO2,JUNITF,NAMPH)    AFOM      238
                      CALL PROGNA(4H(AFO,4HM  ))                                        AFOM      239
                C                                                                       AFOM      240
240             C IF FREE-FREE, DO THE SAME ASSEMBLY FOR THE MODES IN ABSOLUTE COORD.   AFOM      241
                C                                                                       AFOM      242
                      IF(KFREE.EQ.1) GO TO 12                                           AFOM      243
                      CALL GEDLAB(8HAFOM  O7,4,NAME1,2,KROW,KCOL)                       AFOM      244
                      CALL PUDLAB(8HAFOM  O7,3,NAMPHT,2,NQZ,KCOL)                       AFOM      245
245                   KS=1                                                              AFOM      246
                      DO 21 I= 1,NMODE                                                  AFOM      247
                      KF= IDMODE(I)                                                     AFOM      248
                      DO 11 J= KS,KF                                                    AFOM      249
                   11 CALL GETROW(4,1,WORK,KCOL)                                        AFOM      250
250                   KS= IDMODE(I) + 1                                                 AFOM      251
                      IF (LC38.NE.1.OR.NOMI.EQ.0)  GO TO 15                             AFOM      252
                      DO 9 K=1,NOMI                                                     AFOM      253
                      IF (NIND(K).EQ.I)  GO TO 21                                       AFOM      254
                    9 CONTINUE                                                          AFOM      255
255                15 CALL PUTROW(3,2,WORK,KCOL)                                        AFOM      256
                   21 CONTINUE                                                          AFOM      257
                      CALL DCLOSE(4)                                                    AFOM      258
                      CALL DCLOSE(3)                                                    AFOM      259
                      IPOS(3)= 2                                                        AFOM      260
260                   IPOS(IUMOD) = 3                                                   AFOM      261
                      JUNITF=  4                                                        AFOM      262
                      CALL TRAN (KORE,WORK,WORK,3,IUMOD,IUGO1,IUGO2,JUNITF,NAMPH)       AFOM      263
                   12 CONTINUE                                                          AFOM      264
                C                                                                       AFOM      265
265             C                                                                       AFOM      266
                C                                                                       AFOM      267
                C                                                                       AFOM      268
                C READ IN UNSORTED MODAL MASS AND MODAL STIFFNESS.                      AFOM      269
                C                                                                       AFOM      270
270                   CALL GEDLAB(8HAFOM  O2,IUMODM,NAME1,IFMODM,KROW,KCOL)             AFOM      271
                      CALL GETROW(IUMODM,1,ALLM(1),KCOL)                                AFOM      272
                      CALL DCLOSE(IUMODM)                                               AFOM      273
                C                                                                       AFOM      274
                      CALL GEDLAB(8HAFOM  O3,IUMODK,NAME2,IFMODK,LROW,LCOL)             AFOM      275
275                   CALL GETROW(IUMODK,1,ALLK(1),LCOL)                                AFOM      276
                      CALL DCLOSE(IUMODK)                                               AFOM      277
                C                                                                       AFOM      278
                C SORT MODAL MASS AND STORE FULL MATRIX.                                AFOM      279
                C                                                                       AFOM      280
280                   CALL PUDLAB(8HAFOM  O2,IUMODM,NAME1,IFMODM,NQZ,NQZ)               AFOM      281
                      DO 30 I=1,NMODE                                                   AFOM      282
                      DO 25 J=1,NMODE                                                   AFOM      283
                   25 BUFFER(J)=0.0                                                     AFOM      284
                      L=IDMODE(I)                                                       AFOM      285
285                   BUFFER(I)=ALLM(L)                                                 AFOM      286
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                  IF (LC38.NE.1.OR.NOMI.EQ.0)  GO TO 29                    AFOM     287
                  DO 27 K=1,NOMI                                           AFOM     288
                  IF (NIND(K).EQ.I)  GO TO 30                              AFOM     289
               27 CONTINUE                                                 AFOM     290
290               CALL REDVEC(BUFFER,NMODE)                                AFOM     291
               29 CALL PUTROW(IUMODM,1,BUFFER,NQZ)                         AFOM     292
               30 CONTINUE                                                 AFOM     293
                  CALL DCLOSE(IUMODM)                                      AFOM     294
            C                                                              AFOM     295
295         C SORT MODAL STIFFNESS AND STORE FULL MATRIX.                  AFOM     296
            C                                                              AFOM     297
                  CALL PUDLAB(8HAFOM  03,IUMODK,NAME2,IFMODK,NQZ,NQZ)      AFOM     298
                  DO 40 I=1,NMODE                                          AFOM     299
                  DO 35 J=1,NMODE                                          AFOM     300
300               35 BUFFER(J)=0.0                                         AFOM     301
                  L=IDMODE(I)                                              AFOM     302
                  BUFFER(I)=ALLK(L)                                        AFOM     303
                  IF (LC38.NE.1.OR.NOMI.EQ.0)  GO TO 39                    AFOM     304
                  DO 37 K=1,NOMI                                           AFOM     305
305               IF (NIND(K).EQ.I)  GO TO 40                              AFOM     306
               37 CONTINUE                                                 AFOM     307
                  CALL REDVEC(BUFFER,NMODE)                                AFOM     308
               39 CALL PUTROW(IUMODK,1,BUFFER,NQZ)                         AFOM     309
               40 CONTINUE                                                 AFOM     310
310               CALL DCLOSE(IUMODK)                                      AFOM     311
            C                                                              AFOM     312
                  IF(KFREE.EQ.1) GO TO 43                                  AFOM     313
            C SORT THE PLUG MODES.                                         AFOM     314
            C                                                              AFOM     315
315               J=1                                                      AFOM     316
                  DO 42 I=1,NMODE                                          AFOM     317
                  KF=IDMODE(I)                                             AFOM     318
                  PHP(1,J)=PHP(1,KF)                                       AFOM     319
                  PHP(2,J)=PHP(2,KF)                                       AFOM     320
320               PHP(3,J)=PHP(3,KF)                                       AFOM     321
                  J=J+1                                                    AFOM     322
               42 CONTINUE                                                 AFOM     323
                  IF (LC38.NE.1.OR.NOMI.EQ.0)  GO TO 43                    AFOM     324
                  DO 46 K=1,3                                              AFOM     325
325               DO 44 J=1,NMODE                                          AFOM     326
                  PHPTMP(J) = PHP(K,J)                                     AFOM     327
               44 CONTINUE                                                 AFOM     328
                  CALL REDVEC(PHPTMP,NMODE)                                AFOM     329
                  DO 45 J=1,NMODE                                          AFOM     330
330               PHP(K,J) = PHPTMP(J)                                     AFOM     331
               45 CONTINUE                                                 AFOM     332
               46 CONTINUE                                                 AFOM     333
            C                                                              AFOM     334
               43 CONTINUE                                                 AFOM     335
335         C                                                              AFOM     336
            C  ********************************************************   AFOM     337
            C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE       *   AFOM     338
            C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT       *   AFOM     339
            C  *       USED IN THE CURRENT VERSION OF ESP.           *   AFOM     340
340         C  ********************************************************   AFOM     341
            C                                                              AFOM     342
            C     IF(KLUB.EQ.0) GO TO 85                                   AFOM     343
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      C     IF(KLUQ.EQ.0) GO TO 45                                          AFOM      344
      C                                                                     AFOM      345
345   C (KLUQ=1) COMPUTE TRANSFORMATION MATRIX QT AND ITS TRANSPOSE Q.      AFOM      346
      C           QT=PHT*B                                                  AFOM      347
      C                                                                     AFOM      348
      C     IPOS(IUPHT)=IFPHT                                               AFOM      349
      C     IPOS(IUB)=IFB                                                   AFOM      350
350   C     IPOS(IUQT)=IFQT                                                 AFOM      351
      C     IPOS(IUG01)=IFS1                                                AFOM      352
      C     IPOS(IUG02)=IFS2                                                AFOM      353
      C                                                                     AFOM      354
      C     CALL MULT(KORE,WORK,WORK,WORK,IUPHT,IUB,IUQT,IUG01,IUG02,NAMQT,0) AFOM    355
355   C     CALL PROGNA(4H(AFO,4HM   ))                                     AFOM      356
      C                                                                     AFOM      357
      C     IOQT=KLUFO(1)                                                   AFOM      358
      C     IF(IOQT.EQ.2.AND.KFREE.EQ.1) CALL PRMAT1(IUQT,IFQT,WORK,0,IUPR,7, AFOM    359
      C    1   92,92H (TRANSPOSE OF QT TRANSFORMS DISPLACEMENTS FROM MODAL COO AFOM   360
360   C    2RDINATES TO STRUCTURAL COORDINATES))                            AFOM      361
      C     IF(IOQT.EQ.2.AND.KFREE.EQ.2) CALL PRMAT1(IUQT,IFQT,WORK,0,IUPR,7, AFOM    362
      C    1 101,101H (TRANSPOSE OF QT TRANSFORMS RELATIVE DISPLACEMENTS FROM AFOM   363
      C    2MODAL COORDINATES TO STRUCTURAL COORDINATES))                   AFOM      364
      C                                                                     AFOM      365
365   C     IPOS(IUQT)=IFQT                                                 AFOM      366
      C     IPOS(IUQ)=IFQ                                                   AFOM      367
      C     IPOS(IUG01)=IFS1                                                AFOM      368
      C     IPOS(IUG02)=IFS2                                                AFOM      369
      C                                                                     AFOM      370
370   C     JUNITF=IUQT+1                                                   AFOM      371
      C     CALL TRAN(KORE,WORK,WORK,IUQT,IUQ,IUG01,IUG02,JUNITF,NAMQ)      AFOM      372
      C     CALL PROGNA(4H(AFO,4HM   ))                                     AFOM      373
      C                                                                     AFOM      374
      C     GO TO 50                                                        AFOM      375
375   C                                                                     AFOM      376
      C  45 CONTINUE                                                        AFOM      377
      C                                                                     AFOM      378
      C (KLUQ=0) TRANSPOSE MATRIX PHT TO OBTAIN MATRIX PH.                  AFOM      379
      C                                                                     AFOM      380
380   C     IPOS(IUPHT)=IFPHT                                               AFOM      381
      C     IPOS(IUPH)=IFPH                                                 AFOM      382
      C     IPOS(IUG01)=IFS1                                                AFOM      383
      C     IPOS(IUG02)=IFS2                                                AFOM      384
      C                                                                     AFOM      385
385   C     JUNITF=IUPHT+1                                                  AFOM      386
      C     CALL TRAN(KORE,WORK,WORK,IUPHT,IUPH,IUG01,IUG02,JUNITF,NAMPH)   AFOM      387
      C     CALL PROGNA(4H(AFO,4HM   ))                                     AFOM      388
      C                                                                     AFOM      389
      C                                                                     AFOM      390
390   C  50 CONTINUE                                                        AFOM      391
      C                                                                     AFOM      392
      C     IF(KFREE.EQ.1) GO TO 85                                         AFOM      393
      C                                                                     AFOM      394
      C (FREE-FREE STRUCTURE)                                               AFOM      395
395   C COMPUTE TRANSFORMATION MATRICES BETWEEN MODAL DISPLACEMENTS AND     AFOM      396
      C ABSOLUTE STRUCTURAL DISPLACEMENTS.                                  AFOM      397
      C    1. IF IRED=1, COMPUTE  QA=Q+LAMBDA(STRUCT)*PHP                   AFOM      398
      C    2. IF IRED=0, COMPUTE  PHA=PH+LAMBDA*PHP                         AFOM      399
      C                                                                     AFOM      400
```

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SUE       INE       1       74/7     OPT
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      C                                                                       AFOM     401
      C DEFINE ADDITIONAL UNITS AND FILES                                     AFOM     402
      C                                                                       AFOM     403
      C     CALL UNFIL(35)                                                    AFOM     404
      C                                                                       AFOM     405
      C FIRST, READ STRUCTURAL LAMBDA MATRIX INTO CORE. STORE IN ELAM.        AFOM     406
      C                                                                       AFOM     407
      C     CALL GEDLAB(8HAFOM  O4,IUSLTI,NAME1,IFSLTI,KROW,KCOL)             AFOM     408
      C     DO 55 I=1,KROW                                                    AFOM     409
      C     CALL GETROW(IUSLTI,1,ELAM(1,I),KCOL)                              AFOM     410
      C  55 CONTINUE                                                          AFOM     411
      C     CALL DCLOSE(IUSLTI)                                               AFOM     412
      C                                                                       AFOM     413
      C     LROW=KCOL                                                         AFOM     414
      C     LCOL=KROW                                                         AFOM     415
      C                                                                       AFOM     416
      C NOW COMPUTE QA (IRED=1),OR PHA(IRED=O). STORE RESULT ON SCRATCH SPACE. AFOM    417
      C                                                                       AFOM     418
      C     IUCOM=IUQ                                                         AFOM     419
      C     IFCOM=IFQ                                                         AFOM     420
      C     IF(IRED.EQ.O) IUCOM=IUPH                                          AFOM     421
      C     IF(IRED.EQ.O) IFCOM=IFPH                                          AFOM     422
      C                                                                       AFOM     423
      C     CALL GEDLAB(8HAFOM  O5,IUCOM,NAME1,IFCOM,KROW,KCOL)               AFOM     424
      C     II=IRED+1                                                         AFOM     425
      C     CALL PUDLAB(8HAFOM  O4,IUGO2,NAMAB(1,II),IFS2,KROW,KCOL)          AFOM     426
      C                                                                       AFOM     427
      C     DO 70 I=1,KROW                                                    AFOM     428
      C     CALL GETROW(IUCOM,1,BUFFER,KCOL)                                  AFOM     429
      C     DO 65 K=1,NMODE                                                   AFOM     430
      C     C=O.O                                                             AFOM     431
      C     DO 60 J=1,LCOL                                                    AFOM     432
      C     C= C+ELAM(I,J)*PHP(J,K)                                           AFOM     433
      C  60 CONTINUE                                                          AFOM     434
      C     BUFFER(K)=BUFFER(K)+C                                             AFOM     435
      C  65 CONTINUE                                                          AFOM     436
      C     CALL PUTROW(IUGO2,1,BUFFER,NMODE)                                 AFOM     437
      C  70 CONTINUE                                                          AFOM     438
      C                                                                       AFOM     439
      C     CALL DCLOSE(IUCOM)                                                AFOM     440
      C     CALL DCLOSE(IUGO2)                                                AFOM     441
      C                                                                       AFOM     442
      C (IRED)=1,TRANSFER QA TO PERMANENT FILE (FOLLOWING Q)                  AFOM     443
      C (IRED)=O,TRANSFER PHA TO PERMANENT FILE (FOLLOWING PH)                AFOM     444
      C                                                                       AFOM     445
      C     IUCOM=IUQA                                                        AFOM     446
      C     IFCOM=IFQA                                                        AFOM     447
      C     IF(IRED.EQ.O) IUCOM=IUPHA                                         AFOM     448
      C     IF(IRED.EQ.O) IFCOM=IFPHA                                         AFOM     449
      C                                                                       AFOM     450
      C     CALL GEDLAB(8HAFOM  O6,IUGO2,NAME1,IFS2,KROW,KCOL)                AFOM     451
      C     CALL PUDLAB(8HAFOM  O5,IUCOM,NAME1,IFCOM,KROW,KCOL)               AFOM     452
      C     DO 75 I=1,KROW                                                    AFOM     453
      C     CALL GETROW(IUGO2,1,BUFFER,KCOL)                                  AFOM     454
      C     CALL PUTROW(IUCOM,1,BUFFER,KCOL)                                  AFOM     455
      C  75 CONTINUE                                                          AFOM     456
      C     CALL DCLOSE(IUGO2)                                                AFOM     457
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      C     CALL DCLOSE(IUCOM)                                                AFOM     458
      C                                                                       AFOM     459
      C IRED=1, TRANSPOSE QA TO GET QAT                                       AFOM     460
460   C IRED=0, TRANSPOSE PHA TO GET PHAT                                     AFOM     461
      C                                                                       AFOM     462
      C     IUCOM=IUQA                                                        AFOM     463
      C     IFCOM=IFQA                                                        AFOM     464
      C     IUCOMT=IUQAT                                                      AFOM     465
465   C     IFCOMT=IFQAT                                                      AFOM     466
      C     IF(IRED.EQ.1) GO TO 80                                            AFOM     467
      C     IUCOM=IUPHA                                                       AFOM     468
      C     IFCOM=IFPHA                                                       AFOM     469
      C     IUCOMT=IUPHAT                                                     AFOM     470
470   C     IFCOMT=IFPHAT                                                     AFOM     471
      C  80 CONTINUE                                                          AFOM     472
      C                                                                       AFOM     473
      C     IPOS(IUCOM)=IFCOM                                                 AFOM     474
      C     IPOS(IUCOMT)=IFCOMT                                               AFOM     475
475   C     IPOS(IUGO1)=IFS1                                                  AFOM     476
      C     IPOS(IUGO2)=IFS2                                                  AFOM     477
      C                                                                       AFOM     478
      C     JU=IUCOMT+1                                                       AFOM     479
      C     CALL TRAN(KORE,WORK,WORK,IUCOM,IUCOMT,IUGO1,IUGO2,JU,NAMABT(1,II)) AFOM     480
480   C     CALL PROGNA (4H(AFO, 4HM  ))                                      AFOM     481
      C     IF(IRED.EQ.1.AND.IOQT.EQ.2) CALL PRMAT1(IUQAT,IFQAT,WORK,0,IUPR,7, AFOM     482
      C    1 102,102H (TRANSPOSE OF QAT TRANSFORMS ABSOLUTE DISPLACEMENTS FROM AFOM     483
      C    2 MODAL COORDINATES TO STRUCTURAL COORDINATES))                    AFOM     484
      C                                                                       AFOM     485
485   C  85 CONTINUE                                                          AFOM     486
      C                                                                       AFOM     487
      C  ********************************************************           AFOM     488
      C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.       *           AFOM     489
      C  ********************************************************           AFOM     490
490   C                                                                       AFOM     491
           IF(IFIN.EQ.1) GO TO 150                                            AFOM     492
      C                                                                       AFOM     493
      C CHECK FLUTTER SPEED TO SEE IF IT FALLS IN THE FLUTTER BAND.           AFOM     494
      C IF SO, CHECK TO SEE IF DESIGN HAS SATISFIED CONVERGENCE CRITERIA.     AFOM     495
495   C                                                                       AFOM     496
           LEFT=LINES-KOUNT                                                   AFOM     497
           IF(LEFT.LT.4) KOUNT=LINES                                          AFOM     498
           CALL TITLES(2)                                                     AFOM     499
           WRITE(IUPR,9006) VF                                                AFOM     500
500        KOUNT=KOUNT+4                                                      AFOM     501
      C                                                                       AFOM     502
           IF(VF.LT.VDES) GO TO 100                                           AFOM     503
      C                                                                       AFOM     504
           IF(NPASS.NE.0.OR.NCYC.NE.0) GO TO 95                               AFOM     505
505   C                                                                       AFOM     506
      C INITIAL FLUTTER SPEED IS LARGER THAN DESIRED SPEED- EXIT PROGRAM.     AFOM     507
      C                                                                       AFOM     508
           KOUNT=LINES                                                        AFOM     509
           CALL TITLES(2)                                                     AFOM     510
510        WRITE(IUPR,9007)                                                   AFOM     511
      C                                                                       AFOM     512
           KWIT=1                                                             AFOM     513
           GO TO 9999                                                         AFOM     514
```

```
                C                                                               AFOM      515
515              95 VUP=VDES*(1.0+EPS1)                                         AFOM      516
                    IF(VF.GT.VUP) GO TO 100                                     AFOM      517
                C                                                               AFOM      518
                C THE CURRENT FLUTTER SPEED IS IN THE FLUTTER BAND.             AFOM      519
                C                                                               AFOM      520
520                 IBAND=IBAND+1                                               AFOM      521
                    LEFT=LINES-KOUNT                                            AFOM      522
                    IF(LEFT.LT.5) KOUNT=LINES                                   AFOM      523
                    CALL TITLES(2)                                              AFOM      524
                    WRITE(IUPR,9008) IBAND                                      AFOM      525
525                 KOUNT=KOUNT+5                                               AFOM      526
                    IF(IBAND.LT.2) GO TO 150                                    AFOM      527
                    LEFT=LINES-KOUNT                                            AFOM      528
                    IF(LEFT.LT.3) KOUNT=LINES                                   AFOM      529
                    CALL TITLES(2)                                              AFOM      530
530                 WRITE(IUPR,9009) DW                                         AFOM      531
                    KOUNT=KOUNT+3                                               AFOM      532
                    DWA=ABS(DW)                                                 AFOM      533
                    IF(DWA.GE.DWMAX) GO TO 150                                  AFOM      534
                C                                                               AFOM      535
535             C THE DESIGN SATISFIES THE CONVERGENCE CRITERIA.                 AFOM      536
                C                                                               AFOM      537
                    LEFT=LINES-KOUNT                                            AFOM      538
                    IF(LEFT.LT.4) KOUNT=LINES                                   AFOM      539
                    CALL TITLES(2)                                              AFOM      540
540                 WRITE(IUPR,9010)                                            AFOM      541
                    KOUNT=KOUNT+4                                               AFOM      542
                C                                                               AFOM      543
                    IFIN=IFIN+1                                                 AFOM      544
                    GO TO 150                                                   AFOM      545
545             C                                                               AFOM      546
                100 CONTINUE                                                    AFOM      547
                C                                                               AFOM      548
                C THE CURRENT FLUTTER SPEED IS NOT IN THE FLUTTER BAND.         AFOM      549
                C                                                               AFOM      550
550             C  ***********************************************************  AFOM      551
                C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE           *  AFOM      552
                C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT           *  AFOM      553
                C  *       USED IN THE CURRENT VERSION OF ESP.               *  AFOM      554
                C  ***********************************************************  AFOM      555
555             C     LEFT=LINES-KOUNT                                          AFOM      556
                C     IF(LEFT.LT.3) KOUNT=LINES                                 AFOM      557
                C     CALL TITLES(2)                                            AFOM      558
                C     WRITE(IUPR,9011)                                          AFOM      559
                C     KOUNT=KOUNT+3                                             AFOM      560
560             C  ***********************************************************  AFOM      561
                C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.          *  AFOM      562
                C  ***********************************************************  AFOM      563
                C                                                               AFOM      564
                    IBAND=0                                                     AFOM      565
565             C                                                               AFOM      566
                150 CONTINUE                                                    AFOM      567
                C                                                               AFOM      568
                C                                                               AFOM      569
                C DETERMINE THE FLUTTER VELOCITY DERIVATIVES.                   AFOM      570
570             C                                                               AFOM      571
```

```
      C FIRST, SET SCRATCH FILE ON IUIN1.                                    AFOM      572
      C                                                                      AFOM      573
            CALL UNFIL(4)                                                    AFOM      574
      C                                                                      AFOM      575
575         CALL PROGNA(4H(AFO,4HM   ))                                      AFOM      576
      C                                                                      AFOM      577
            NROW=2*KFREE                                                     AFOM      578
            CALL DRVTV(WORK,BUFFER,NROW)                                     AFOM      579
      C                                                                      AFOM      580
580         CALL PROGNA(4H(AFO,4HM   ))                                      AFOM      581
            CALL STRDES                                                      AFOM      582
            CALL PROGNA(4H(AFO,4HM   ))                                      AFOM      583
            CALL UNFIL(6)                                                    AFOM      584
            IF(ICYCLE.LT.0) IFIN = 5                                         AFOM      585
585   C                                                                      AFOM      586
            IF(IFIN.NE.1) GO TO 220                                          AFOM      587
      C                                                                      AFOM      588
      C (IFIN=1)- EXIT THE PROGRAM.                                          AFOM      589
      C                                                                      AFOM      590
590         KWIT=1                                                           AFOM      591
            GO TO 9999                                                       AFOM      592
      C                                                                      AFOM      593
        220 CONTINUE                                                         AFOM      594
      C                                                                      AFOM      595
595         IF(IFIN.LE.2) GO TO 250                                          AFOM      596
      C                                                                      AFOM      597
      C (IFIN GREATER THAN 2)- PREPARE OUTPUT TAPES AND EXIT THE PROGRAM.    AFOM      598
      C                                                                      AFOM      599
      C  ******************************************************              AFOM      600
600   C  *       THE FOLLOWING LINE OF FASTOP CODE HAS        *              AFOM      601
      C  *       BEEN COMMENTED OUT BECAUSE IT IS NOT         *              AFOM      602
      C  *       USED IN THE CURRENT VERSION OF ESP.          *              AFOM      603
      C  ******************************************************              AFOM      604
      C     CALL TAPOUT(WORK,BUFFER,BUFFER)                                  AFOM      605
605   C                                                                      AFOM      606
            CALL PROGNA(4H(AFO,4HM   ))                                      AFOM      607
      C                                                                      AFOM      608
            KWIT=1                                                           AFOM      609
            GO TO 9999                                                       AFOM      610
610   C                                                                      AFOM      611
        250 CONTINUE                                                         AFOM      612
      C                                                                      AFOM      613
      C                                                                      AFOM      614
      C CALL THE FLUTTER RESIZING PROGRAM.                                   AFOM      615
615   C                                                                      AFOM      616
            KVAR=NVAR                                                        AFOM      617
      C                                                                      AFOM      618
      C  ******************************************************              AFOM      619
      C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE      *              AFOM      620
620   C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT      *              AFOM      621
      C  *       USED IN THE CURRENT VERSION OF ESP.          *              AFOM      622
      C  ******************************************************              AFOM      623
      C                                                                      AFOM      624
      C     IF(KLUB.EQ.0) GO TO 280                                          AFOM      625
625   C     CALL FLTDES(WORK,WORK,KVAR)                                      AFOM      626
      C                                                                      AFOM      627
      C     CALL PROGNA(4H(AFO,4HM   ))                                      AFOM      628
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      C                                                                 AFOM      629
      C 280 CONTINUE                                                    AFOM      630
630   C                                                                 AFOM      631
      C  ******************************************************         AFOM      632
      C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.     *         AFOM      633
      C  ******************************************************         AFOM      634
      C                                                                 AFOM      635
635         NCYC=NCYC+1                                                 AFOM      636
            IF(NCYC.EQ.NFIX) IFIN=IFIN+2                                AFOM      637
      C                                                                 AFOM      638
      C THE STRUCTURE HAS NOW BEEN RESIZED FOR FLUTTER. COMPUTE THE     AFOM      639
      C INCREMENTAL MODAL MASS, INCM, AND INCREMENTAL MODAL STIFFNESS,INCK,  AFOM  640
640   C ASSOCIATED WITH THIS LATEST RESIZING.                           AFOM      641
      C                                                                 AFOM      642
      C  ******************************************************         AFOM      643
      C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE      *         AFOM      644
      C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT      *         AFOM      645
645   C  *       USED IN THE CURRENT VERSION OF ESP.          *         AFOM      646
      C  ******************************************************         AFOM      647
      C                                                                 AFOM      648
      C     KMODE=NMODE                                                 AFOM      649
      C     CALL INCMK(WORK,KORE,KOREDP,BUFFER,KMODE)                   AFOM      650
650   C                                                                 AFOM      651
      C     CALL PROGNA (4H(AFO,4HM   ))                                AFOM      652
      C                                                                 AFOM      653
      C UPDATE THE MODAL MASS AND MODAL STIFFNESS.                      AFOM      654
      C                                                                 AFOM      655
655   C     CALL NEWMK(WORK)                                            AFOM      656
      C                                                                 AFOM      657
      C     CALL PROGNA(4H(AFO,4HM   ))                                 AFOM      658
      C                                                                 AFOM      659
      C  ******************************************************         AFOM      660
660   C  *       END OF CODE THA1 HAS BEEN COMMENTED OUT.     *         AFOM      661
      C  ******************************************************         AFOM      662
      C                                                                 AFOM      663
            KWIT=0                                                      AFOM      664
      C                                                                 AFOM      665
665   C                                                                 AFOM      666
       9999 CONTINUE                                                    AFOM      667
      C                                                                 AFOM      668
      C                                                                 AFOM      669
            CALL TIMEB (39, 39HFROM AFOM - END OF FLUTTER OPTIMIZATION) AFOM      670
670         CALL MESAGE(2,4,4HAFOM)                                     AFOM      671
      C                                                                 AFOM      672
       9000 FORMAT(18A4)                                                AFOM      673
       9001 FORMAT(4F10.3)                                              AFOM      674
       9002 FORMAT(4I5)                                                 AFOM      675
675    9003 FORMAT(//,10X,  24HREQUIRED FLUTTER SPEED =,F12.4,6H KNOTS,  AFOM      676
           1       //,10X,  26HFLUTTER BAND EXTENDS FROM ,F12.4,7H KNOTS ,  AFOM  677
           2                3HTO ,F12.4,6H KNOTS,                       AFOM      678
           3       //,10X,  46HCONVERGENCE CRITERION - TWO SUCCESSIVE DESIGNS,  AFOM  679
           4                43H WITH SPEEDS IN THE FLUTTER BAND AND WHICH ,  AFOM  680
680        5        /,10X,30HDIFFER IN WEIGHT BY LESS THAN ,F12.4,      AFOM      681
           6                 8H POUNDS.,/)                              AFOM      682
       9004 FORMAT(//,10X,  33HTHE PROGRAM WILL ATTEMPT TO TAKE ,I3,    AFOM      683
           1                46H APROXIMATELY EQUAL STEPS TO REACH THE CENTER ,  AFOM  684
           2                34HOF THE FLUTTER BAND AND WILL THEN ,      AFOM      685
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685                3        /,10X,  43HITERATE UNTIL THE CONVERGENCE CRITERION IS ,     AFOM      686
                   4                 42HSATISFIED. HOWEVER, THE MAXIMUM NUMBER OF ,     AFOM      687
                   5                 13HREDESIGNS IS ,I3,/)                             AFOM      688
                9005 FORMAT(//,10X,  41HMAXIMUM CUT FOR REDESIGN OF A STRUCTURAL ,      AFOM      689
                   1                 10HVARIABLE =,F10.2, 8H PERCENT,                   AFOM      690
690                2        /,10X,  43HMAXIMUM CUT FOR REDESIGN OF A MASS BALANCE ,    AFOM      691
                   3                 10HVARIABLE =,F8.2,  8H PERCENT,                   AFOM      692
                   4       //,10X,  46HLINEARLY PREDICTED FLUTTER SPEED STEP SIZE IS , AFOM      693
                   5                 27HACCEPTABLE IF IT IS WITHIN ,F10.3,              AFOM      694
                   6                 10H KNOTS OR ,F10.3, 9H PERCENT ,                  AFOM      695
695                7        /,10X   25HOF THE DESIRED STEP SIZE.,/)                     AFOM      696
                9006 FORMAT(//,10X,  23HCURRENT FLUTTER SPEED =,F15.4,   6H KNOTS,/)   AFOM      697
                9007 FORMAT(//,10X,  45HTHE INITIAL FLUTTER SPEED IS LARGER THAN THE ,  AFOM      698
                   1                 15HREQUIRED SPEED.,                                AFOM      699
                   2        /,10X,  12HEXIT PROGRAM,/)                                 AFOM      700
700             9008 FORMAT(/,10X,   41HTHIS FLUTTER SPEED IS IN THE FLUTTER BAND,      AFOM      701
                   1       //,10X,   7HIBAND =,I2,/)                                   AFOM      702
                9009 FORMAT(/,10X,   40HWEIGHT CHANGE IN LAST FLUTTER REDESIGN =,      AFOM      703
                   1       1PE15.5,/)                                                 AFOM      704
                9010 FORMAT(/,10X,   34HCONVERGENCE CRITERION IS SATISFIED,            AFOM      705
705                1        /,10X,   21HEXIT DECISION IS MADE,/)                       AFOM      706
                9011 FORMAT(/,10X,   40HFLUTTER SPEED IS NOT IN THE FLUTTER BAND,/)    AFOM      707
                9014 FORMAT(//,10X,30(1H*),    33H FLUTTER OPTIMIZATION PARAMETERS ,   AFOM      708
                   1                30(1H*),/)                                         AFOM      709
                C                                                                      AFOM      710
710                   RETURN                                                          AFOM      711
                      END                                                             AFOM      712
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	AFOM	24	710

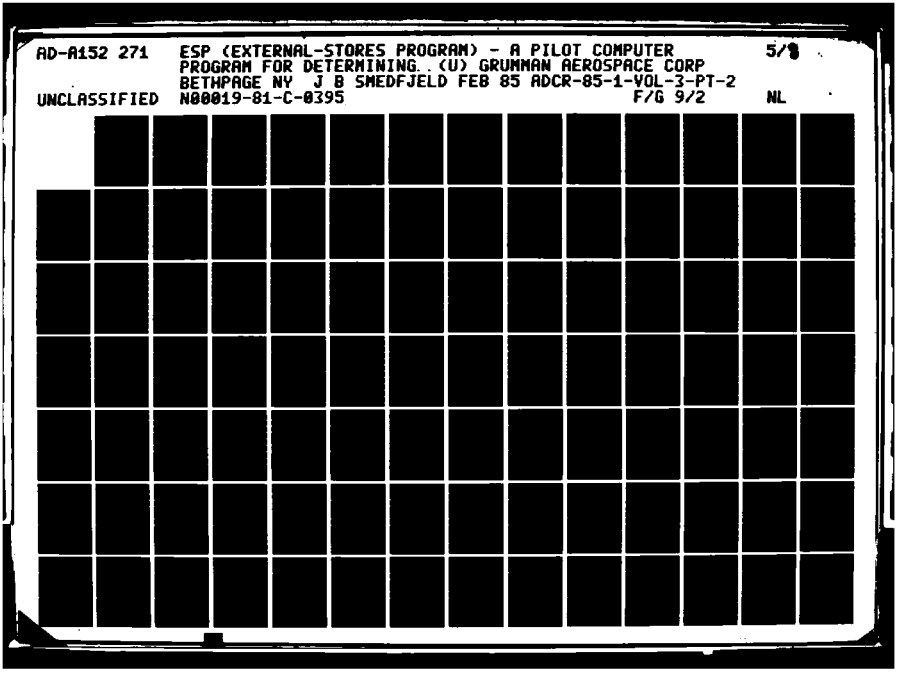
VARIABLES

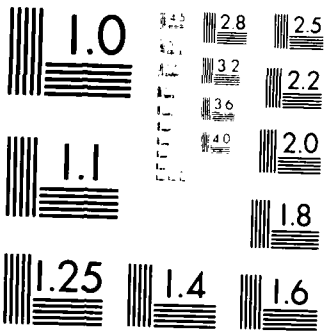
		SN	TYPE		RELOCATION								
11654	ALLK		REAL	ARRAY		REFS	41	275	302				
11604	ALLM		REAL	ARRAY		REFS	41	271	285				
11246	BUFFER		REAL	ARRAY		REFS	38	290	291	307	308	578	
						DEFINED	283	285	300	302			
242	CSCL		REAL		FLUT	REFS	89						
15	D		REAL		KLUES	REFS	63	DEFINED	166				
27	DBAL		REAL		KLUES	REFS	63	DEFINED	166				
16	DEL		REAL		KLUES	REFS	63	DEFINED	166				
5	DW		REAL		WAYTS	REFS	95	530	532				
1403	DWA		REAL			REFS	533	DEFINED	532				
12	DWMAX		REAL		KLUES	REFS	63	533	DEFINED	164			
0	EMP		REAL	ARRAY	PLUG	REFS	66						
11	EPS1		REAL		KLUES	REFS	63	515	DEFINED	164			
17	EPS2		REAL		KLUES	REFS	63	DEFINED	166				
0	FMTA		REAL	ARRAY	CFMTA	REFS	30	61	147				
1372	I		INTEGER			REFS	217	220	223	247	250	253	284
							285	288	301	302	305	317	
						DEFINED	216	246	281	298	316		
22	IBAND		INTEGER		KLUES	REFS	63	520	524	526	DEFINED	520	564

VARIABLES	SN	TYPE		RELOCATION							
0	ICYCLE	INTEGER		STRCLU	REFS	105	584	DEFINED	135		
3	IDENS	INTEGER		COLS	REFS	90					
244	IDMODE	INTEGER	ARRAY	FLUT	REFS	89	217	220	247	250	284	301
					317							
7	IDNOPT	INTEGER		KLUES	REFS	63					
76	IDSTR	INTEGER	ARRAY	STORES	REFS	100					
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	100					
21	IFA	INTEGER		PLACES	REFS	72					
67	IFADD	INTEGER		PLACES	REFS	72					
41	IFADDI	INTEGER		PLACES	REFS	72					
33	IFB	INTEGER		PLACES	REFS	72					
71	IFBAL	INTEGER		PLACES	REFS	72					
43	IFBALI	INTEGER		PLACES	REFS	72					
117	IFBR	INTEGER		PLACES	REFS	72					
53	IFBT	INTEGER		PLACES	REFS	72					
73	IFDESF	INTEGER		PLACES	REFS	72					
45	IFDESI	INTEGER		PLACES	REFS	72					
55	IFDESN	INTEGER		PLACES	REFS	72					
35	IFDESO	INTEGER		PLACES	REFS	72					
21	IFDLT	INTEGER		PLAYFF	REFS	68					
3	IFDLTI	INTEGER		PLAYFF	REFS	68					
77	IFDUM1	INTEGER		PLACES	REFS	72					
101	IFDUM2	INTEGER		PLACES	REFS	72					
103	IFDUM3	INTEGER		PLACES	REFS	72					
23	IFIN	INTEGER		KLUES	REFS	63	491	543	586	595	636	
					DEFINED	543	584	636				
141	IFINCK	INTEGER		PLACES	REFS	72					
137	IFINCM	INTEGER		PLACES	REFS	72					
31	IFKS	INTEGER		PLACES	REFS	72					
105	IFL	INTEGER		PLACES	REFS	72					
115	IFLR	INTEGER		PLACES	REFS	72					
57	IFMD	INTEGER		PLACES	REFS	72					
65	IFMDB	INTEGER		PLACES	REFS	72					
37	IFMDBI	INTEGER		PLACES	REFS	72					
1	IFMDFF	INTEGER		PLAYFF	REFS	68					
61	IFMEMF	INTEGER		PLACES	REFS	72					
25	IFMEMN	INTEGER		PLACES	REFS	72					
51	IFMEMO	INTEGER		PLACES	REFS	72					
5	IFMOD	INTEGER		LOCSTR	REFS	106	233				
125	IFMODK	INTEGER		PLACES	REFS	72	274	297			
123	IFMODM	INTEGER		PLACES	REFS	72	270	280			
15	IFMPL	INTEGER		PLAYFF	REFS	68					
7	IFMPLI	INTEGER		PLAYFF	REFS	68					
3	IFMREF	INTEGER		LOCSTR	REFS	106					
13	IFPATF	INTEGER		PLAYFF	REFS	68					
135	IFPH	INTEGER		PLACES	REFS	72					
27	IFPHA	INTEGER		PLAYFF	REFS	68					
31	IFPHAT	INTEGER		PLAYFF	REFS	68					
127	IFPHT	INTEGER		PLACES	REFS	72	213	232			
121	IFPHTF	INTEGER		PLACES	REFS	72	210				
133	IFQ	INTEGER		PLACES	REFS	72					
23	IFQA	INTEGER		PLAYFF	REFS	68					
25	IFQAT	INTEGER		PLAYFF	REFS	68					
131	IFQT	INTEGER		PLACES	REFS	72					
11	IFSCR	INTEGER		PLACES	REFS	72					
17	IFSLT	INTEGER		PLAYFF	REFS	68					
5	IFSLTI	INTEGER		PLAYFF	REFS	68					

VARIABLES	SN	TYPE		RELOCATION								
27	IFSTFN	INTEGER		PLACES	REFS	72						
63	IFSTFO	INTEGER		PLACES	REFS	72						
1	IFSTRI	INTEGER		LOCSTR	REFS	106						
12	IFS1	INTEGER		PLACES	REFS	72	234					
13	IFS2	INTEGER		PLACES	REFS	72	235					
14	IFS3	INTEGER		PLACES	REFS	72						
15	IFS4	INTEGER		PLACES	REFS	72						
11	IFTPGT	INTEGER		PLAYFF	REFS	68						
75	IFWT	INTEGER		PLACES	REFS	72						
47	IFWTI	INTEGER		PLACES	REFS	72						
23	IFY	INTEGER		PLACES	REFS	72						
107	IFYT	INTEGER		PLACES	REFS	72						
111	IFZ	INTEGER		PLACES	REFS	72						
113	IFZR	INTEGER		PLACES	REFS	72						
10	IINITT	INTEGER		COLS	REFS	90						
2	IMAXT	INTEGER		COLS	REFS	90						
1	IMINT	INTEGER		COLS	REFS	90						
7	IMINTO	INTEGER		COLS	REFS	90						
4	IOLDT	INTEGER		COLS	REFS	90						
5	IOLDW	INTEGER		COLS	REFS	90						
0	IPOS	INTEGER	ARRAY	FILE	REFS	39	94	DEFINED	232	233	234	235
						259	260					
2	IRED	INTEGER		KLUES	REFS	63						
6	ISRAT	INTEGER		COLS	REFS	90						
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	100						
1	ISTEP	INTEGER		STRCLU	REFS	105						
0	IT	INTEGER		COLS	REFS	90						
2	ITAPEP	INTEGER		COMRWP	REFS	62						
0	ITAPER	INTEGER		COMRWP	REFS	62	I/O REFS	146	147			
1	ITAPEW	INTEGER		COMRWP	REFS	62						
20	IUA	INTEGER		PLACES	REFS	72						
66	IUADD	INTEGER		PLACES	REFS	72						
40	IUADDI	INTEGER		PLACES	REFS	72						
32	IUB	INTEGER		PLACES	REFS	72						
70	IUBAL	INTEGER		PLACES	REFS	72						
42	IUBALI	INTEGER		PLACES	REFS	72						
116	IUBR	INTEGER		PLACES	REFS	72						
52	IUBT	INTEGER		PLACES	REFS	72						
16	IUCD	INTEGER		PLACES	REFS	72	161	I/O REFS	164	165	166	
72	IUDESF	INTEGER		PLACES	REFS	72						
44	IUDESI	INTEGER		PLACES	REFS	72						
54	IUDESN	INTEGER		PLACES	REFS	72						
34	IUDESO	INTEGER		PLACES	REFS	72						
20	IUDLT	INTEGER		PLAYFF	REFS	68						
2	IUDLTI	INTEGER		PLAYFF	REFS	68						
76	IUDUM1	INTEGER		PLACES	REFS	72						
100	IUDUM2	INTEGER		PLACES	REFS	72						
102	IUDUM3	INTEGER		PLACES	REFS	72						
4	IUGO1	INTEGER		PLACES	REFS	72	234	237	262			
5	IUGO2	INTEGER		PLACES	REFS	72	235	237	262			
6	IUGO3	INTEGER		PLACES	REFS	72						
7	IUGO4	INTEGER		PLACES	REFS	72						
140	IUINCK	INTEGER		PLACES	REFS	72						
136	IUINCM	INTEGER		PLACES	REFS	72						
0	IUIN1	INTEGER		PLACES	REFS	72						
1	IUIN2	INTEGER		PLACES	REFS	72						
30	IUKS	INTEGER		PLACES	REFS	72						

VARIABLES	SN	TYPE	RELOCATION								
104	IUL	INTEGER	PLACES	REFS	72						
114	IULR	INTEGER	PLACES	REFS	72						
56	IUMD	INTEGER	PLACES	REFS	72						
64	IUMDB	INTEGER	PLACES	REFS	72						
36	IUMDBI	INTEGER	PLACES	REFS	72						
0	IUMDFF	INTEGER	PLAYFF	REFS	68						
60	IUMEMF	INTEGER	PLACES	REFS	72						
24	IUMEMN	INTEGER	PLACES	REFS	72						
50	IUMEMO	INTEGER	PLACES	REFS	72						
4	IUMOD	INTEGER	LOCSTR	REFS	106	233	237	260	262		
124	IUMODK	INTEGER	PLACES	REFS	72	274	275	276	297	308	310
122	IUMODM	INTEGER	PLACES	REFS	72	270	271	272	280	291	293
14	IUMPI	INTEGER	PLAYFF	REFS	68						
6	IUMPLI	INTEGER	PLAYFF	REFS	68						
2	IUMREF	INTEGER	LOCSTR	REFS	106						
2	IUOUT1	INTEGER	PLACES	REFS	72						
3	IUOUT2	INTEGER	PLACES	REFS	72						
12	IUPATF	INTEGER	PLAYFF	REFS	68						
134	IUPH	INTEGER	PLACES	REFS	72						
26	IUPHA	INTEGER	PLAYFF	REFS	68						
30	IUPHAT	INTEGER	PLAYFF	REFS	68						
126	IUPHT	INTEGER	PLACES	REFS	72	213	225	229	232	236	237
120	IUPHTF	INTEGER	PLACES	REFS	72	210	219	228			
17	IUPR	INTEGER	PLACES	REFS	72	I/O REFS	499	510	524	530	540
132	IUQ	INTEGER	PLACES	REFS	72						
22	IUQA	INTEGER	PLAYFF	REFS	68						
24	IUQAT	INTEGER	PLAYFF	REFS	68						
130	IUQT	INTEGER	PLACES	REFS	72						
10	IUSCR	INTEGER	PLACES	REFS	72						
16	IUSLT	INTEGER	PLAYFF	REFS	68						
4	IUSLTI	INTEGER	PLAYFF	REFS	68						
26	IUSTFN	INTEGER	PLACES	REFS	72						
62	IUSTFO	INTEGER	PLACES	REFS	72						
0	IUSTRI	INTEGER	LOCSTR	REFS	106						
10	IUTPGT	INTEGER	PLAYFF	REFS	68						
74	IUWT	INTEGER	PLACES	REFS	72						
46	IUWTI	INTEGER	PLACES	REFS	72						
22	IUY	INTEGER	PLACES	REFS	72						
106	IUYT	INTEGER	PLACES	REFS	72						
110	IUZ	INTEGER	PLACES	REFS	72						
112	IUZR	INTEGER	PLACES	REFS	72						
11	IWPUT	INTEGER	COLS	REFS	90						
1374	J	INTEGER		REFS	283	300	318	319	320	321	2*326
				2*330	DEFINED	218	248	282	299	315	321
				325	329						
21	JDRV	INTEGER	COLS	REFS	90						
22	JDRVO	INTEGER	COLS	REFS	90						
14	JINITT	INTEGER	COLS	REFS	90						
16	JMAXT	INTEGER	COLS	REFS	90						
15	JMINT	INTEGER	COLS	REFS	90						
20	JNEWT	INTEGER	COLS	REFS	90						
17	JOLDT	INTEGER	COLS	REFS	90						
23	JSPR1	INTEGER	COLS	REFS	90						
24	JSPR2	INTEGER	COLS	REFS	90						
25	JSPR3	INTEGER	COLS	REFS	90						
1376	JUNITF	INTEGER		REFS	237	262	DEFINED	236	261		
13	JWPUT	INTEGER	COLS	REFS	90						


AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING.. (U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2
UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

VARIABLES		SN	TYPE		RELOCATION							
1375	K		INTEGER			REFS	223	253	288	305	326	330	
						DEFINED	222	252	287	304	324		
7	KBPAGE		INTEGER		CLIST	REFS	97						
1367	KCOL		INTEGER			REFS	210	213	219	225	243	244	249
							255	270	271				
1	KCONST		INTEGER		STORES	REFS	100						
1373	KF		INTEGER			REFS	218	248	318	319	320		
						DEFINED	217	247	317				
0	KFREE		INTEGER		KLUFF	REFS	67	242	312	577			
4	KLABEL		INTEGER		CLIST	REFS	97						
24	KLUB		INTEGER		KLUES	REFS	63						
4	KLUBAL		INTEGER		KLUES	REFS	63						
1	KLUFO		INTEGER	ARRAY	CLUFO	REFS	99	161					
3	KLUMD		INTEGER		KLUES	REFS	63						
1	KLUNAL		INTEGER		KLUES	REFS	63						
25	KLUQ		INTEGER		KLUES	REFS	63						
0	KLUSE		INTEGER		KLUES	REFS	63	162					
0	KORE		INTEGER		CORE	REFS	96	129	131	237	262		
						DEFINED	122						
1	KOREDP		INTEGER		CORE	REFS	96	DEFINED	129	131			
0	KOUNT		INTEGER		CLIST	REFS	97	496	500	521	525	527	531
							537	541	DEFINED	144	497	500	508	522
							525	528	531	538	541		
11	KOUNTH		INTEGER		CLIST	REFS	97						
12	KOUNTI		INTEGER		CLIST	REFS	97						
1	KPAGE		INTEGER		CLIST	REFS	97						
1366	KROW		INTEGER			REFS	210	243	270				
1371	KS		INTEGER			REFS	218	248	DEFINED	215	220	245	250
5	KTPAGE		INTEGER		CLIST	REFS	97						
0	KTSH		INTEGER		CTSH	REFS	58	136					
1405	KVAR	*	INTEGER			DEFINED	616						
0	KWIT		INTEGER		F.P.	DEFINED	24	512	590	608	663		
1363	L		INTEGER			REFS	147	2*150	285	302	DEFINED	147	149
							284	301					
1400	LCOL		INTEGER			REFS	274	275					
2	LC38		INTEGER		QELIM	REFS	109	212	221	251	286	303	323
1401	LEFT		INTEGER			REFS	497	522	528	538	DEFINED	496	521
							527	537					
2	LINES		INTEGER		CLIST	REFS	97	144	496	497	508	521	522
							527	528	537	538			
10	LINESG		INTEGER		CLIST	REFS	97						
3	LINEST		INTEGER		CLIST	REFS	97						
0	LKLUFO		INTEGER		CLUFO	REFS	99	160					
1377	LROW	*	INTEGER			REFS	274						
1	LTSH		INTEGER		CTSH	REFS	58	134	136	149			
0	LTSHFO		INTEGER		CTSHFO	REFS	59						
1361	LTSHR		INTEGER			REFS	147	DEFINED	134	136			
26	MORBAL		INTEGER		KLUES	REFS	63						
5	MSADD		INTEGER		KLUES	REFS	63						
2	M1		INTEGER		STRCLU	REFS	105						
3	M2		INTEGER		STRCLU	REFS	105						
4	M3		INTEGER		STRCLU	REFS	105						
5	M4		INTEGER		STRCLU	REFS	105						
11570	NAME1		INTEGER	ARRAY		REFS	40	210	243	270	280		
11572	NAME2		INTEGER	ARRAY		REFS	40	274	297				
11574	NAMPH		INTEGER	ARRAY		REFS	40	237	262	DEFINED	119		
11576	NAMPHT		INTEGER	ARRAY		REFS	40	213	244	DEFINED	119		

VARIABLES	SN	TYPE	RELOCATION									
11600	NAMQ	INTEGER	ARRAY		REFS	40	DEFINED	119				
11602	NAMQT	INTEGER	ARRAY		REFS	40	DEFINED	119				
13	NBAR	INTEGER		KLUES	REFS	63	192	DEFINED	165			
1364	NCC	INTEGER			REFS	161	DEFINED	159				
20	NCYC	INTEGER		KLUES	REFS	63	145	157	504	635	636	
					DEFINED	635						
14	N[illegible]	INTEGER		KLUES	REFS	63	636	DEFINED	165			
1	N ND	INTEGER	ARRAY	FITR	REFS	108	223	253	288	305		
1365	NKLUFO	INTEGER			REFS	161	DEFINED	160				
243	NMODE	INTEGER		FLUT	REFS	89	211	212	216	246	281	282
					290	298	299	307	316	325	328	329
21	NNN	INTEGER		KLUES	REFS	63	DEFINED	192				
0	NO	INTEGER		CONSTS	REFS	60						
0	NOMI	INTEGER		FITR	REFS	108	212	221	222	251	252	286
					287	303	304	323				
6	NPAGE	INTEGER		CLIST	REFS	97						
6	NPASS	INTEGER		KLUES	REFS	63	504					
1370	NQZ	INTEGER			REFS	213	244	2*280	291	2*297	308	
					DEFINED	211	212					
1404	NROW	INTEGER			REFS	578	DEFINED	577				
0	NUMSTR	INTEGER		STORES	REFS	100						
12	NVAR	INTEGER		COLS	REFS	90	616					
11	PHP	REAL	ARRAY	PLUG	REFS	66	318	319	320	326		
					DEFINED	318	319	320	330			
11724	PHPTMP	REAL	ARRAY		REFS	49	328	330	DEFINED	326		
0	QDW	REAL		QELIM	REFS	109						
362	SCALE	REAL	ARRAY	STORES	REFS	100						
1362	SOOOR *	REAL			DEFINED	146						
11	STPOLD	REAL		STRCLU	REFS	105						
305	STRIDN	REAL	ARRAY	STORES	REFS	100						
266	STRIDO	REAL	ARRAY	STORES	REFS	100						
122	STRII	REAL	ARRAY	STORES	REFS	100						
160	STRIN	REAL	ARRAY	STORES	REFS	100						
141	STRIO	REAL	ARRAY	STORES	REFS	100						
343	STRRDN	REAL	ARRAY	STORES	REFS	100						
324	STRRDO	REAL	ARRAY	STORES	REFS	100						
177	STRRI	REAL	ARRAY	STORES	REFS	100						
235	STRRN	REAL	ARRAY	STORES	REFS	100						
216	STRRO	REAL	ARRAY	STORES	REFS	100						
261	STRWDN	REAL	ARRAY	STORES	REFS	100						
254	STRWDO	REAL	ARRAY	STORES	REFS	100						
103	STRWI	REAL	ARRAY	STORES	REFS	100						
115	STRWN	REAL	ARRAY	STORES	REFS	100						
110	STRWO	REAL	ARRAY	STORES	REFS	100						
2	TSH	REAL	ARRAY	CTSH	REFS	48	58	DEFINED	150			
1	TSHFO	REAL	ARRAY	CTSHFO	REFS	48	59	150	DEFINED	147		
0	UMOD	COMPLEX	ARRAY	FLUT	REFS	28	89					
10	VDES	REAL		KLUES	REFS	63	502	515	DEFINED	164		
240	VF	REAL		FLUT	REFS	89	499	502	516			
120	VMOD	COMPLEX	ARRAY	FLUT	REFS	28	89					
10	VNEW	REAL		STRCLU	REFS	105						
7	VOLD	REAL		STRCLU	REFS	105						
1	VQDW	REAL		QELIM	REFS	109						
6	VS	REAL		STRCLU	REFS	105						
1402	VUP	REAL			REFS	516	DEFINED	515				
3	WBOTH	REAL		WAYTS	REFS	95						
0	WINITT	REAL		WAYTS	REFS	95						

VARIABLES	SN	TYPE	RELOCATION							
2	WMB	REAL		WAYTS	REFS	95				
1406	WORK	REAL	ARRAY		REFS	31	219	225	2*237	249	255	2*262
					578							
4	WPRES	REAL		WAYTS	REFS	95				
1	WST	REAL		WAYTS	REFS	95				
241	WW	REAL		FLUT	REFS	89				
1	YES	INTEGER		CONSTS	REFS	26	60	136		
	VARIABLES USED AS FILE NAMES, SEE ABOVE									

EXTERNALS	TYPE	ARGS	REFERENCES							
CLUES		4	161							
DCLOSE		1	228	229	257	258	272	276	293	310
DRVTV		3	578							
GEDLAB		6	210	243	270	274				
GETROW		4	219	249	271	275				
MESAGE		3	154	670						
PROGNA		2	152	200	238	575	580	582	606	
PUDLAB		6	213	244	280	297				
PUTROW		4	225	255	291	308				
REDVEC		2	290	307	328					
STRDES		0	581							
TAFOM		1	141							
TIMEB		2	155	669						
TITLES		1	153	498	509	523	529	539		
TRAN		9	237	262						
UNFIL		1	198	573	583					

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
ABS	REAL	1	INTRIN	532

STATEMENT LABELS		DEF LINE	REFERENCES	
30	2	148	145	
0	4	150	149	
66	6	194	157	162
0	8	224	222	
0	9	254	252	
0	10	219	218	
0	11	249	248	
224	12	263	242	
127	14	225	221	
207	15	255	251	
131	20	226	216	223
211	21	256	246	253
0	25	283	282	
0	27	289	287	
270	29	291	286	
272	30	292	281	288
0	35	300	299	
0	37	306	304	
326	39	308	303	
330	40	309	298	305
0	42	322	316	
405	43	334	312	323
0	44	327	325	
0	45	331	329	
0	46	332	324	
435	95	515	504	

STATEMENT LABELS				DEF LINE	REFERENCES			
506	100			546	502	516		
507	150			566	491	526	533	544
533	220			593	586			
541	250			611	595			
1126	9000	FMT		672	146			
1130	9001	FMT		673	164	166		
1132	9002	FMT		674	165			
1134	9003	FMT	NO REFS	675				
1170	9004	FMT	NO REFS	682				
1222	9005	FMT	NO REFS	688				
1263	9006	FMT		696	499			
1271	9007	FMT		697	510			
1304	9008	FMT		700	524			
1314	9009	FMT		702	530			
1323	9010	FMT		704	540			
1334	9011	FMT	NO REFS	706				
1342	9014	FMT	NO REFS	707				
550	9999			666	513	591	609	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
33	4	L	149 150	3B	INSTACK		
104	20	I	216 226	30B		EXT REFS	NOT INNER
107	10	J	218 219	5B		EXT REFS	
122	8	K	222 224	5B	INSTACK	EXITS	
164	21	I	246 256	30B		EXT REFS	NOT INNER
167	11	J	248 249	5B		EXT REFS	
202	9	K	252 254	5B	INSTACK	EXITS	
243	30	I	281 292	32B		EXT REFS	NOT INNER
246	25	J	282 283	2B	INSTACK		
261	27	K	287 289	5B	INSTACK	EXITS	
301	40	I	298 309	32B		EXT REFS	NOT INNER
304	35	J	299 300	2B	INSTACK		
317	37	K	304 306	5B	INSTACK	EXITS	
343	42	I	316 322	10B	OPT		
360	46	K	324 332	25B		EXT REFS	NOT INNER
365	44	J	325 327	3B	INSTACK		
377	45	J	329 331	3B	INSTACK		

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
CTSH	3	0 KTSH (1)	1 LTSH (1)	2 TSH (1)
CTSHFO	2	0 LTSHFO (1)	1 TSHFO (1)	
CONSTS	2	0 NO (1)	1 YES (1)	
CFMTA	1	0 FMTA (1)		
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)
KLUES	24	0 KLUSE (1)	1 KLUNAL (1)	2 IRED (1)
		3 KLUMD (1)	4 KLUBAL (1)	5 MSADD (1)
		6 NPASS (1)	7 IDNOPT (1)	8 VDES (1)
		9 EPS1 (1)	10 DWMAX (1)	11 NBAR (1)
		12 NFIX (1)	13 D (1)	14 DEL (1)
		15 EPS2 (1)	16 NCYC (1)	17 NNN (1)
		18 IBAND (1)	19 IFIN (1)	20 KLUB (1)
		21 KLUQ (1)	22 MORBAL (1)	23 DBAL (1)
PLUG	129	0 EMP (9)	9 PHP (120)	
KLUFF	1	0 KFREE (1)		
PLAYFF	26	0 IUMDFF (1)	1 IFMDFF (1)	2 IUDLTI (1)
		3 IFDLTI (1)	4 IUSLTI (1)	5 IFSLTI (1)
		6 IUMPLI (1)	7 IFMPLI (1)	8 IUTPGT (1)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
		9 IFTPGT (1)	10 IUPATF (1)	11 IFPATF (1)
		12 IUMPL (1)	13 IFMPL (1)	14 IUSLT (1)
		15 IFSLT (1)	16 IUDLT (1)	17 IFDLT (1)
		18 IUQA (1)	19 IFQA (1)	20 IUQAT (1)
		21 IFQAT (1)	22 IUPHA (1)	23 IFPHA (1)
		24 IUPHAT (1)	25 IFPHAT (1)	
PLACES	98	0 IUIN1 (1)	1 IUIN2 (1)	2 IUOUT1 (1)
		3 IUOUT2 (1)	4 IUGO1 (1)	5 IUGO2 (1)
		6 IUGO3 (1)	7 IUGO4 (1)	8 IUSCR (1)
		9 IFSCR (1)	10 IFS1 (1)	11 IFS2 (1)
		12 IFS3 (1)	13 IFS4 (1)	14 IUCD (1)
		15 IUPR (1)	16 IUA (1)	17 IFA (1)
		18 IUY (1)	19 IFY (1)	20 IUMEMN (1)
		21 IFMEMN (1)	22 IUSTFN (1)	23 IFSTFN (1)
		24 IUKS (1)	25 IFKS (1)	26 IUB (1)
		27 IFB (1)	28 IUDESO (1)	29 IFDESO (1)
		30 IUMDBI (1)	31 IFMDBI (1)	32 IUADDI (1)
		33 IFADDI (1)	34 IUBALI (1)	35 IFBALI (1)
		36 IUDESI (1)	37 IFDESI (1)	38 IUWTI (1)
		39 IFWTI (1)	40 IUMEMO (1)	41 IFMEMO (1)
		42 IUBT (1)	43 IFBT (1)	44 IUDESN (1)
		45 IFDESN (1)	46 IUMD (1)	47 IFMD (1)
		48 IUMEMF (1)	49 IFMEMF (1)	50 IUSTFO (1)
		51 IFSTFO (1)	52 IUMDB (1)	53 IFMDB (1)
		54 IUADD (1)	55 IFADD (1)	56 IUBAL (1)
		57 IFBAL (1)	58 IUDESF (1)	59 IFDESF (1)
		60 IUWT (1)	61 IFWT (1)	62 IUDUM1 (1)
		63 IFDUM1 (1)	64 IUDUM2 (1)	65 IFDUM2 (1)
		66 IUDUM3 (1)	67 IFDUM3 (1)	68 IUL (1)
		69 IFL (1)	70 IUYT (1)	71 IFYT (1)
		72 IUZ (1)	73 IFZ (1)	74 IUZR (1)
		75 IFZR (1)	76 IULR (1)	77 IFLR (1)
		78 IUBR (1)	79 IFBR (1)	80 IUPHTF (1)
		81 IFPHTF (1)	82 IUMODM (1)	83 IFMODM (1)
		84 IUMODK (1)	85 IFMODK (1)	86 IUPHT (1)
		87 IFPHT (1)	88 IUQT (1)	89 IFQT (1)
		90 IUQ (1)	91 IFQ (1)	92 IUPH (1)
		93 IFPH (1)	94 IUINCM (1)	95 IFINCM (1)
		96 IUINCK (1)	97 IFINCK (1)	
FLUT	204	0 UMOD (80)	80 VMOD (80)	160 VF (1)
		161 WW (1)	162 CSCL (1)	163 NMODE (1)
		164 IDMODE (40)		
COLS	22	0 IT (1)	1 IMINT (1)	2 IMAXT (1)
		3 IDENS (1)	4 IOLDT (1)	5 IOLDW (1)
		6 ISRAT (1)	7 IMINTO (1)	8 IINITT (1)
		9 IWPUT (1)	10 NVAR (1)	11 JWPUT (1)
		12 JINITT (1)	13 JMINT (1)	14 JMAXT (1)
		15 JOLDT (1)	16 JNEWT (1)	17 JDRV (1)
		18 JDRVO (1)	19 JSPR1 (1)	20 JSPR2 (1)
		21 JSPR3 (1)		
FILE	20	0 IPOS (20)		
WAYTS	6	0 WINITT (1)	1 WST (1)	2 WMB (1)
		3 WBOTH (1)	4 WPRES (1)	5 DW (1)
CORE	2	0 KORE (1)	1 KOREDP (1)	
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
		9 KOUNTH (1)	10 KOUNTI (1)				
CLUFO	21	0 LKLUFO (1)	1 KLUFO (20)				
STORES	277	0 NUMSTR (1)	1 KCONST (1)		2 ISTDOF (30)		
		32 IDYDOF (30)	62 IDSTR (5)		67 STRWI (5)		
		72 STRWO (5)	77 STRWN (5)		82 STRII (15)		
		97 STRIO (15)	112 STRIN (15)		127 STRRI (15)		
		142 STRRO (15)	157 STRRN (15)		172 STRWDO (5)		
		177 STRWDN (5)	182 STRIDO (15)		197 STRIDN (15)		
		212 STRRDO (15)	227 STRRDN (15)		242 SCALE (35)		
STRCLU	10	0 ICYCLE (1)	1 ISTEP (1)		2 M1 (1)		
		3 M2 (1)	4 M3 (1)		5 M4 (1)		
		6 VS (1)	7 VOLD (1)		8 VNEW (1)		
		9 STPOLD (1)					
LOCSTR	6	0 IUSTRI (1)	1 IFSTRI (1)		2 IUMREF (1)		
		3 IFMREF (1)	4 IUMOD (1)		5 IFMOD (1)		
FITR	41	0 NOMI (1)	1 NIND (40)				
QELIM	3	0 QDW (1)	1 VQDW (1)		2 LC38 (1)		

STATISTICS

PROGRAM LENGTH	12063B	5171
CM LABELED COMMON LENGTH	1620B	912

520000B CM USED

```
      C                                                                      TAFOM      2
      C45700, SUB. TAFOM (TITLE FOR AUTOMATED FLUTTER OPTIMIZATION MODULE)   TAFOM      3
      C                                                                      TAFOM      4
      C**********************************************************************TAFOM      5
      C                                                                     * TAFOM      6
      C***  SUBROUTINE TAFOM  ************************************************TAFOM      7
      C                                                                     * TAFOM      8
      C***  OBJECTIVE  *******************************************************TAFOM      9
      C     ---------                                                       * TAFOM     10
      C     PRINTS THE TITLE PAGE FOR THE AUTOMATED FLUTTER OPTIMIZATION    * TAFOM     11
      C     MODULE                                                          * TAFOM     12
      C                                                                     * TAFOM     13
      C**********************************************************************TAFOM     14
      C                                                                      TAFOM     15
            SUBROUTINE TAFOM (KALGOR)                                        TAFOM     16
      C                                                                      TAFOM     17
            DIMENSION AFFDL(4)                                               TAFOM     18
      C                                                                      TAFOM     19
            COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                             TAFOM     20
            COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE  TAFOM     21
           1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                      TAFOM     22
            COMMON /CTABLE/ KTABLE,NPASS ,NROWS ,NCOLS ,NCOLST,KTABLO,NPAGEA TAFOM     23
           1               ,ITAPET                                           TAFOM     24
            COMMON /CAFFDL/ AFFDL                                            TAFOM     25
      C                                                                      TAFOM     26
      C                                                                      TAFOM     27
      C PREPARE TABLE OF CONTENTS                                            TAFOM     28
      C                                                                      TAFOM     29
            KOUNT  =  LINES                                                  TAFOM     30
            CALL TITLES (-1)                                                 TAFOM     31
            NCOLS  =  0                                                      TAFOM     32
            NROWS  =  2                                                      TAFOM     33
            KTABLE =  2                                                      TAFOM     34
            CALL PTABLE (1,60,60                                             TAFOM     35
           *   H ***    ****     ***    *   *                               )TAFOM     36
            NROWS  =  0                                                      TAFOM     37
            KTABLE =  2                                                      TAFOM     38
            CALL PTABLE (1,60,60                                             TAFOM     39
           *   H*   * - *       *   *   ** **          AUTOMATED           )TAFOM     40
            KTABLE =  2                                                      TAFOM     41
            CALL PTABLE (1,60,60                                             TAFOM     42
           *   H*****   ****  - *   * - * * *          FLUTTER             )TAFOM     43
            KTABLE =  2                                                      TAFOM     44
            CALL PTABLE (1,60,60                                             TAFOM     45
           *   H*   *   *       *   *   * * *        OPTIMIZATION          )TAFOM     46
            KTABLE =  2                                                      TAFOM     47
            CALL PTABLE (2,60,60                                             TAFOM     48
           *   H*   *   *       ***    * * *          MODULE              )TAFOM     49
            KOUNT  =  LINES                                                  TAFOM     50
      C                                                                      TAFOM     51
      C                                                                      TAFOM     52
      C PREPARE TABLE OF CONTENTS FOR OPTIMIZATION ALGORITHM                 TAFOM     53
      C                                                                      TAFOM     54
            NROWS  =  2                                                      TAFOM     55
            NCOLS  =  0                                                      TAFOM     56
            KTABLE =  2                                                      TAFOM     57
            NPAGEA =  1                                                      TAFOM     58
```

```
      IF (KALGOR .EQ. 1) CALL PTABLE (2,50,50                          TAFOM   59
     1   HBEGIN VELOCITY DERIVATIVE RATIO ALGORITHM - V.D.R.)          TAFOM   60
60    KOUNT  =  LINES                                                  TAFOM   61
C                                                                      TAFOM   62
C                                                                      TAFOM   63
C LIST TITLE PAGE                                                      TAFOM   64
C                                                                      TAFOM   65
65    WRITE (ITAPEW,100)                                               TAFOM   66
      WRITE (ITAPEW,105)                                               TAFOM   67
      WRITE (ITAPEW,110)                                               TAFOM   68
      WRITE (ITAPEW,115)                                               TAFOM   69
      WRITE (ITAPEW,120) AFFDL                                         TAFOM   70
70    WRITE (ITAPEW,125)                                               TAFOM   71
      WRITE (ITAPEW,130)                                               TAFOM   72
      WRITE (ITAPEW,135)                                               TAFOM   73
      WRITE (ITAPEW,140)                                               TAFOM   74
      WRITE (ITAPEW,145)                                               TAFOM   75
75    WRITE (ITAPEW,150)                                               TAFOM   76
      WRITE (ITAPEW,155)                                               TAFOM   77
      WRITE (ITAPEW,160)                                               TAFOM   78
      WRITE (ITAPEW,165)                                               TAFOM   79
      WRITE (ITAPEW,170)                                               TAFOM   80
80    WRITE (ITAPEW,175)                                               TAFOM   81
  100 FORMAT (                                                         TAFOM   82
     *    5X,122(1H*)                                                  TAFOM   83
     *,/, 5X,1H*,120X,1H*                                              TAFOM   84
     *,/, 5X,1H*,15X                                                   TAFOM   85
85   A,13H      A                                                     TAFOM   86
     *,52X, 36H.....,4X,1H*                                            TAFOM   87
     *,/, 5X,1H*,15X                                                   TAFOM   88
     A,13H     AAA                                                    TAFOM   89
     *,52X, 36H.                                    .,4X,1H*          TAFOM   90
90   *,/, 5X,1H*,15X                                                   TAFOM   91
     A,13H    AAAAA                                                   TAFOM   92
     *,52X, 36H.          **** FASTOP ****          .,4X,1H*          TAFOM   93
     *,/, 5X,1H*,15X                                                   TAFOM   94
     A,13H    AAAAA                                                   TAFOM   95
95   *,52X, 36H.       FLUTTER AND STRUCTURAL       .,4X,1H*          TAFOM   96
     *,/, 5X,1H*,15X                                                   TAFOM   97
     A,13H   AAA AAA                                                   TAFOM   98
     *,52X, 36H.        OPTIMIZATION PROGRAM        .,4X,1H*)         TAFOM   99
  105 FORMAT (                                                         TAFOM  100
100  *    5X,1H*,15X                                                   TAFOM  101
     A,13H   AAA AAA                                                   TAFOM  102
     *,52X, 36H.                                    .,4X,1H*          TAFOM  103
     *,/, 5X,1H*,15X                                                   TAFOM  104
     A,13H   AAA AAA                                                   TAFOM  105
105  *,52X, 36H.           **** FOP ****            .,4X,1H*          TAFOM  106
     *,/, 5X,1H*,15X                                                   TAFOM  107
     A,13H   AAA AAA                                                   TAFOM  108
     *,52X, 36H.   FLUTTER OPTIMIZATION PACKAGE     .,4X,1H*          TAFOM  109
     *,/, 5X,1H*,15X                                                   TAFOM  110
110  A,13H   AAA AAA                                                   TAFOM  111
     *,52X, 36H.                                    .,4X,1H*          TAFOM  112
     *,/, 5X,1H*,15X                                                   TAFOM  113
     A,13H  AAAAAAAAA                                                  TAFOM  114
     *,52X, 36H.           **** AFOM ****           .,4X,1H*)         TAFOM  115
```

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115          110 FORMAT (                                                    TAFOM    116
                *    5X,1H*,15X                                            TAFOM    117
                A,13H  AAAAAAAAA                                           TAFOM    118
                *,13X                                                      TAFOM    119
                F,13HFFFFFFFFFFFFF                                         TAFOM    120
120             *,26X, 36H.            AUTOMATED            .,4X,1H*       TAFOM    121
                *,/, 5X,1H*,15X                                            TAFOM    122
                A,13H  AAAA AAAA                                           TAFOM    123
                *,13X                                                      TAFOM    124
                F,13HFFFFFFFFFFFFF                                         TAFOM    125
125             *,26X, 36H.   FLUTTER OPTIMIZATION MODULE   .,4X,1H*       TAFOM    126
                *,/, 5X,1H*,15X                                            TAFOM    127
                A,13H  AAA   AAA                                           TAFOM    128
                *,13X                                                      TAFOM    129
                F,13H FFF     FFF                                          TAFOM    130
130             *,26X, 36H.                                 .,4X,1H*)      TAFOM    131
             115 FORMAT (                                                  TAFOM    132
                *    5X,1H*,15X                                            TAFOM    133
                A,13H  AAA   AAA                                           TAFOM    134
                *,13X                                                      TAFOM    135
135             F,13H FFF     FFF                                          TAFOM    136
                *,26X, 36H.....................................,4X,1H*      TAFOM    137
                *,/, 5X,1H*,15X                                            TAFOM    138
                A,13H AAA     AAA                                          TAFOM    139
                *,13X                                                      TAFOM    140
140             F,13H FFF                                                  TAFOM    141
                *,26X, 36H.                                 .4X,1H*        TAFOM    142
                *,/, 5X,1H*,15X                                            TAFOM    143
                A,13H AAA     AAA                                          TAFOM    144
                *,13X                                                      TAFOM    145
145             F,13H FFF                                                  TAFOM    146
                *,26X, 36H.             AIR FORCE           .,4X,1H*)      TAFOM    147
             120 FORMAT (                                                  TAFOM    148
                *    5X,1H*,15X                                            TAFOM    149
                A,13H AAA     AAA                                          TAFOM    150
150             *,13X                                                      TAFOM    151
                F,13H FFF                                                  TAFOM    152
                *,26X, 36H.    FLIGHT DYNAMICS LABORATORY   .,4X,1H*       TAFOM    153
                *,/, 5X,1H*,15X                                            TAFOM    154
                A,13HAAA       AAA                                         TAFOM    155
155             *,13X                                                      TAFOM    156
                F,13H FFF                                                  TAFOM    157
                *,26X, 36H.                                 .,4X,1H*       TAFOM    158
                *,/, 5X,1H*,15X                                            TAFOM    159
                A,13HAAA       AAA                                         TAFOM    160
160             *,13X                                                      TAFOM    161
                F,13H FFF                                                  TAFOM    162
                *,26X, 10H.          ,4A4, 10H          .,4X,1H*)          TAFOM    163
             125 FORMAT (                                                  TAFOM    164
                *    5X,1H*,15X                                            TAFOM    165
165             A,13HAAA       AAA                                         TAFOM    166
                *,13X                                                      TAFOM    167
                F,13H FFFFFFFFF                                            TAFOM    168
                *,26X, 36H.                                 .,4X,1H*       TAFOM    169
                *,/, 5X,1H*,41X                                            TAFOM    170
170             F,13H FFFFFFFFF                                            TAFOM    171
                *,13X                                                      TAFOM    172
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```
                0,13H   0000000                                                  TAFOM     173
                *,     36H.....................................,4X,1H*           TAFOM     174
                *,/, 5X,1H*,41X                                                 TAFOM     175
175             F,13H FFF                                                       TAFOM     176
                *,13X                                                           TAFOM     177
                0,13H  000000000                                                TAFOM     178
                *,40X,1H*)                                                      TAFOM     179
              130 FORMAT (                                                      TAFOM     180
180             *    5X,1H*,41X                                                 TAFOM     181
                F,13H FFF                                                       TAFOM     182
                *,13X                                                           TAFOM     183
                0,13H 0000   0000                                               TAFOM     184
                *,40X,1H*                                                       TAFOM     185
185             *,/, 5X,1H*,41X                                                 TAFOM     186
                F,13H FFF                                                       TAFOM     187
                *,13X                                                           TAFOM     188
                0,13H000       000                                              TAFOM     189
                *,40X, 1H*                                                      TAFOM     190
190             *,/, 5X,1H*,41X                                                 TAFOM     191
                F,13H FFF                                                       TAFOM     192
                *,13X                                                           TAFOM     193
                0,13H000       000                                              TAFOM     194
                *,40X,1H*)                                                      TAFOM     195
195           135 FORMAT (                                                      TAFOM     196
                *    5X,1H*,41X                                                 TAFOM     197
                F,13H FFF                                                       TAFOM     198
                *,13X                                                           TAFOM     199
                0,13H000       000                                              TAFOM     200
200             *,40X,1H*                                                       TAFOM     201
                *,/, 5X,1H*,41X                                                 TAFOM     202
                F,13H FFF                                                       TAFOM     203
                *,13X                                                           TAFOM     204
                0,13H000       000                                              TAFOM     205
205             *,40X,1H*                                                       TAFOM     206
                *,/, 5X,1H*,41X                                                 TAFOM     207
                F,13H FFF                                                       TAFOM     208
                *,13X                                                           TAFOM     209
                0,13H000       000                                              TAFOM     210
210             *,40X,1H*)                                                      TAFOM     211
              140 FORMAT (                                                      TAFOM     212
                *    5X,1H*,41X                                                 TAFOM     213
                F,13HFFFF                                                       TAFOM     214
                *,13X                                                           TAFOM     215
215             0,13H000       000                                              TAFOM     216
                *,40X,1H*                                                       TAFOM     217
                *,/, 5X,1H*,41X                                                 TAFOM     218
                F,13HFFFF                                                       TAFOM     219
                *,13X                                                           TAFOM     220
220             0,13H000       000                                              TAFOM     221
                *,40X,1H*                                                       TAFOM     222
                *,/, 5X,1H*,67X                                                 TAFOM     223
                0,13H000       000                                              TAFOM     224
                *,13X                                                           TAFOM     225
225             M,13HMMM       MMM                                              TAFOM     226
                *,14X,1H*)                                                      TAFOM     227
              145 FORMAT (                                                      TAFOM     228
                *    5X,1H*,2X                                                  TAFOM     229
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```
                *,65X                                                                                                TAFOM     230
230             0,13H000        000                                                                                  TAFOM     231
                *,13X                                                                                                TAFOM     232
                M,13HMMM        MMM                                                                                  TAFOM     233
                *,14X,1H*                                                                                            TAFOM     234
                *,/, 5X,1H*,2X                                                                                       TAFOM     235
235             *,65X                                                                                                TAFOM     236
                0,13H000        000                                                                                  TAFOM     237
                *,13X                                                                                                TAFOM     238
                M,13HMMMM       MMMM                                                                                 TAFOM     239
                *,14X,1H*                                                                                            TAFOM     240
240             *,/, 5X,1H*,2X                                                                                       TAFOM     241
                * 65X                                                                                                TAFOM     242
                0,13H000        000                                                                                  TAFOM     243
                *,13X                                                                                                TAFOM     244
                M,13HMMMM       MMMM                                                                                 TAFOM     245
245             *,14X, 1H*)                                                                                          TAFOM     246
              150 FORMAT (                                                                                           TAFOM     247
                *    5X,1H*,2X                                                                                       TAFOM     248
                *,65X                                                                                                TAFOM     249
                0,13H000        000                                                                                  TAFOM     250
250             *,13X                                                                                                TAFOM     251
                M,13HMMMMM    MMMMM                                                                                  TAFOM     252
                *,14X,1H*                                                                                            TAFOM     253
                *,/, 5X,1H*,2X                                                                                       TAFOM     254
                *,65X                                                                                                TAFOM     255
255             0,13H000        000                                                                                  TAFOM     256
                *,13X                                                                                                TAFOM     257
                M,13HMMMMM    MMMMM                                                                                  TAFOM     258
                *,14X,1H*                                                                                            TAFOM     259
                *,/, 5X,1H*,2X                                                                                       TAFOM     260
260             *,8(3HGGG), 4OHGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG,1X                                       TAFOM     261
                0,13H000        000                                                                                  TAFOM     262
                *,13X                                                                                                TAFOM     263
                M,13HMMMMM    MMMMM                                                                                  TAFOM     264
                *,14X,1H*)                                                                                           TAFOM     265
265           155 FORMAT (                                                                                           TAFOM     266
                *    5X,1H*,2X                                                                                       TAFOM     267
                *,8(3HGGG), 4OHGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG      ,1X                                     TAFOM     268
                0,13H 0000    0000                                                                                   TAFOM     269
                *,13X                                                                                                TAFOM     270
270             M,13HMMMMMM MMMMMM                                                                                   TAFOM     271
                *,14X,1H*                                                                                            TAFOM     272
                *,/, 5X,1H*,2X                                                                                       TAFOM     273
                *,24X,       4OH  GGGGGGGGGGGGGGGGGGGGGGGGGGGG          ,1X                                      TAFOM     274
                0,13H  000000000                                                                                     TAFOM     275
275             *,13X                                                                                                TAFOM     276
                M,13HMMM MM MM MMM                                                                                   TAFOM     277
                *,14X,1H*                                                                                            TAFOM     278
                *,/, 5X,1H*,2X                                                                                       TAFOM     279
                *,24X,       4OH   GGGGGGGGGGGGGGGGGGGG             ,1X                                          TAFOM     280
280             0,13H   0000000                                                                                      TAFOM     281
                *,13X                                                                                                TAFOM     282
                M,13HMMM MM MM MMM                                                                                   TAFOM     283
                *,14X,1H*)                                                                                           TAFOM     284
              160 FORMAT (                                                                                           TAFOM     285
285             *    5X,1H*,2X                                                                                       TAFOM     286
```

```
      *,5X,   15H                    ,4X                                    TAFOM    287
      *,            40H    GGGGGGGGGGGGGGGG                  ,1X            TAFOM    288
      *,26X                                                                 TAFOM    289
      M,13HMMM MMMMM MMM                                                    TAFOM    290
290   *,14X,1H*                                                             TAFOM    291
      *,/, 5X,1H*,2X                                                        TAFOM    292
      *,5X,   15H                    ,4X                                    TAFOM    293
      *,            40H    GGGGGGGGGGGGGGG                   ,1X            TAFOM    294
      *,26X                                                                 TAFOM    295
295   M,13HMMM MMMMM MMM                                                    TAFOM    296
      *,14X,1H*                                                             TAFOM    297
      *,/, 5X,1H*,2X                                                        TAFOM    298
      *,5X,   15H    GRUMMAN         ,4X                                    TAFOM    299
      *,            40H  GGGGGGGGGGGGGG                   ,1X            TAFOM    300
300   *,26X                                                                 TAFOM    301
      M,13HMMM  MMM  MMM                                                    TAFOM    302
      *,14X,1H*)                                                            TAFOM    303
    165 FORMAT (                                                            TAFOM    304
      *    5X,1H*,2X                                                        TAFOM    305
305   *,5X,   15H.  AEROSPACE     ,4X                                       TAFOM    306
      *,            40H  GGGGGGGGGGG                  ,1X                 TAFOM    307
      *,26X                                                                 TAFOM    308
      M,13HMMM  MMM  MMM                                                    TAFOM    309
      *,14X,1H*                                                             TAFOM    310
310   *,/, 5X,1H*,2X                                                        TAFOM    311
      *,5X,   15H. CORPORATION  ,4X                                         TAFOM    312
      *,            40H  GGGGGGGGG                    ,1X                 TAFOM    313
      *,26X                                                                 TAFOM    314
      M,13HMMM  MMM  MMM                                                    TAFOM    315
315   *,14X,1H*                                                             TAFOM    316
      *,/, 5X,1H*,2X                                                        TAFOM    317
      *,5X,   15H.                   ,4X                                    TAFOM    318
      *,            40H  GGGGGGGG                     ,1X                 TAFOM    319
      *,26X                                                                 TAFOM    320
320   M,13HMMM  MMM  MMM                                                    TAFOM    321
      *,14X,1H*)                                                            TAFOM    322
    170 FORMAT (  5X, 1H*, 2X                                               TAFOM    323
      *,5X,   15H................,4X                                       TAFOM    324
      *,            40H  GGGGGG                       ,1X                 TAFOM    325
325   *,26X                                                                 TAFOM    326
      M,13HMMM  MMM  MMM                                                    TAFOM    327
      *,14X,1H*                                                             TAFOM    328
      *,/, 5X,1H*,2X                                                        TAFOM    329
      *,24X,        40H  GGGG                         ,1X                 TAFOM    330
330   *,26X                                                                 TAFOM    331
      M,13HMMM  MMM  MMM                                                    TAFOM    332
      *,14X,1H*                                                             TAFOM    333
      *,/, 5X,1H*,2X                                                        TAFOM    334
      *,24X,        40H  GG                           ,1X                 TAFOM    335
335   *,26X                                                                 TAFOM    336
      M,13HMMM  MMM  MMM                                                    TAFOM    337
      *,14X,1H*                                                             TAFOM    338
      *,/, 5X,1H*,2X                                                        TAFOM    339
      *,24X,        40H  G                            ,1X                 TAFOM    340
340   *,26X                                                                 TAFOM    341
      M,13HMMM  MMM  MMM        ,14X,1H*)                                   TAFOM    342
    175 FORMAT ( 5X,1H*,120X,1H*,/,5X,122(1H*))                             TAFOM    343
```

VARIABLES	SN	TYPE		RELOCATION						
46	IUWTI	INTEGER		PLACES	REFS	24				
22	IUY	INTEGER		PLACES	REFS	24				
106	IUYT	INTEGER		PLACES	REFS	24				
110	IUZ	INTEGER		PLACES	REFS	24				
112	IUZR	INTEGER		PLACES	REFS	24				
11	IWPUT	INTEGER		COLS	REFS	50				
21	JDRV	INTEGER		COLS	REFS	50				
22	JDRVO	INTEGER		COLS	REFS	50				
14	JINITT	INTEGER		COLS	REFS	50				
16	JMAXT	INTEGER		COLS	REFS	50				
15	JMINT	INTEGER		COLS	REFS	50				
20	JNEWT	INTEGER		COLS	REFS	50				
17	JOLDT	INTEGER		COLS	REFS	50				
23	JSPR1	INTEGER		COLS	REFS	50				
24	JSPR2	INTEGER		COLS	REFS	50				
25	JSPR3	INTEGER		COLS	REFS	50				
13	JWPUT	INTEGER		COLS	REFS	50				
7	KBPAGE	INTEGER		CLIST	REFS	68				
0	KFREE	INTEGER		KLUFF	REFS	42				
4	KLABEL	INTEGER		CLIST	REFS	68				
24	KLUB	INTEGER		KLUES	REFS	47				
4	KLUBAL	INTEGER		KLUES	REFS	47				
1	KLUFO	INTEGER	ARRAY	CLUFO	REFS	41				
3	KLUMD	INTEGER		KLUES	REFS	47				
1	KLUNAL	INTEGER		KLUES	REFS	47				
25	KLUQ	INTEGER		KLUES	REFS	47				
0	KLUSE	INTEGER		KLUES	REFS	47				
0	KOUNT	INTEGER		CLIST	REFS	68				
11	KOUNTH	INTEGER		CLIST	REFS	68				
12	KOUNTI	INTEGER		CLIST	REFS	68				
1	KPAGE	INTEGER		CLIST	REFS	68				
5	KTPAGE	INTEGER		CLIST	REFS	68				
2	LINES	INTEGER		CLIST	REFS	68				
10	LINESG	INTEGER		CLIST	REFS	68				
3	LINEST	INTEGER		CLIST	REFS	68				
0	LKLUFO	INTEGER		CLUFO	REFS	41				
121	MBDOF	INTEGER	ARRAY	BAL	REFS	57				
350	MES	INTEGER	ARRAY		REFS	12	DEFINED	71		
307	MESTYP	INTEGER			DEFINED	79	80			
26	MORBAL	INTEGER		KLUES	REFS	47				
5	MSADD	INTEGER		KLUES	REFS	47				
346	NAME	INTEGER	*UNDEF		REFS	10				
13	NBAR	INTEGER		KLUES	REFS	47				
0	NBYTES	INTEGER		CBYTES	REFS	55				
20	NCYC	INTEGER		KLUES	REFS	47	80			
14	NFIX	INTEGER		KLUES	REFS	47				
0	NMBAL	INTEGER		BAL	REFS	57				
243	NMODE	INTEGER		FLUT	REFS	56				
21	NNN	INTEGER		KLUES	REFS	47				
6	NPAGE	INTEGER		CLIST	REFS	68				
6	NPASS	INTEGER		KLUES	REFS	47				
0	NROWS	INTEGER		F.P.	REFS	2*9	426	DEFINED	1	
310	NTYME	* INTEGER			DEFINED	101				
311	NU	* INTEGER			DEFINED	102				
312	NV	* INTEGER			DEFINED	103				
12	NVAR	INTEGER		COLS	REFS	50				
315	ROE	REAL	*UNDEF		REFS	10	14			

VARIABLES	SN	TYPE	RELOCATION			
70	IUBAL	INTEGER	PLACES	REFS	24	
42	IUBALI	INTEGER	PLACES	REFS	24	
116	IUBR	INTEGER	PLACES	REFS	24	
52	IUBT	INTEGER	PLACES	REFS	24	
16	IUCD	INTEGER	PLACES	REFS	24	
313	IUCOM	INTEGER		DEFINED	104	106
72	IUDESF	INTEGER	PLACES	REFS	24	
44	IUDESI	INTEGER	PLACES	REFS	24	
54	IUDESN	INTEGER	PLACES	REFS	24	
34	IUDESO	INTEGER	PLACES	REFS	24	
20	IUDLT	INTEGER	PLAYFF	REFS	43	
2	IUDLTI	INTEGER	PLAYFF	REFS	43	
76	IUDUM1	INTEGER	PLACES	REFS	24	
100	IUDUM2	INTEGER	PLACES	REFS	24	
102	IUDUM3	INTEGER	PLACES	REFS	24	
4	IUGO1	INTEGER	PLACES	REFS	24	
5	IUGO2	INTEGER	PLACES	REFS	24	
6	IUGO3	INTEGER	PLACES	REFS	24	
7	IUGO4	INTEGER	PLACES	REFS	24	
140	IUINCK	INTEGER	PLACES	REFS	24	
136	IUINCM	INTEGER	PLACES	REFS	24	
0	IUIN1	INTEGER	PLACES	REFS	24	
1	IUIN2	INTEGER	PLACES	REFS	24	
30	IUKS	INTEGER	PLACES	REFS	24	
104	IUL	INTEGER	PLACES	REFS	24	
114	IULR	INTEGER	PLACES	REFS	24	
56	IUMD	INTEGER	PLACES	REFS	24	
64	IUMDB	INTEGER	PLACES	REFS	24	
36	IUMDBI	INTEGER	PLACES	REFS	24	
0	IUMDFF	INTEGER	PLAYFF	REFS	43	
60	IUMEMF	INTEGER	PLACES	REFS	24	
24	IUMEMN	INTEGER	PLACES	REFS	24	
50	IUMEMO	INTEGER	PLACES	REFS	24	
124	IUMODK	INTEGER	PLACES	REFS	24	
122	IUMODM	INTEGER	PLACES	REFS	24	
14	IUMPL	INTEGER	PLAYFF	REFS	43	
6	IUMPLI	INTEGER	PLAYFF	REFS	43	
2	IUOUT1	INTEGER	PLACES	REFS	24	
3	IUOUT2	INTEGER	PLACES	REFS	24	
12	IUPATF	INTEGER	PLAYFF	REFS	43	
134	IUPH	INTEGER	PLACES	REFS	24	106
26	IUPHA	INTEGER	PLAYFF	REFS	43	
30	IUPHAT	INTEGER	PLAYFF	REFS	43	
126	IUPHT	INTEGER	PLACES	REFS	24	
120	IUPHTF	INTEGER	PLACES	REFS	24	
17	IUPR	INTEGER	PLACES	REFS	24	
132	IUQ	INTEGER	PLACES	REFS	24	104
22	IUQA	INTEGER	PLAYFF	REFS	43	
24	IUQAT	INTEGER	PLAYFF	REFS	43	
130	IUQT	INTEGER	PLACES	REFS	24	
10	IUSCR	INTEGER	PLACES	REFS	24	
16	IUSLT	INTEGER	PLAYFF	REFS	43	
4	IUSLTI	INTEGER	PLAYFF	REFS	43	
26	IUSTFN	INTEGER	PLACES	REFS	24	
62	IUSTFO	INTEGER	PLACES	REFS	24	
10	IUTPGT	INTEGER	PLAYFF	REFS	43	
74	IUWT	INTEGER	PLACES	REFS	24	

VARIABLES	SN	TYPE		RELOCATION				
141	IFINCK	INTEGER		PLACES	REFS	24		
137	IFINCM	INTEGER		PLACES	REFS	24		
31	IFKS	INTEGER		PLACES	REFS	24		
105	IFL	INTEGER		PLACES	REFS	24		
115	IFLR	INTEGER		PLACES	REFS	24		
57	IFMD	INTEGER		PLACES	REFS	24		
65	IFMDB	INTEGER		PLACES	REFS	24		
37	IFMDBI	INTEGER		PLACES	REFS	24		
1	IFMDFF	INTEGER		PLAYFF	REFS	43		
61	IFMEMF	INTEGER		PLACES	REFS	24		
25	IFMEMN	INTEGER		PLACES	REFS	24		
51	IFMEMO	INTEGER		PLACES	REFS	24		
125	IFMODK	INTEGER		PLACES	REFS	24		
123	IFMODM	INTEGER		PLACES	REFS	24		
15	IFMPL	INTEGER		PLAYFF	REFS	43		
7	IFMPLI	INTEGER		PLAYFF	REFS	43		
13	IFPATF	INTEGER		PLAYFF	REFS	43		
135	IFPH	INTEGER		PLACES	REFS	24	107	
27	IFPHA	INTEGER		PLAYFF	REFS	43		
31	IFPHAT	INTEGER		PLAYFF	REFS	43		
127	IFPHT	INTEGER		PLACES	REFS	24		
121	IFPHTF	INTEGER		PLACES	REFS	24		
133	IFQ	INTEGER		PLACES	REFS	24	105	
23	IFQA	INTEGER		PLAYFF	REFS	43		
25	IFQAT	INTEGER		PLAYFF	REFS	43		
131	IFQT	INTEGER		PLACES	REFS	24		
11	IFSCR	INTEGER		PLACES	REFS	24		
17	IFSLT	INTEGER		PLAYFF	REFS	43		
5	IFSLTI	INTEGER		PLAYFF	REFS	43		
27	IFSTFN	INTEGER		PLACES	REFS	24		
63	IFSTFO	INTEGER		PLACES	REFS	24		
12	IFS1	INTEGER		PLACES	REFS	24		
13	IFS2	INTEGER		PLACES	REFS	24		
14	IFS3	INTEGER		PLACES	REFS	24		
15	IFS4	INTEGER		PLACES	REFS	24		
11	IFTPGT	INTEGER		PLAYFF	REFS	43		
75	IFWT	INTEGER		PLACES	REFS	24		
47	IFWTI	INTEGER		PLACES	REFS	24		
23	IFY	INTEGER		PLACES	REFS	24		
107	IFYT	INTEGER		PLACES	REFS	24		
111	IFZ	INTEGER		PLACES	REFS	24		
113	IFZR	INTEGER		PLACES	REFS	24		
10	IINITT	INTEGER		COLS	REFS	50		
2	IMAXT	INTEGER		COLS	REFS	50		
1	IMINT	INTEGER		COLS	REFS	50		
7	IMINTO	INTEGER		COLS	REFS	50		
4	IOLDT	INTEGER		COLS	REFS	50		
5	IOLDW	INTEGER		COLS	REFS	50		
0	IPOS	INTEGER	ARRAY	FILE	REFS	11	54	
2	IRED	INTEGER		KLUES	REFS	47	106	107
315	IROE	INTEGER	*UNDEF		REFS	14		
6	ISRAT	INTEGER		COLS	REFS	50		
0	IT	INTEGER		COLS	REFS	50		
20	IUA	INTEGER		PLACES	REFS	24		
66	IUADD	INTEGER		PLACES	REFS	24		
40	IUADDI	INTEGER		PLACES	REFS	24		
32	IUB	INTEGER		PLACES	REFS	24		

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                     3      52H    U-REAL       U-IMAG        V-REAL        V-IMAG    ,/)   DRVTV     458
                  9008 FORMAT(20X,                                                         DRVTV     459
                     1      52H************** RELATIVE DISPLACEMENTS **************,5X,   DRVTV     460
     460             2      52H************** ABSOLUTE DISPLACEMENTS **************,/,   DRVTV     461
                     3       10X, 5H  DOF,                                               DRVTV     462
                     4 2(5X,52H    U-REAL       U-IMAG        V-REAL        V-IMAG    ),/)  DRVTV     463
                  9009 FORMAT(10X,I5,2(5X,1P4E13.4))                                       DRVTV     464
                    C                                                                      DRVTV     465
     465              RETURN                                                               DRVTV     466
                      END                                                                  DRVTV     467
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SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	DRVTV	1	465

VARIABLES		SN	TYPE	RELOCATION								
303	A	*	COMPLEX	*UNDEF		REFS	7					
305	B	*	COMPLEX	*UNDEF		REFS	7					
0	CHART		COMPLEX	ARRAY	F.P	REFS	7	9	426	DEFINED	1	
242	CSCL		REAL		FLUT	REFS	56					
15	D		REAL		KLUES	REFS	47					
27	DBAL		REAL		KLUES	REFS	47					
16	DEL		REAL		KLUES	REFS	47					
215	DRVMB		REAL	ARRAY	BAL	REFS	57					
241	DRVMBO		REAL	ARRAY	BAL	REFS	57					
12	DWMAX		REAL		KLUES	REFS	47					
11	EPS1		REAL		KLUES	REFS	47					
17	EPS2		REAL		KLUES	REFS	47					
22	IBAND		INTEGER		KLUES	REFS	47					
1	IDBAL		INTEGER	ARRAY	BAL	REFS	57					
3	IDENS		INTEGER		COLS	REFS	50					
244	IDMODE		INTEGER	ARRAY	FLUT	REFS	56					
7	IDNOPT		INTEGER		KLUES	REFS	47					
21	IFA		INTEGER		PLACES	REFS	24					
67	IFADD		INTEGER		PLACES	REFS	24					
41	IFADDI		INTEGER		PLACES	REFS	24					
33	IFB		INTEGER		PLACES	REFS	24					
71	IFBAL		INTEGER		PLACES	REFS	24					
43	IFBALI		INTEGER		PLACES	REFS	24					
117	IFBR		INTEGER		PLACES	REFS	24					
53	IFBT		INTEGER		PLACES	REFS	24					
314	IFCOM		INTEGER			DEFINED	105	107				
73	IFDESF		INTEGER		PLACES	REFS	24					
45	IFDESI		INTEGER		PLACES	REFS	24					
55	IFDESN		INTEGER		PLACES	REFS	24					
35	IFDESO		INTEGER		PLACES	REFS	24					
21	IFDLT		INTEGER		PLAYFF	REFS	43					
3	IFDLTI		INTEGER		PLAYFF	REFS	43					
77	IFDUM1		INTEGER		PLACES	REFS	24					
101	IFDUM2		INTEGER		PLACES	REFS	24					
103	IFDUM3		INTEGER		PLACES	REFS	24					
23	IFIN		INTEGER		KLUES	REFS	47					

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      C     LEFT=LINES-KOUNT                                                  DRVTV   401
      C     IF(LEFT LT 3) KOUNT=LINES                                         DRVTV   402
      C     CALL TITLES(2)                                                    DRVTV   403
      C     WRITE(IUPR,9004)                                                  DRVTV   404
      C     KOUNT=KOUNT+3                                                     DRVTV   405
      C     GO TO 9999                                                        DRVTV   406
      C                                                                       DRVTV   407
      C 260 CONTINUE                                                          DRVTV   408
      C     AVGO=SUMXO/N                                                      DRVTV   409
      C     AVGN=SUMXN/N                                                      DRVTV   410
      C     VARO=(SUMXO2/N)-(AVGO*AVGO)                                       DRVTV   411
      C     VARN=(SUMXN2/N)-(AVGN*AVGN)                                       DRVTV   412
      C     DEVO=SQRT(VARO)                                                   DRVTV   413
      C     DEVN=SQRT(VARN)                                                   DRVTV   414
      C     LEFT=LINES-KOUNT                                                  DRVTV   415
      C     IF(LEFT.LT.7) KOUNT=LINES                                         DRVTV   416
      C     CALL TITLES(2)                                                    DRVTV   417
      C     WRITE(IUPR,9005) N,AVGO,DEVO,AVGN,DEVN                            DRVTV   418
      C     KOUNT=KOUNT+7                                                     DRVTV   419
      C                                                                       DRVTV   420
      C9999 CONTINUE                                                          DRVTV   421
      C                                                                       DRVTV   422
      C  ****************************************************               DRVTV   423
      C  *       END OF CODE THAT HAS BEEN COMMENTED OUT      *              DRVTV   424
      C  ********************************************** ******               DRVTV   425
      C                                                                       DRVTV   426
            CALL DRVSTR(CHART,VECTS,NROWS)                                    DRVTV   427
            CALL PROGNA(4H(DRV,4HTV ))                                        DRVTV   428
      C                                                                       DRVTV   429
            CALL TIMEB(10,10HFROM DRVTV)                                      DRVTV   430
            CALL MESAGE(2,5,5HDRVTV)                                          DRVTV   431
      C                                                                       DRVTV   432
       9000 FORMAT(/,10X,   30HFLUTTER VELOCITY DERIVATIVES, ,                DRVTV   433
           1                25HSTRAIN ENERGY DENSITIES, ,                     DRVTV   434
           2                28HAND KINETIC ENERGY DENSITIES,3X,6A4,           DRVTV   435
           3      //,10X,    6HMEMBER,15H     DERIVATIVE,5X,                  DRVTV   436
           4                30H          SED            KED ,/)               DRVTV   437
       9001 FORMAT(10X,I6, F15.4 ,5X,  2F15.4,/)                              DRVTV   438
       9002 FORMAT(/,10X,   46HDERIVATIVES, BEFORE AND AFTER FLUTTER REDESIGN, DRVTV   439
           1                29H OF FLUTTER CRITICAL ELEMENTS,                 DRVTV   440
           A      //,10X,    16HOLD DERIVATIVES ,6A4,                        DRVTV   441
           B       /,10X,    16HNEW DERIVATIVES ,6A4,                        DRVTV   442
           2      //,10X,     6HMEMBER,30H      OLD DERIV      NEW DERIV,/)   DRVTV   443
       9003 FORMAT(10X,I6,2F15.4,/)                                           DRVTV   444
       9004 FORMAT(/,10X,   39HTHERE WERE NO FLUTTER CRITICAL ELEMENTS,/)     DRVTV   445
       9005 FORMAT(/,10X,   11HTHERE WERE ,I5,  26H FLUTTER CRITICAL ELEMENTS, DRVTV   446
           1                30H IN THE LAST FLUTTER REDESIGN.,                DRVTV   447
           2      //,10X,    42HBEFORE REDESIGN, THE DERIVATIVES OF THESE ,    DRVTV   448
           3                29HELEMENTS HAD A MEAN VALUE OF ,F10.4,           DRVTV   449
           4                29H AND A STANDARD DEVIATION OF ,F10.4,           DRVTV   450
           5      //,10X,    41HAFTER REDESIGN, THE DERIVATIVES OF THESE ,     DRVTV   451
           6                29HELEMENTS HAD A MEAN VALUE OF ,F10.4,           DRVTV   452
           M                29H AND A STANDARD DEVIATION OF ,F10.4,/)         DRVTV   453
       9006 FORMAT(/,10X,   44HFLUTTER VECTORS (U AND V) IN STRUCT. COORDS.,/) DRVTV   454
       9007 FORMAT(20X,                                                       DRVTV   455
           1      52(1H*),/,                                                  DRVTV   456
           2       10X, 5H  DOF,5X,                                           DRVTV   457
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      C     KOUNT=LINES                                                    DRVTV   344
      C     SUMXO=0.0                                                      DRVTV   345
345   C     SUMXN=0.0                                                      DRVTV   346
      C     SUMXO2=0.0                                                     DRVTV   347
      C     SUMXN2=0.0                                                     DRVTV   348
      C     N=0                                                            DRVTV   349
      C     IF(KROW.EQ.0) GO TO 205                                        DRVTV   350
350   C     DO 200 I=1,KROW                                                DRVTV   351
      C     CALL GETROW(IUDESN,1,ROE,KCOL)                                 DRVTV   352
      C     TNEW=ROE(JNEWT)                                                DRVTV   353
      C     TMIN=ROE(JMINT)                                                DRVTV   354
      C     TMINAB=ABS(TMIN)                                               DRVTV   355
355   C     IF(TNEW.EQ.TMINAB) GO TO 200                                   DRVTV   356
      C     DVN=ROE(JDRV)                                                  DRVTV   357
      C     DVO=ROE(JDRVO)                                                 DRVTV   358
      C     LEFT=LINES-KOUNT                                               DRVTV   359
      C     IF(LEFT.LT.2) KOUNT=LINES                                      DRVTV   360
360   C     CALL TITLES(2)                                                 DRVTV   361
      C     IF(KOUNT.GT.KOUNTH) GO TO 190                                  DRVTV   362
      C     WRITE(IUPR,9002) (MES(KK,MESTYP),KK=1,6),(MES(KK,2),KK=1,6)    DRVTV   363
      C     KOUNT=KOUNT+8                                                  DRVTV   364
      C 190 CONTINUE                                                       DRVTV   365
365   C     WRITE(IUPR,9003) IROE,DVO,DVN                                  DRVTV   366
      C     KOUNT=KOUNT+2                                                  DRVTV   367
      C     SUMXO=SUMXO+DVO                                                DRVTV   368
      C     SUMXN=SUMXN+DVN                                                DRVTV   369
      C     SUMXO2=SUMXO2+(DVO*DVO)                                        DRVTV   370
370   C     SUMXN2=SUMXN2+(DVN*DVN)                                        DRVTV   371
      C     N=N+1                                                          DRVTV   372
      C 200 CONTINUE                                                       DRVTV   373
      C     CALL DCLOSE(IUDESN)                                            DRVTV   374
      C                                                                    DRVTV   375
375   C 205 CONTINUE                                                       DRVTV   376
      C                                                                    DRVTV   377
      C     IF(KLUBAL.EQ.0) GO TO 250                                      DRVTV   378
      C     DO 220 I=1,NMBAL                                               DRVTV   379
      C     IF(VMBNEW(I).EQ.0.) GO TO 220                                  DRVTV   380
380   C     DVN=DRVMB(I)                                                   DRVTV   381
      C     DVO=DRVMBO(I)                                                  DRVTV   382
      C     LEFT=LINES-KOUNT                                               DRVTV   383
      C     IF(LEFT.LT.2) KOUNT=LINES                                      DRVTV   384
      C     CALL TITLES(2)                                                 DRVTV   385
385   C     IF(KOUNT.GT.KOUNTH) GO TO 210                                  DRVTV   386
      C     WRITE(IUPR,9002) (MES(KK,MESTYP),KK=1,6),(MES(KK,2),KK=1,6)    DRVTV   387
      C 210 CONTINUE                                                       DRVTV   388
      C     WRITE(IUPR,9003) IDBAL(I),DVO,DVN                              DRVTV   389
      C     KOUNT=KOUNT+2                                                  DRVTV   390
390   C     SUMXO=SUMXO+DVO                                                DRVTV   391
      C     SUMXN=SUMXN+DVN                                                DRVTV   392
      C     SUMXO2=SUMXO2+(DVO*DVO)                                        DRVTV   393
      C     SUMXN2=SUMXN2+(DVN*DVN)                                        DRVTV   394
      C     N=N+1                                                          DRVTV   395
395   C 220 CONTINUE                                                       DRVTV   396
      C                                                                    DRVTV   397
      C 250 C  .TINUE                                                      DRVTV   398
      C                                                                    DRVTV   399
      C     IF(N.NE.0) GO TO 260                                           DRVTV   400
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      C     CALL DCLOSE(IUDESO)                                              DRVTV    287
      C     CALL DCLOSE(IUDESN)                                              DRVTV    288
      C 115 CONTINUE                                                         DRVTV    289
      C     CALL DCLOSE(IUSTFN)                                              DRVTV    290
290   C                                                                      DRVTV    291
      C                                                                      DRVTV    292
      C NOW, CONSIDER MASS BALANCE VARIABLES-IF ANY.                         DRVTV    293
      C                                                                      DRVTV    294
      C     IF(KLUBAL.EQ.0) GO TO 180                                        DRVTV    295
295   C                                                                      DRVTV    296
      C     DO 150 I=1,NMBAL                                                 DRVTV    297
      C                                                                      DRVTV    298
      C SET UP URED AND VRED.                                                DRVTV    299
      C                                                                      DRVTV    300
300   C     DO 120 J=1,3                                                     DRVTV    301
      C     L=MBDOF(I,J)                                                     DRVTV    302
      C     VECTS(NR1,J)=CHART(NR1,L)                                        DRVTV    303
      C     VECTS(NR2,J)=CHART(NR2,L)                                        DRVTV    304
      C 120 CONTINUE                                                         DRVTV    305
305   C                                                                      DRVTV    306
      C     SED=0.0                                                          DRVTV    307
      C                                                                      DRVTV    308
      C COMPUTE KINETIC ENERGY DENSITY AND FLUTTER VELOCITY DERIVATIVE.      DRVTV    309
      C                                                                      DRVTV    310
310   C     B=CMPLX(0.,0.)                                                   DRVTV    311
      C     DO 130 J=1,3                                                     DRVTV    312
      C     B=B+VECTS(NR2,J)*VECTS(NR1,J)                                    DRVTV    313
      C 130 CONTINUE                                                         DRVTV    314
      C     AKED=REAL(B)-CSCL*AIMAG(B)                                       DRVTV    315
315   C     AKED=FK*AKED                                                     DRVTV    316
      C                                                                      DRVTV    317
      C     DRVMBO(I)=DRVMB(I)                                               DRVTV    318
      C     DRVMB(I)=SED-AKED                                                DRVTV    319
      C                                                                      DRVTV    320
320   C     LEFT=LINES-KOUNT                                                 DRVTV    321
      C     IF(LEFT.LT.2) KOUNT=LINES                                        DRVTV    322
      C     CALL TITLES(2)                                                   DRVTV    323
      C     IF(KOUNT.GT.KOUNTH) GO TO 135                                    DRVTV    324
      C     WRITE(IUPR,9000) (MES(KK,MESTYP),KK=1,6)                         DRVTV    325
325   C     KOUNT=KOUNT+5                                                    DRVTV    326
      C 135 CONTINUE                                                         DRVTV    327
      C     WRITE(IUPR,9001) IDBAL(I),DRVMB(I),SED,AKED                      DRVTV    328
      C     KOUNT=KOUNT+2                                                    DRVTV    329
      C                                                                      DRVTV    330
330   C 150 CONTINUE                                                         DRVTV    331
      C                                                                      DRVTV    332
      C                                                                      DRVTV    333
      C 180 CONTINUE                                                         DRVTV    334
      C                                                                      DRVTV    335
335   C     IF(NCYC.EQ.0) GO TO 9999                                         DRVTV    336
      C                                                                      DRVTV    337
      C LIST (IN A SEPARATE GROUP) DERIVATIVES FOR ALL ELEMENTS CATEGORIZED AS DRVTV  338
      C FLUTTER CRITICAL IN LAST FLUTTER REDESIGN.                           DRVTV    339
      C                                                                      DRVTV    340
340   C     MESTYP=1                                                         DRVTV    341
      C     IF(NCYC.GT.1) MESTYP=2                                           DRVTV    342
      C     CALL GEDLAB(8HDRVTV 03,IUDESN,NAME,IFDESN,KROW,KCOL)             DRVTV    343
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                C     A=A/WT                                                    DRVTV     230
230             C                                                               DRVTV     231
                C     SED=REAL(A)-CSCL*AIMAG(A)                                 DRVTV     232
                C     SED=FS*SED*386.4                                          DRVTV     233
                C                                                               DRVTV     234
                C     IF(MEMTYP.NE.2) GO TO 90                                  DRVTV     235
235             C                                                               DRVTV     236
                C BEAM TYPE ELEMENTS HAVE ROTATIONAL DEGREES OF FREEDOM. AS ROTARY DRVTV     237
                C INERTIAS ARE NOT BEING CONSIDERED (EXCEPT FOR FIXED MASS ITEMS), THESE DRVTV 238
                C ROTATIONAL COMPONENTS MUST HAVE NO CONTRIBUTION TO THE KINETIC ENERGY DRVTV 239
                C DENSITY.                                                      DRVTV     240
240             C                                                               DRVTV     241
                C     J=0                                                       DRVTV     242
                C     DO 80 K=1,NODES                                           DRVTV     243
                C     JF=J+NGO(K)                                               DRVTV     244
                C     IF(NGO(K).LE.3) GO TO 70                                  DRVTV     245
245             C     JS=J+4                                                    DRVTV     246
                C     DO 60 M=JS,JF                                             DRVTV     247
                C     VECTS(NR1,M)=CMPLX(0.0,0.0)                               DRVTV     248
                C     VECTS(NR2,M)=CMPLX(0.0,0.0)                               DRVTV     249
                C  60 CONTINUE                                                  DRVTV     250
250             C  70 J=JF                                                      DRVTV     251
                C  80 CONTINUE                                                  DRVTV     252
                C                                                               DRVTV     253
                C  90 CONTINUE                                                  DRVTV     254
                C                                                               DRVTV     255
255             C     B=CMPLX(0.,0.)                                            DRVTV     256
                C     DO 95 J=1,IROW                                            DRVTV     257
                C     B=B+VECTS(NR2,J)*VECTS(NR1,J)                             DRVTV     258
                C  95 CONTINUE                                                  DRVTV     259
                C     B=B/NODES                                                 DRVTV     260
260             C                                                               DRVTV     261
                C     AKED=REAL(B)-CSCL*AIMAG(B)                                DRVTV     262
                C     AKED=FK*AKED                                              DRVTV     263
                C                                                               DRVTV     264
                C     DRV=SED-AKED                                              DRVTV     265
265             C                                                               DRVTV     266
                C     IF(KLUSE.NE.2) GO TO 100                                  DRVTV     267
                C     ROE(JDRVO)=ROE(JDRV)                                      DRVTV     268
                C     ROE(JDRV)=DRV                                             DRVTV     269
                C     CALL PUTROW(IUDESN,2,ROE,KCOL)                            DRVTV     270
270             C                                                               DRVTV     271
                C 100 CONTINUE                                                  DRVTV     272
                C     LEFT=LINES-KOUNT                                          DRVTV     273
                C     IF(LEFT.LT.2) KOUNT=LINES                                 DRVTV     274
                C     CALL TITLES(2)                                            DRVTV     275
275             C     IF(KOUNT.GT.KOUNTH) GO TO 104                             DRVTV     276
                C     WRITE(IUPR,9000) (MES(KK,MESTYP),KK=1,6)                  DRVTV     277
                C     KOUNT=KOUNT+5                                             DRVTV     278
                C 104 CONTINUE                                                  DRVTV     279
                C     WRITE(IUPR,9001) MEM,DRV,SED,AKED                         DRVTV     280
280             C     KOUNT=KOUNT+2                                             DRVTV     281
                C                                                               DRVTV     282
                C 110 CONTINUE                                                  DRVTV     283
                C                                                               DRVTV     284
                C 112 CONTINUE                                                  DRVTV     285
285             C     IF(KLUSE.NE.2) GO TO 115                                  DRVTV     286
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                C                                                                DRVTV   173
                C     IUDESN=IUDUM2-IUDESN                                       DRVTV   174
                C     IUDESO=IUDUM2-IUDESO                                       DRVTV   175
      175       C     IFDESN=IFDUM2-IFDESN                                       DRVTV   176
                C     IFDESO=IFDUM2-IFDESO                                       DRVTV   177
                C                                                                DRVTV   178
                C     CALL GEDLAB(8HDRVTV 02,IUDESO,NAME,IFDESO,KROW,KCOL)       DRVTV   179
                C     CALL PUDLAB(8HDRVTV 01,IUDESN,NAME,IFDESN,KROW,KCOL)       DRVTV   180
      180       C   5 CONTINUE                                                    DRVTV   181
                C     CALL GEDLAB(8HDRVTV 03,IUSTFN,NAME,IFSTFN,JROW,JCOL)       DRVTV   182
                C                                                                DRVTV   183
                C     KOUNT=LINES                                                DRVTV   184
                C                                                                DRVTV   185
      185       C     IF(KLUSE.NE.2) KROW=JROW                                   DRVTV   186
                C     IF(KROW.EQ.0) GO TO 112                                    DRVTV   187
                C     DO 110 I=1,KROW                                            DRVTV   188
                C     IF(KLUSE.NE.2) GO TO 10                                    DRVTV   189
                C     CALL GETROW(IUDESO,1,ROE,KCOL)                             DRVTV   190
      190       C                                                                DRVTV   191
                C  10 CALL PREAD(IUSTFN,PATTY(1),24)                             DRVTV   192
                C     NBYTE=4*NODES                                              DRVTV   193
                C     CALL PREAD(IUSTFN,NSTART(1),NBYTE)                         DRVTV   194
                C     CALL PREAD(IUSTFN,NGO(1),NBYTE)                            DRVTV   195
      195       C     NBYTE=NBYTES*IROW                                          DRVTV   196
                C     DO 20 J=1,ICOL                                             DRVTV   197
                C  20 CALL PREAD(IUSTFN,ELSTF(1,J),NBYTE)                        DRVTV   198
                C     CALL REND(IUSTFN)                                          DRVTV   199
                C                                                                DRVTV   200
      200       C     IF(KLUSE.NE.2) GO TO 25                                    DRVTV   201
                C     IF(MEM.NE.IROE) GO TO 10                                   DRVTV   202
                C  25 CONTINUE                                                   DRVTV   203
                C                                                                DRVTV   204
                C SET UP VECTORS URED,VRED TO CONTAIN THOSE COMPONENTS OF THE FLUTTER DRVTV   205
      205       C VECTORS(PHYSICAL COORDINATES) ASSOCIATED WITH THE ELEMENT UNDER DRVTV   206
                C CONSIDERATION. THE JTH COMPONENTS OF URED AND VRED ARE STORED AS DRVTV   207
                C THE JTH COLUMN OF VARIABLE VECTS.                              DRVTV   208
                C                                                                DRVTV   209
                C     J=0                                                        DRVTV   210
      210       C     DO 40 K=1,NODES                                            DRVTV   211
                C     NG=NGO(K)                                                  DRVTV   212
                C     IF(NG.EQ.0) GO TO 40                                       DRVTV   213
                C     NS=NSTART(K)                                               DRVTV   214
                C     NF=NS+NG-1                                                 DRVTV   215
      215       C     DO 30 L=NS,NF                                              DRVTV   216
                C     J=J+1                                                      DRVTV   217
                C     DO 28 M=1,NROWS                                            DRVTV   218
                C  28 VECTS(M,J)=CHART(M,L)                                      DRVTV   219
                C  30 CONTINUE                                                   DRVTV   220
      220       C  40 CONTINUE                                                   DRVTV   221
                C                                                                DRVTV   222
                C COMPUTE STRAIN ENERGY DENSITY(SED), KINETIC ENERGY DENSITY(AKED), AND DRVTV   223
                C VELOCITY DERIVATIVE(DRV) FOR THE STRUCTURAL ELEMENT.           DRVTV   224
                C                                                                DRVTV   225
      225       C     A=CMPLX(0.,0.)                                             DRVTV   226
                C     DO 50 J=1,IROW                                             DRVTV   227
                C     DO 50 K=1,ICOL                                             DRVTV   228
                C  50 A=A+VECTS(2,J)*ELSTF(J,K)*VECTS(1,K)                       DRVTV   229
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115         C     IF(KLUB.EQ.0) GO TO 9999                                  DRVTV   116
            C 500 CONTINUE                                                  DRVTV   117
            C     CALL GEDLAB(8HDRVTV 01,IUCOM,NAME,IFCOM,KROW,KCOL)        DRVTV   118
            C     DO 550 I=1,KROW                                           DRVTV   119
            C     CALL GETROW(IUCOM,1,ROE,KCOL)                             DRVTV   120
120         C     A=CMPLX(0.0,0.0)                                          DRVTV   121
            C     B=CMPLX(0.0,0.0)                                          DRVTV   122
            C     DO 520 J=1,KCOL                                           DRVTV   123
            C     A=A+(ROE(J)*UMOD(J))                                      DRVTV   124
            C     B=B+(ROE(J)*VMOD(J))                                      DRVTV   125
125         C 520 CONTINUE                                                  DRVTV   126
            C     CHART(NU,I)=A                                             DRVTV   127
            C     CHART(NV,I)=B                                             DRVTV   128
            C 550 CONTINUE                                                  DRVTV   129
            C     CALL DCLOSE(IUCOM)                                        DRVTV   130
130         C                                                               DRVTV   131
            C     IF(KFREE.EQ.1.OR.NTYME.EQ.2) GO TO 600                    DRVTV   132
            C                                                               DRVTV   133
            C     NTYME=2                                                   DRVTV   134
            C     NU=3                                                      DRVTV   135
135         C     NV=4                                                      DRVTV   136
            C     IUCOM=IUQA                                                DRVTV   137
            C     IFCOM=IFQA                                                DRVTV   138
            C     IF(IRED.EQ.0) IUCOM=IUPHA                                 DRVTV   139
            C     IF(IRED.EQ.0) IFCOM=IFPHA                                 DRVTV   140
140         C     GO TO 500                                                 DRVTV   141
            C                                                               DRVTV   142
            C 600 CONTINUE                                                  DRVTV   143
            C                                                               DRVTV   144
            C     IOUV=KLUFO(2)                                             DRVTV   145
145         C     IF(IOUV.NE.2) GO TO 700                                   DRVTV   146
            C     KOUNT=LINES                                               DRVTV   147
            C     DO 640 I=1,KROW                                           DRVTV   148
            C     CALL TITLES(2)                                            DRVTV   149
            C     IF(KOUNT.GT.KOUNTH) GO TO 620                             DRVTV   150
150         C     WRITE(IUPR,9006)                                          DRVTV   151
            C     IF(KFREE.EQ.1) WRITE(IUPR,9007)                           DRVTV   152
            C     IF(KFREE.EQ.2) WRITE(IUPR,9008)                           DRVTV   153
            C     KOUNT=KOUNT+6                                             DRVTV   154
            C 620 CONTINUE                                                  DRVTV   155
155         C     WRITE(IUPR,9009) I,(CHART(J,I),J=1,NROWS)                 DRVTV   156
            C     KOUNT=KOUNT+1                                             DRVTV   157
            C 640 CONTINUE                                                  DRVTV   158
            C                                                               DRVTV   159
            C                                                               DRVTV   160
160         C 700 CONTINUE                                                  DRVTV   161
            C                                                               DRVTV   162
            C                                                               DRVTV   163
            C     NR1=1                                                     DRVTV   164
            C     IF(KFREE.EQ.2) NR1=3                                      DRVTV   165
165         C     NR2=NR1+1                                                 DRVTV   166
            C     FS=VF/(2.0*WW)                                            DRVTV   167
            C     FK=VF/2.0                                                 DRVTV   168
            C                                                               DRVTV   169
            C FIRST, CONSIDER THE STRUCTURAL ELEMENTS.                      DRVTV   170
170         C                                                               DRVTV   171
            C     IF(KLUSE.NE.2) GO TO 5                                    DRVTV   172
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     1            MBDOF(20,3),DRVMB(20),DRVMBO(20),                    DRVTV      59
     2            S1MB(20),S2MB(20),S3MB(20)                           DRVTV      60
60   C                                                                 DRVTV      61
     C  ******************************************************         DRVTV      62
     C  *       THE FOLLOWING LINE OF FASTOP CODE HAS        *         DRVTV      63
     C  *       BEEN COMMENTED OUT BECAUSE IT IS NOT         *         DRVTV      64
     C  *       USED IN THE CURRENT VERSION OF ESP.          *         DRVTV      65
65   C  ******************************************************         DRVTV      66
     C     COMMON /ELMNT/ ELSTF(24,24),PATTY(6),NSTART(8),NGO(8)        DRVTV      67
     C                                                                 DRVTV      68
      COMMON /CLIST / KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE     DRVTV      69
     1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                      DRVTV      70
70   C                                                                 DRVTV      71
      DATA MES/4H(BAS,4HED 0,4HN NO,4HRMAL,4H MOD,4HES) ,              DRVTV      72
     1         4H(BAS,4HED 0,4HN CO,4HUPLE,4HD MO,4HDES)/              DRVTV      73
     C                                                                 DRVTV      74
     C                                                                 DRVTV      75
75    CALL PROGNA(4H(DRV,4HTV ))                                       DRVTV      76
      CALL MESAGE(1,5,5HDRVTV)                                         DRVTV      77
      CALL TIMEB(10,10HFROM DRVTV)                                     DRVTV      78
     C                                                                 DRVTV      79
      MESTYP=1                                                         DRVTV      80
80    IF(NCYC.GT.0) MESTYP=2                                           DRVTV      81
     C                                                                 DRVTV      82
     C                                                                 DRVTV      83
     C TRANSFORM MODAL FLUTTER VECTORS UMOD AND VMOD INTO STRUCTURAL   DRVTV      84
     C COORDINATES TO FORM VECTORS UPHYS AND VPHYS.                    DRVTV      85
85   C    STEP1. (IF IRED=1) UPHYS= Q*UMOD AND VPHYS= Q*VMOD           DRVTV      86
     C           (IF IRED=0) UPHYS=PH*UMOD AND VPHYS=PH*VMOD           DRVTV      87
     C         THESE VECTORS ARE STORED IN ROWS 1 AND 2 OF VARIABLE CHART. DRVTV 88
     C         IF CANTILEVER MODES ARE BEING USED, THESE UPHYS AND VPHYS ARE DRVTV 89
     C         IN ABSOLUTE COORDINATES AND WILL BE USED TO COMPUTE BOTH DRVTV 90
90   C         STRAIN ENERGY DENSITY (SED) AND KINETIC ENERGY DENSITY (KED). DRVTV 91
     C    STEP2. WHEN FREE-FREE MODES ARE USED, THE ABOVE UPHYS AND VPHYS DRVTV 92
     C         ARE IN RELATIVE (TO THE PLUG) COORDINATES AND WILL BE USED TO DRVTV 93
     C         COMPUTE SED ONLY. THEN, COMPUTE UPHYS AND VPHYS IN ABSOLUTE DRVTV 94
     C         COORDINATES AS FOLLOWS                                  DRVTV      95
95   C           (IF IRED=1) UPHYS= QA*UMOD AND VPHYS= QA*VMOD         DRVTV      96
     C           (IF IRED=0) UPHYS=PHA*UMOD AND VPHYS=PHA*VMOD         DRVTV      97
     C         THESE VECTORS ARE STORED IN ROWS 3 AND 4 OF VARIABLE CHART, DRVTV 98
     C         AND WILL BE USED TO COMPUTE KED.                        DRVTV      99
     C                                                                 DRVTV     100
100  C                                                                 DRVTV     101
      NTYME=1                                                          DRVTV     102
      NU=1                                                             DRVTV     103
      NV=2                                                             DRVTV     104
      IUCOM=IUQ                                                        DRVTV     105
105   IFCOM=IFQ                                                        DRVTV     106
      IF(IRED.EQ.0) IUCOM=IUPH                                         DRVTV     107
      IF(IRED.EQ.0) IFCOM=IFPH                                         DRVTV     108
     C                                                                 DRVTV     109
     C  ******************************************************         DRVTV     110
110  C  *       THE FOLLOWING LINES OF FASTOP CODE HAVE      *         DRVTV     111
     C  *       BEEN COMMENTED OUT BECAUSE THEY ARE NOT      *         DRVTV     112
     C  *       USED IN THE CURRENT VERSION OF ESP.          *         DRVTV     113
     C  ******************************************************         DRVTV     114
     C                                                                 DRVTV     115
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      SUBROUTINE DRVTV(CHART,VECTS,NROWS)                                DRVTV      2
C                                                                        DRVTV      3
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      DRVTV      4
C     DOUBLE PRECISION ELSTF                                             DRVTV      5
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS         DRVTV      6
C                                                                        DRVTV      7
      COMPLEX UMOD,VMOD,CHART,VECTS,A,B                                  DRVTV      8
C                                                                        DRVTV      9
      DIMENSION CHART(NROWS,1),VECTS(NROWS,1)                            DRVTV     10
      DIMENSION ROE(25),NAME(2)                                          DRVTV     11
      DIMENSION IPOS(20)                                                 DRVTV     12
      DIMENSION MES(6,2)                                                 DRVTV     13
C                                                                        DRVTV     14
      EQUIVALENCE (ROE(1),IROE)                                          DRVTV     15
C                                                                        DRVTV     16
C  ******************************************************              DRVTV     17
C  *       THE FOLLOWING LINE OF FASTOP CODE HAS        *              DRVTV     18
C  *       BEEN COMMENTED OUT BECAUSE IT IS NOT         *              DRVTV     19
C  *       USED IN THE CURRENT VERSION OF ESP.          *              DRVTV     20
C  ******************************************************              DRVTV     21
C     EQUIVALENCE (PATTY(1),MEM),(PATTY(2),NODES),(PATTY(3),IROW),     DRVTV     22
C    *            (PATTY(4),ICOL),(PATTY(5),WT),(PATTY(6),MEMTYP)      DRVTV     23
C                                                                        DRVTV     24
      COMMON/PLACES/ IUIN1,IUIN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4, DRVTV     25
     1               IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,         DRVTV     26
     2               IUA,IFA,IUY,IFY,IUMEMN,IFMEMN,IUSTFN,IFSTFN,       DRVTV     27
     3               IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,                   DRVTV     28
     4               IUMDBI,IFMDBI,IUADDI,IFADDI,IUBALI,IFBALI,         DRVTV     29
     5               IUDESI,IFDESI,IUWTI,IFWTI,                         DRVTV     30
     6               IUMEMO,IFMEMO,IUBT,IFBT,                           DRVTV     31
     7               IUDESN,IFDESN,IUMD,IFMD,                           DRVTV     32
     8               IUMEMF,IFMEMF,                                     DRVTV     33
     9               IUSTFO,IFSTFO,IUMDB,IFMDB,IUADD,IFADD,IUBAL,IFBAL, DRVTV     34
     A               IUDESF,IFDESF,IUWT,IFWT,                           DRVTV     35
     B               IUDUM1,IFDUM1,IUDUM2,IFDUM2,IUDUM3,IFDUM3,         DRVTV     36
     C               IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IULR,IFLR,     DRVTV     37
     D               IUBR,IFBR,                                         DRVTV     38
     E               IUPHTF,IFPHTF,IUMODM,IFMODM,                       DRVTV     39
     F               IUMODK,IFMODK,IUPHT,IFPHT,IUQT,IFQT,IUQ,IFQ,       DRVTV     40
     G               IUPH,IFPH,IUINCM,IFINCM,IUINCK,IFINCK              DRVTV     41
      COMMON /CLUFO/ LKLUFO,KLUFO(20)                                    DRVTV     42
      COMMON /KLUFF/ KFREE                                               DRVTV     43
      COMMON /PLAYFF/ IUMDFF,IFMDFF,IUDLTI,IFDLTI,IUSLTI,IFSLTI          DRVTV     44
     1               ,IUMPLI,IFMPLI,IUTPGT,IFTPGT,IUPATF,IFPATF         DRVTV     45
     2               ,IUMPL,IFMPL,IUSLT,IFSLT,IUDLT,IFDLT               DRVTV     46
     3               ,IUQA,IFQA,IUQAT,IFQAT,IUPHA,IFPHA,IUPHAT,IFPHAT   DRVTV     47
      COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUMD,KLUBAL,MSADD,NPASS,IDNOPT,   DRVTV     48
     1              VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND, DRVTV     49
     2              IFIN,KLUB,KLUQ,MORBAL,DBAL                           DRVTV     50
      COMMON/COLS/ IT,IMINT,IMAXT,IDENS,IOLDT,IOLDW,ISRAT,IMINTO,        DRVTV     51
     A             IINITT,IWPUT,                                        DRVTV     52
     1             NVAR,JWPUT,JINITT,JMINT,JMAXT,JOLDT,JNEWT,JDRV,      DRVTV     53
     2             JDRVO,JSPR1,JSPR2,JSPR3                              DRVTV     54
      COMMON /FILE  / IPOS                                               DRVTV     55
      COMMON /CBYTES/ NBYTES                                             DRVTV     56
      COMMON /FLUT/ UMOD(40),VMOD(40),VF,WW,CSCL,NMODE,IDMODE(40)        DRVTV     57
      COMMON/BAL/ NMBAL,IDBAL(20),VMBIN(20),VMBOLD(20),VMBNEW(20),       DRVTV     58
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STATEMENT LABELS			DEF LINE	REFERENCES
577	145	FMT	227	74
620	150	FMT	246	75
646	155	FMT	265	76
705	160	FMT	284	77
745	165	FMT	303	78
1005	170	FMT	322	79
1051	175	FMT	342	80

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)
		9 KOUNTH (1)	10 KOUNTI (1)	
CTABLE	8	0 KTABLE (1)	1 NPASS (1)	2 NROWS (1)
		3 NCOLS (1)	4 NCOLST (1)	5 KTABLO (1)
		6 NPAGEA (1)	7 ITAPET (1)	
CAFFDL	4	0 AFFDL (4)		

STATISTICS

PROGRAM LENGTH	1132B	602
CM LABELED COMMON LENGTH	32B	26

52000B CM USED

```
                C                                                       TAFOM     344
                      RETURN                                            TAFOM     345
    345               END                                               TAFOM     346
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SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	TAFOM	15	344

VARIABLES	SN	TYPE		RELOCATION									
0	AFFDL	REAL	ARRAY	CAFFDL	REFS	17	24	69					
2	ITAPEP	INTEGER		COMRWP	REFS	19							
0	ITAPER	INTEGER		COMRWP	REFS	19							
7	ITAPET	INTEGER		CTABLE	REFS	22							
1	ITAPEW	INTEGER		COMRWP	REFS	19	I/O REFS	65	66	67	68	69	
					70	71	72	73	74	75	76	77	
					78	79	80						
0	KALGOR	INTEGER		F.P.	REFS	58	DEFINED	15					
7	KBPAGE	INTEGER		CLIST	REFS	20							
4	KLABEL	INTEGER		CLIST	REFS	20							
0	KOUNT	INTEGER		CLIST	REFS	20	DEFINED	29	49	60			
11	KOUNTH	INTEGER		CLIST	REFS	20							
12	KOUNTI	INTEGER		CLIST	REFS	20							
1	KPAGE	INTEGER		CLIST	REFS	20							
0	KTABLE	INTEGER		CTABLE	REFS	22	DEFINED	33	37	40	43	46	
					56								
5	KTABLO	INTEGER		CTABLE	REFS	22							
5	KTPAGE	INTEGER		CLIST	REFS	20							
2	LINES	INTEGER		CLIST	REFS	20	29	49	60				
10	LINESG	INTEGER		CLIST	REFS	20							
3	LINEST	INTEGER		CLIST	REFS	20							
3	NCOLS	INTEGER		CTABLE	REFS	22	DEFINED	31	55				
4	NCOLST	INTEGER		CTABLE	REFS	22							
6	NPAGE	INTEGER		CLIST	REFS	20							
6	NPAGEA	INTEGER		CTABLE	REFS	22	DEFINED	57					
1	NPASS	INTEGER		CTABLE	REFS	22							
2	NROWS	INTEGER		CTABLE	REFS	22	DEFINED	32	36	54			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES						
PTABLE		3	34	38	41	44	47	58	
TITLES		1	30						

STATEMENT LABELS			DEF LINE	REFERENCES
220	100	FMT	81	65
270	105	FMT	99	66
336	110	FMT	115	67
373	115	FMT	131	68
430	120	FMT	147	69
464	125	FMT	163	70
514	130	FMT	179	71
535	135	FMT	195	72
556	140	FMT	211	73

VARIABLES	SN	TYPE		RELOCATION						
265	S1MB	REAL	ARRAY	BAL	REFS	57				
311	S2MB	REAL	ARRAY	BAL	REFS	57				
335	S3MB	REAL	ARRAY	BAL	REFS	57				
0	UMOD	COMPLEX	ARRAY	FLUT	REFS	7	56			
10	VDES	REAL		KLUES	REFS	47				
0	VECTS	COMPLEX	ARRAY	F.P.	REFS	7	9	426	DEFINED	1
240	VF	REAL		FLUT	REFS	56				
25	VMBIN	REAL	ARRAY	BAL	REFS	57				
75	VMBNEW	REAL	ARRAY	BAL	REFS	57				
51	VMBOLD	REAL	ARRAY	BAL	REFS	57				
120	VMOD	COMPLEX	ARRAY	FLUT	REFS	7	56			
241	WW	REAL		FLUT	REFS	56				

EXTERNALS	TYPE	ARGS	REFERENCES	
DRVSTR		3	426	
MESAGE		3	76	430
PROGNA		2	75	427
TIMEB		2	77	429

STATEMENT LABELS				DEF LINE	REFERENCES
77	9000	FMT	NO REFS	432	
122	9001	FMT	NO REFS	437	
126	9002	FMT	NO REFS	438	
152	9003	FMT	NO REFS	443	
155	9004	FMT	NO REFS	444	
163	9005	FMT	NO REFS	445	
226	9006	FMT	NO REFS	453	
235	9007	FMT	NO REFS	454	
247	9008	FMT	NO REFS	458	
273	9009	FMT	NO REFS	463	

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)
PLACES 98

0	IUIN1 (1)	1	IUIN2 (1)	2	IUOUT1 (1)			
3	IUOUT2 (1)	4	IUGO1 (1)	5	IUGO2 (1)			
6	IUGO3 (1)	7	IUGO4 (1)	8	IUSCR (1)			
9	IFSCR (1)	10	IFS1 (1)	11	IFS2 (1)			
12	IFS3 (1)	13	IFS4 (1)	14	IUCD (1)			
15	IUPR (1)	16	IUA (1)	17	IFA (1)			
18	IUY (1)	19	IFY (1)	20	IUMEMN (1)			
21	IFMEMN (1)	22	IUSTFN (1)	23	IFSTFN (1)			
24	IUKS (1)	25	IFKS (1)	26	IUB (1)			
27	IFB (1)	28	IUDESO (1)	29	IFDESO (1)			
30	IUMDBI (1)	31	IFMDBI (1)	32	IUADDI (1)			
33	IFADDI (1)	34	IUBALI (1)	35	IFBALI (1)			
36	IUDESI (1)	37	IFDESI (1)	38	IUWTI (1)			
39	IFWTI (1)	40	IUMEMO (1)	41	IFMEMO (1)			
42	IUBT (1)	43	IFBT (1)	44	IUDESN (1)			
45	IFDESN (1)	46	IUMD (1)	47	IFMD (1)			
48	IUMEMF (1)	49	IFMEMF (1)	50	IUSTFO (1)			
51	IFSTFO (1)	52	IUMDB (1)	53	IFMDB (1)			
54	IUADD (1)	55	IFADD (1)	56	IUBAL (1)			
57	IFBAL (1)	58	IUDESF (1)	59	IFDESF (1)			
60	IUWT (1)	61	IFWT (1)	62	IUDUM1 (1)			
63	IFDUM1 (1)	64	IUDUM2 (1)	65	IFDUM2 (1)			
66	IUDUM3 (1)	67	IFDUM3 (1)	68	IUL (1)			
69	IFL (1)	70	IUYT (1)	71	IFYT (1)			
72	IUZ (1)	73	IFZ (1)	74	IUZR (1)			

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
		75 IFZR (1)	76 IULR (1)	77 IFLR (1)
		78 IUBR (1)	79 IFBR (1)	80 IUPHTF (1)
		81 IFPHTF (1)	82 IUMODM (1)	83 IFMODM (1)
		84 IUMODK (1)	85 IFMODK (1)	86 IUPHT (1)
		87 IFPHT (1)	88 IUQT (1)	89 IFQT (1)
		90 IUQ (1)	91 IFQ (1)	92 IUPH (1)
		93 IFPH (1)	94 IUINCM (1)	95 IFINCM (1)
		96 IUINCK (1)	97 IFINCK (1)	
CLUFO	21	0 LKLUFO (1)	1 KLUFO (20)	
KLUFF	1	0 KFREE (1)		
PLAYFF	26	0 IUMDFF (1)	1 IFMDFF (1)	2 IUDLTI (1)
		3 IFDLTI (1)	4 IUSLTI (1)	5 IFSLTI (1)
		6 IUMPLI (1)	7 IFMPLI (1)	8 IUTPGT (1)
		9 IFTPGT (1)	10 IUPATF (1)	11 IFPATF (1)
		12 IUMPL (1)	13 IFMPL (1)	14 IUSLT (1)
		15 IFSLT (1)	16 IUDLT (1)	17 IFDLT (1)
		18 IUQA (1)	19 IFQA (1)	20 IUQAT (1)
		21 IFQAT (1)	22 IUPHA (1)	23 IFPHA (1)
		24 IUPHAT (1)	25 IFPHAT (1)	
KLUES	24	0 KLUSE (1)	1 KLUNAL (1)	2 IRED (1)
		3 KLUMD (1)	4 KLUBAL (1)	5 MSADD (1)
		6 NPASS (1)	7 IDNOPT (1)	8 VDES (1)
		9 EPS1 (1)	10 DWMAX (1)	11 NBAR (1)
		12 NFIX (1)	13 D (1)	14 DEL (1)
		15 EPS2 (1)	16 NCYC (1)	17 NNN (1)
		18 IBAND (1)	19 IFIN (1)	20 KLUB (1)
		21 KLUQ (1)	22 MORBAL (1)	23 DBAL (1)
COLS	22	0 IT (1)	1 IMINT (1)	2 IMAXT (1)
		3 IDENS (1)	4 IOLDT (1)	5 IOLDW (1)
		6 ISRAT (1)	7 IMINTO (1)	8 IINITT (1)
		9 IWPUT (1)	10 NVAR (1)	11 JWPUT (1)
		12 JINITT (1)	13 JMINT (1)	14 JMAXT (1)
		15 JOLDT (1)	16 JNEWT (1)	17 JDRV (1)
		18 JDRVO (1)	19 JSPR1 (1)	20 JSPR2 (1)
		21 JSPR3 (1)		
FILE	20	0 IPOS (20)		
CBYTES	1	0 NBYTES (1)		
FLUT	204	0 UMOD (80)	80 VMOD (80)	160 VF (1)
		161 WW (1)	162 CSCL (1)	163 NMODE (1)
		164 IDMODE (40)		
BAL	241	0 NMBAL (1)	1 IDBAL (20)	21 VMBIN (20)
		41 VMBOLD (20)	61 VMBNEW (20)	81 MBDOF (60)
		141 DRVMB (20)	161 DRVMBO (20)	181 S1MB (20)
		201 S2MB (20)	221 S3MB (20)	
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)
		9 KOUNTH (1)	10 KOUNTI (1)	

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
ROE	25	0 IROE (1)

STATISTICS

PROGRAM LENGTH	404B	260
CM LABELED COMMON LENGTH	1235B	669

52000B CM USED

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      SUBROUTINE DRVSTR(CHART,VECTS,NROWS)                              DRVSTR     2
C                                                                       DRVSTR     3
C                                                                       DRVSTR     4
      COMPLEX CHART,VECTS,B,UMOD,VMOD                                   DRVSTR     5
      COMPLEX A                                                         DRVSTR     6
C                                                                       DRVSTR     7
C                                                                       DRVSTR     8
      DIMENSION DMS(3,6,6),VAR(7)                                       DRVSTR     9
      COMMON /KLUFF/ KFREE                                              DRVSTR    10
      DIMENSION CHART(NROWS,1),VECTS(NROWS,1)                           DRVSTR    11
      DIMENSION DMM(6,6),IDDOF(5,6),NDOF(5)                             DRVSTR    12
      DIMENSION ROE(40),NAME(2)                                         DRVSTR    13
C                                                                       DRVSTR    14
C                                                                       DRVSTR    15
      COMMON /CLIST/ KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE       DRVSTR    16
     1              ,KBPAGE,LINESG,KOUNTH,KOUNTI                       DRVSTR    17
      COMMON /STORES/ NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    DRVSTR    18
     A               ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)  DRVSTR    19
     B               ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)       DRVSTR    20
     C               ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)       DRVSTR    21
     D     ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                         DRVSTR    22
     E     ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                            DRVSTR    23
     F     ,STRFDO(5,6),STRFDN(5,6)                                     DRVSTR    24
      COMMON/ INVERT / INVERT,IUA2,IFLEX,AORD(30),IPERM(30),NSTOR(30,2) DRVSTR    25
     A,IPREV,NDOFT                                                      DRVSTR    26
      DIMENSION NAME1(2),BUF1(1000),BUF2(1000)                          DRVSTR    27
      DIMENSION BUF3(1000), DELTA(30)                                   DRVSTR    28
      COMPLEX C                                                         DRVSTR    29
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD      DRVSTR    30
      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                              DRVSTR    31
      COMMON/CTAPES/ ITAPES(50)                                         DRVSTR    32
      COMMON /FLUT/ UMOD(40),VMOD(40),VF,WW,CSCL,NMODE,IDMODE(40)       DRVSTR    33
      COMMON/LOCSTR/ IUSTRI,IFSTRI,IUMREF,IFMREF                        DRVSTR    34
     1              ,IUMOD,IFMOD                                       DRVSTR    35
C                                                                       DRVSTR    36
C                                                                       DRVSTR    37
      DIMENSION VAR2(6)                                                 DRVSTR    38
      DATA VAR2 /4HPFX ,4HPFY ,4HPFZ ,4HPFXX,4HPFYY,4HPFZZ/             DRVSTR    39
      DATA VAR /4HW    ,4HIXX ,4HIYY ,4HIZZ ,4HSX  ,4HSY  ,4HSZ  /     DRVSTR    40
C                                                                       DRVSTR    41
      CALL PROGNA(4H(DRV,4HSTR))                                        DRVSTR    42
      CALL MESAGE(1,6,6HDRVSTR)                                         DRVSTR    43
C                                                                       DRVSTR    44
      NTYME=1                                                           DRVSTR    45
      NU=1                                                              DRVSTR    46
      NV=2                                                              DRVSTR    47
      IFMOD=2                                                           DRVSTR    48
    4 CONTINUE                                                          DRVSTR    49
      CALL GEDLAB(8HDRVSTRO1,IUMOD,NAME,IFMOD,KROW,KCOL)                DRVSTR    50
      ITAPEN = ITAPES(40)                                               DRVSTR    51
      DO 5 I = 1,KROW                                                   DRVSTR    52
      CALL GETROW(IUMOD,1,ROE,KCOL)                                     DRVSTR    53
      A = CMPLX(0.,0.)                                                  DRVSTR    54
      B = CMPLX(0.,0.)                                                  DRVSTR    55
      DO 3 J=1,KCOL                                                     DRVSTR    56
      A = A + (ROE(J)*UMOD(J))                                          DRVSTR    57
      B = B + (ROE(J)*VMOD(J))                                          DRVSTR    58
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                3 CONTINUE                                                      DRVSTR     59
                  CHART(NU,I)= A                                                DRVSTR     60
60                CHART(NV,I)= B                                                DRVSTR     61
                5 CONTINUE                                                      DRVSTR     62
                  CALL DCLOSE(IUMOD)                                            DRVSTR     63
          C                                                                     DRVSTR     64
                  IF(KFREE.EQ.1 .OR. NTYME.EQ.2) GO TO 6                        DRVSTR     65
65                NU= 3                                                         DRVSTR     66
                  NV= 4                                                         DRVSTR     67
                  IFMOD=3                                                       DRVSTR     68
                  NTYME=2                                                       DRVSTR     69
                  GO TO 4                                                       DRVSTR     70
70              6 CONTINUE                                                      DRVSTR     71
          C                                                                     DRVSTR     72
                  FK=VF/2.0                                                     DRVSTR     73
          C                                                                     DRVSTR     74
          C       SAVE OLD DERIVATIVES                                          DRVSTR     75
75        C                                                                     DRVSTR     76
                  DO 95 I = 1, 5                                                DRVSTR     77
                  DO 95 J = 1, 6                                                DRVSTR     78
               95 STRFDO(I,J) = STRFDN(I,J)                                     DRVSTR     79
          C                                                                     DRVSTR     80
80        C       SET UP I/O UNITS.                                             DRVSTR     81
          C                                                                     DRVSTR     82
                  N1 = ITAPES(21)                                               DRVSTR     83
                  N2 = ITAPES(22)                                               DRVSTR     84
                  N3 = ITAPES(23)                                               DRVSTR     85
85                N4 = ITAPES(28)                                               DRVSTR     86
                  N5 = ITAPES(29)                                               DRVSTR     87
                  N6 = ITAPES(30)                                               DRVSTR     88
                  N7 = ITAPES(32)                                               DRVSTR     89
                  N8 = ITAPES(33)                                               DRVSTR     90
90                N9 = ITAPES(36)                                               DRVSTR     91
                  N10 = ITAPES(50)                                              DRVSTR     92
          CIBM                                                                  DRVSTR     93
          C       IUSTF = 8                                                     DRVSTR     94
          CIBM                                                                  DRVSTR     95
95        CCDC                                                                  DRVSTR     96
                  IUSTF = 5                                                     DRVSTR     97
          CCDC                                                                  DRVSTR     98
          C                                                                     DRVSTR     99
          C       CALCULATE INCREMENTAL CHANGE IN PYLON FLEXIBILITIES FOR THIS STEP DRVSTR  100
100       C                                                                     DRVSTR    101
                  CALL TIMEB(13,13HBEFORE CHANGE )                              DRVSTR    102
                  CALL CHANGE( DELTA )                                          DRVSTR    103
                  CALL TIMEB(12,12HAFTER CHANGE )                               DRVSTR    104
          C                                                                     DRVSTR    105
105       C       READ PYLON-PYLON PARTITION OF STIFFNESS MATRIX                DRVSTR    106
          C       AND FORM MATRIX ( I - DELTA * KPP ) ON UNIT N1.               DRVSTR    107
          C                                                                     DRVSTR    108
                  REWIND N1                                                     DRVSTR    109
                  CALL GEDLAB (8HDRVSTRO1,IUSTF,NAME1,4,KROW,KCOL)              DRVSTR    110
110               DO 103 I = 1, KROW                                            DRVSTR    111
                  CALL GETROW (IUSTF,1,BUF1,KCOL)                               DRVSTR    112
                  DO 102 J = 1, KCOL                                            DRVSTR    113
                  IF( J .NE. I ) GO TO 101                                      DRVSTR    114
                  BUF2(J) = 1.0 + DELTA(I) * BUF1(J)                            DRVSTR    115
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115                GO TO 102                                                    DRVSTR    116
                 101 BUF2(J) = DELTA(I) * BUF1(J)                               DRVSTR    117
                 102 CONTINUE                                                   DRVSTR    118
                     WRITE(N1) ( BUF2(K), K = 1, KCOL )                         DRVSTR    119
                 103 CONTINUE                                                   DRVSTR    120
120                 REWIND N1                                                   DRVSTR    121
               C                                                                DRVSTR    122
               C      FORM R = INV( I - DELTA * KPP ) IN COLUMN SORT ON N3.      DRVSTR    123
               C                                                                DRVSTR    124
                     CALL TIMEB(10,10HBEFORE INV )                              DRVSTR    125
125                  CALL INV(KROW,N1,N2,N3,N4,N5,N6,N7,N8,1000,BUF1,BUF2,0)    DRVSTR    126
                     CALL TIMEB(9,9HAFTER INV )                                 DRVSTR    127
                                                                                DRVSTR    128
               C                                                                DRVSTR    129
               C     PUT KP ON N2 IN ROW SORT                                   DRVSTR    130
130            C                                                                DRVSTR    131
                     CALL GEDLAB (8HDRVSTRO2,IUSTF,NAME1,3,JROW,JCOL)           DRVSTR    132
                     REWIND N2                                                  DRVSTR    133
                     DO 105 I = 1, JROW                                         DRVSTR    134
                     CALL GETROW (IUSTF,1,BUF1,JCOL)                            DRVSTR    135
135                  WRITE(N2) ( BUF1(K), K = 1, JCOL )                         DRVSTR    136
                 105 CONTINUE                                                   DRVSTR    137
               C                                                                DRVSTR    138
               C     TRANSPOSE MATRIX ON N2 TO PRODUCE COLUMNS OF ORIGINAL      DRVSTR    139
               C     STIFFNESS MATRIX CORRESPONDING TO PYLON D.O.F.             DRVSTR    140
140            C                                                                DRVSTR    141
                     REWIND N2                                                  DRVSTR    142
                     CALL TIMEB(13,13HBEFORE TRPOSE )                           DRVSTR    143
                     CALL TRPOSE(N2,BUF1,BUF2,JCOL,JROW,N4,N5,1000)             DRVSTR    144
                     CALL TIMEB(12,12HAFTER TRPOSE )                            DRVSTR    145
145            C                                                                DRVSTR    146
               C     FORM  KP * R                                               DRVSTR    147
               C                                                                DRVSTR    148
                     REWIND N3                                                  DRVSTR    149
                     REWIND N1                                                  DRVSTR    150
150                  REWIND N4                                                  DRVSTR    151
                     CALL TRIXY(N4,N3,N1,JROW,JCOL,KCOL,BUF1,BUF2,BUF3,1000,IRET) DRVSTR  152
                     CALL TIMEB(11,11HAFTER TRIXY )                             DRVSTR    153
               C                                                                DRVSTR    154
               C     CALCULATE NDOFT PYLON FLEXIBILITY DERIVATIVES.             DRVSTR    155
155            C                                                                DRVSTR    156
                     ND = JROW                                                  DRVSTR    157
                     REWIND N1                                                  DRVSTR    158
                     DO 140 I = 1, NDOFT                                        DRVSTR    159
                     READ(N1) ( BUF1(K), K = 1, ND )                            DRVSTR    160
160                  A = CMPLX(0.,0.)                                           DRVSTR    161
                     B = CMPLX(0.,0.)                                           DRVSTR    162
                     DO 120 K = 1, ND                                           DRVSTR    163
                     C =  BUF1(K) * CHART(1,K)                                  DRVSTR    164
                     B = B + C                                                  DRVSTR    165
165              120 CONTINUE                                                   DRVSTR    166
                     DO 130 J = 1, ND                                           DRVSTR    167
                     C =  CHART(2,J) * BUF1(J)                                  DRVSTR    168
                     A = A + C                                                  DRVSTR    169
                 130 CONTINUE                                                   DRVSTR    170
170                  B = A * B                                                  DRVSTR    171
                     AKED = REAL(B) - CSCL * AIMAG(B)                           DRVSTR    172
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                AKED = - AKED                                                   DRVSTR  173
                JROW = NSTOR(I,1)                                               DRVSTR  174
                JCOL = NSTOR(I,2)                                               DRVSTR  175
175             STRFDN(JROW,JCOL) = ( FK/WW) * AKED * 386.4                     DRVSTR  176
              140 CONTINUE                                                      DRVSTR  177
                CALL TIMEB(16,16HAFTER FLEX DERIV )                             DRVSTR  178
            C                                                                   DRVSTR  179
                DO 200 I=1,NUMSTR                                               DRVSTR  180
180         C                                                                   DRVSTR  181
            C SET UP DERIVATIVE OF MASS MATRIX WITH RESPECT TO WEIGHT.          DRVSTR  182
            C                                                                   DRVSTR  183
                DO 10 J=1,6                                                     DRVSTR  184
                DO 10 K=1,6                                                     DRVSTR  185
185             DMM(J,K)=0.0                                                    DRVSTR  186
               10 CONTINUE                                                      DRVSTR  187
            C                                                                   DRVSTR  188
                SX= STRRN(I,1)                                                  DRVSTR  189
                SY= STRRN(I,2)                                                  DRVSTR  190
190             SZ= STRRN(I,3)                                                  DRVSTR  191
            C                                                                   DRVSTR  192
            C                                                                   DRVSTR  193
                DO 20 J=1,3                                                     DRVSTR  194
                DMM(J,J)=1.0                                                    DRVSTR  195
195            20 CONTINUE                                                      DRVSTR  196
            C                                                                   DRVSTR  197
                DMM(4,2)= -SZ                                                   DRVSTR  198
            C     CURRENT EQUATIONS FOR DERIVATIVES OF STORE MASS MATRIX ARE BASED DRVSTR  199
            C     ON RIGHT-HAND COORDINATE SYSTEM.                              DRVSTR  200
200         C                                                                   DRVSTR  201
            C     ORIGINAL EQUATIONS, TAKEN FROM GAC REPORT ADCR-80-1, ARE      DRVSTR  202
            C     RETAINED AS COMMENTS.                                         DRVSTR  203
            C                                                                   DRVSTR  204
                DMM(4,3)= SY                                                    DRVSTR  205
205             DMM(4,4)= (SY*SY)+(SZ*SZ)                                       DRVSTR  206
            C                                                                   DRVSTR  207
                DMM(5,1)= SZ                                                    DRVSTR  208
                DMM(5,3)= -SX                                                   DRVSTR  209
                DMM(5,4)= -SX*SY                                                DRVSTR  210
210             DMM(5,5)= (SX*SX)+(SZ*SZ)                                       DRVSTR  211
            C                                                                   DRVSTR  212
            C     DMM(6,1)= SY                                                  DRVSTR  213
            C     DMM(6,2)=-SX                                                  DRVSTR  214
            C     DMM(6,4)= SX*SZ                                               DRVSTR  215
215         C     DMM(6,5)= SY*SZ                                               DRVSTR  216
                DMM(6,1)=-SY                                                    DRVSTR  217
                DMM(6,2)= SX                                                    DRVSTR  218
                DMM(6,4)=-SX*SZ                                                 DRVSTR  219
                DMM(6,5)=-SY*SZ                                                 DRVSTR  220
220             DMM(6,6)= (SX*SX)+(SY*SY)                                       DRVSTR  221
            C                                                                   DRVSTR  222
                DO 30 J=1,6                                                     DRVSTR  223
                DO 30 K=1,J                                                     DRVSTR  224
                DMM(K,J)=DMM(J,K)                                               DRVSTR  225
225            30 CONTINUE                                                      DRVSTR  226
            C                                                                   DRVSTR  227
            C CONTRACT DMM TO ACCOUNT FOR ANY IGNORED STRUCTURAL DOF.           DRVSTR  228
            C                                                                   DRVSTR  229
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                      K=0                                                    DRVSTR    230
230                   DO 40 J=1,6                                            DRVSTR    231
                      IF(IDYDOF(I,J).EQ.0) GO TO 40                          DRVSTR    232
                      K=K+1                                                  DRVSTR    233
                      IDDOF(I,K)=IDYDOF(I,J)                                 DRVSTR    234
                      DO 35 L=1,6                                            DRVSTR    235
235                   DMM(K,L)=DMM(J,L)                                      DRVSTR    236
                   35 CONTINUE                                               DRVSTR    237
                   40 CONTINUE                                               DRVSTR    238
                C                                                            DRVSTR    239
                      K=0                                                    DRVSTR    240
240                   DO 45  L=1,6                                           DRVSTR    241
                      IF (IDYDOF(I,L).EQ.0) GOTO 45                          DRVSTR    242
                      K=K+1                                                  DRVSTR    243
                      IDDOF (I,K) = IDYDOF(I,L)                              DRVSTR    244
                      DO 44  J=1,6                                           DRVSTR    245
245                   DMM(J,K)  = DMM(J,L)                                   DRVSTR    246
                   44 CONTINUE                                               DRVSTR    247
                   45 CONTINUE                                               DRVSTR    248
                C                                                            DRVSTR    249
                      NDOF(I)=K                                              DRVSTR    250
250             C                                                            DRVSTR    251
                C SET UP VECTORS (VECTS) TO CONTAIN COMPONENTS OF FLUTIER VECTORS    DRVSTR    252
                C ASSOCIATED WITH STORE UNDER CONSIDERATION.                 DRVSTR    253
                C                                                            DRVSTR    254
                      L=NDOF(I)                                              DRVSTR    255
255                   K=0                                                    DRVSTR    256
                      DO 50 J=1,L                                            DRVSTR    257
                      M=IDDOF(I,J)                                           DRVSTR    258
                      VECTS(1,J)= CHART(3,M)                                 DRVSTR    259
                      VECTS(2,J)= CHART(4,M)                                 DRVSTR    260
260                   50 CONTINUE                                            DRVSTR    261
                C                                                            DRVSTR    262
                C NOW FORM DERIVATIVE (OF WEIGHT VARIABLE)                   DRVSTR    263
                C                                                            DRVSTR    264
                      B=CMPLX(0.,0.)                                         DRVSTR    265
265                   DO 60 J=1,L                                            DRVSTR    266
                      DO 60 K=1,L                                            DRVSTR    267
                      B=B+VECTS(2,J)*DMM(J,K)*VECTS(1,K)                     DRVSTR    268
                   60 CONTINUE                                               DRVSTR    269
                C                                                            DRVSTR    270
270                   AKED=REAL(B)-CSCL*AIMAG(B)                             DRVSTR    271
                      AKED=FK*AKED                                           DRVSTR    272
                C                                                            DRVSTR    273
                      STRWDO(I)=STRWDN(I)                                    DRVSTR    274
                      STRWDN(I)=-AKED                                        DRVSTR    275
275             C                                                            DRVSTR    276
                C NOW CONSIDER INERTIA TYPE VARIABLES.                       DRVSTR    277
                C                                                            DRVSTR    278
                      DO 70 J=4,6                                            DRVSTR    279
                      B=CMPLX(0.,0.)                                         DRVSTR    280
280                   IF(IDYDOF(I,J).EQ.0) GO TO 70                          DRVSTR    281
                      L=IDYDOF(I,J)                                          DRVSTR    282
                      B= B + CHART(4,L)*CHART(3,L)                           DRVSTR    283
                      AKED=REAL(B)-CSCL*AIMAG(B)                             DRVSTR    284
                      AKED=FK*AKED                                           DRVSTR    285
285                   K=J-3                                                  DRVSTR    286
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                  STRIDO(I,K)=STRIDN(I,K)                                  DRVSTR   287
                  STRIDN(I,K)=-AKED                                        DRVSTR   288
               70 CONTINUE                                                 DRVSTR   289
                  IF(KCONST.NE.O) GO TO 73                                 DRVSTR   290
290               X = STRIDN(I,2) + STRIDN(I,3)                            DRVSTR   291
                  STRIDN(I,2) = X                                          DRVSTR   292
                  STRIDN(I,3) = X                                          DRVSTR   293
               73 CONTINUE                                                 DRVSTR   294
            C                                                              DRVSTR   295
295         C NOW CONSIDER CG TYPE VARIABLES                               DRVSTR   296
            C                                                              DRVSTR   297
                  DO 75 J= 1,3                                             DRVSTR   298
                  DO 75 K= 1,6                                             DRVSTR   299
                  DO 75 L= 1,6                                             DRVSTR   300
300               DMS(J,K,L)= 0.0                                          DRVSTR   301
               75 CONTINUE                                                 DRVSTR   302
            C                                                              DRVSTR   303
                  W= STRWN(I)                                              DRVSTR   304
                  DMS(1,5,3)= -W                                           DRVSTR   305
305               DMS(1,5,4)= -W*SY                                        DRVSTR   306
                  DMS(1,5,5)=  W*SX*2.                                     DRVSTR   307
            C     DMS(1,6,2)= -W                                           DRVSTR   308
            C     DMS(1,6,4)=  W*SZ                                        DRVSTR   309
                  DMS(1,6,2)=  W                                           DRVSTR   310
310               DMS(1,6,4)= -W*SZ                                        DRVSTR   311
                  DMS(1,6,6)=  W*SX*2.                                     DRVSTR   312
            C                                                              DRVSTR   313
                  DMS(2,4,3)=  W                                           DRVSTR   314
                  DMS(2,4,4)=  W*SY*2.                                     DRVSTR   315
315               DMS(2,5,4)= -W*SX                                        DRVSTR   316
            C     DMS(2,6,1)=  W                                           DRVSTR   317
            C     DMS(2,6,5)=  W*SZ                                        DRVSTR   318
                  DMS(2,6,1)= -W                                           DRVSTR   319
                  DMS(2,6,5)= -W*SZ                                        DRVSTR   320
320               DMS(2,6,6)=  W*SY*2.                                     DRVSTR   321
            C                                                              DRVSTR   322
                  DMS(3,4,2)= -W                                           DRVSTR   323
                  DMS(3,4,4)=  W*SZ*2.                                     DRVSTR   324
                  DMS(3,5,1)=  W                                           DRVSTR   325
325               DMS(3,5,5)=  W*SZ*2.                                     DRVSTR   326
            C     DMS(3,6,4)=  W*SX                                        DRVSTR   327
            C     DMS(3,6,5)=  W*SY                                        DRVSTR   328
                  DMS(3,6,4)= -W*SX                                        DRVSTR   329
                  DMS(3,6,5)= -W*SY                                        DRVSTR   330
330         C                                                              DRVSTR   331
                  DO 76 J= 1,3                                             DRVSTR   332
                  DO 76 K= 1,6                                             DRVSTR   333
                  DO 76 L= 1,K                                             DRVSTR   334
                  DMS(J,L,K)= DMS(J,K,L)                                   DRVSTR   335
335               76 CONTINUE                                              DRVSTR   336
            C                                                              DRVSTR   337
            C CONTRACT DMS TO ACCOUNT FOR ANY IGNORED DOF'S                DRVSTR   338
            C                                                              DRVSTR   339
                  DO 77 L= 1,3                                             DRVSTR   340
340               K=O                                                      DRVSTR   341
                  DO 78 J= 1,6                                             DRVSTR   342
                  IF(IDYDOF(I,J) .EQ. O) GO TO 78                          DRVSTR   343
```

```
                  K=K+1                                                    DRVSTR   344
                  DO 72 M=1,6                                              DRVSTR   345
345               DMS(L,K,M)= DMS(L,J,M)                                   DRVSTR   346
               72 CONTINUE                                                 DRVSTR   347
               78 CONTINUE                                                 DRVSTR   348
                  K=0                                                      DRVSTR   349
                  DO 74 J=1,6                                              DRVSTR   350
350               IF (IDYDOF(I,J).EQ.0) GO TO 74                           DRVSTR   351
                  K=K+1                                                    DRVSTR   352
                  DO 79 M= 1,6                                             DRVSTR   353
                  DMS(L,M,K)= DMS(L,M,J)                                   DRVSTR   354
               79 CONTINUE                                                 DRVSTR   355
355            74 CONTINUE                                                 DRVSTR   356
               77 CONTINUE                                                 DRVSTR   357
            C                                                              DRVSTR   358
            C NOW FORM DERIVATIVES OF CG VARIABLES                         DRVSTR   359
            C                                                              DRVSTR   360
360               DO 81 II= 1,3                                            DRVSTR   361
                  L= NDOF(I)                                               DRVSTR   362
                  K= 0                                                     DRVSTR   363
                  B= CMPLX(0.,0.)                                          DRVSTR   364
                  DO 82 J= 1,L                                             DRVSTR   365
365               DO 82 K= 1,L                                             DRVSTR   366
                  B= B + VECTS(2,J)*DMS(II,J,K)*VECTS(1,K)                 DRVSTR   367
               82 CONTINUE                                                 DRVSTR   368
                  AKED= REAL(B) - CSCL*AIMAG(B)                            DRVSTR   369
                  STRRDO(I,II)= STRRDN(I,II)                               DRVSTR   370
370               STRRDN(I,II)= -AKED*FK                                   DRVSTR   371
               81 CONTINUE                                                 DRVSTR   372
            C                                                              DRVSTR   373
            C LIST DERIVATIVES OF STORE VARIABLES                          DRVSTR   374
            C                                                              DRVSTR   375
375               WRITE(ITAPEW,9000) IDSTR(I)                              DRVSTR   376
                  WRITE(ITAPEN,9000) IDSTR(I)                              DRVSTR   377
                  WRITE(ITAPEW,9001) VAR(1),STRWDN(I)                      DRVSTR   378
                  WRITE(ITAPEN,9001) VAR(1),STRWDN(I)                      DRVSTR   379
                  DO 80 J=1,3                                              DRVSTR   380
380               K=J+3                                                    DRVSTR   381
                  IF(IDYDOF(I,K).EQ.0) GO TO 80                            DRVSTR   382
                  K=J+1                                                    DRVSTR   383
                  WRITE(ITAPEW,9001) VAR(K),STRIDN(I,J)                    DRVSTR   384
                  WRITE(ITAPEN,9001) VAR(K),STRIDN(I,J)                    DRVSTR   385
385            80 CONTINUE                                                 DRVSTR   386
            C                                                              DRVSTR   387
                  DO 83 J= 1,3                                             DRVSTR   388
                  K= J+4                                                   DRVSTR   389
                  WRITE(ITAPEW,9001) VAR(K),STRRDN(I,J)                    DRVSTR   390
390            83 CONTINUE                                                 DRVSTR   391
                  DO 84 J = 1, 6                                           DRVSTR   392
                  WRITE(ITAPEW,9001) VAR2(J), STRFDN(I,J)                  DRVSTR   393
               84 CONTINUE                                                 DRVSTR   394
                  DO 90 II= 1,3                                            DRVSTR   395
395               L= NDOF(I)                                               DRVSTR   396
                  WRITE(ITAPEW,9003) I,II                                  DRVSTR   397
                  DO 90 J= 1,L                                             DRVSTR   398
                  WRITE(ITAPEW,9002) J,(DMS(II,J,K),K=1,L)                 DRVSTR   399
               90 CONTINUE                                                 DRVSTR   400
```

```
400               WRITE(ITAPEW,9004) (VECTS(1,J),J=1,L)                    DRVSTR   401
                  WRITE(ITAPEW,9005) (VECTS(2,J),J=1,L)                    DRVSTR   402
                  WRITE(ITAPEW,9006) CSCL                                  DRVSTR   403
                9003 FORMAT(///10X,5HSTORE,I2,18H DERIVATIVES FOR S,I1/)   DRVSTR   404
                9002 FORMAT(10X,I1,2X,6(1PE15.5))                          DRVSTR   405
405             9004 FORMAT(//,10X,18H U FLUTTER VECTORS,//,10X,6(1PE15.5),DRVSTR   406
               A       //,10X,6(1PE15.5))                                 DRVSTR   407
                9005 FORMAT(//,10X,18H V FLUTTER VECTORS,//,10X,6(1PE15.5),DRVSTR   408
               A       //10X,6(1PE15.5))                                  DRVSTR   409
                9006 FORMAT(//10X,6HCSCL =,1PE15.5)                        DRVSTR   410
410              200 CONTINUE                                              DRVSTR   411
              C                                                            DRVSTR   412
              C                                                            DRVSTR   413
                9000 FORMAT(///,10X, 28HDERIVATIVES FOR STORE NUMBER,I4)   DRVSTR   414
                9001 FORMAT(/,10X,A4,2X,1PE15.5)                           DRVSTR   415
415           C                                                            DRVSTR   416
                  RETURN                                                   DRVSTR   417
                  END                                                      DRVSTR   418
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	DRVSTR	1	416

VARIABLES

		SN	TYPE		RELOCATION							
1603	A		COMPLEX			REFS	5	56	59	168	170		
						DEFINED	53	56	160	168			
1640	AKED		REAL			REFS	172	175	271	274	284	287	370
						DEFINED	171	172	270	271	283	284	368
3	AORD		REAL	ARRAY	INVERT	REFS	24						
1601	B		COMPLEX			REFS	4	57	60	164	170	2*171	267
						2*270	282	2*283	366	2*368	DEFINED	54	57
						161	164	170	264	267	279	282	363
						366							
2217	BUF1		REAL	ARRAY		REFS	26	111	114	116	125	134	135
						143	151	163	167	DEFINED	159		
4167	BUF2		REAL	ARRAY		REFS	26	118	125	143	151		
						DEFINED	114	116					
6137	BUF3		REAL	ARRAY		REFS	27	151					
1605	C		COMPLEX			REFS	28	164	168	DEFINED	163	167	
0	CHART		COMPLEX	ARRAY	F.P.	REFS	4	10	163	167	258	259	2*282
						DEFINED	1	59	60				
242	CSCL		REAL		FLUT	REFS	32	171	270	283	368	402	
10107	DELTA		REAL	ARRAY		REFS	27	102	114	116			
2034	DMM		REAL	ARRAY		REFS	11	224	235	245	267		
						DEFINED	185	194	197	204	205	207	208
						209	210	216	217	218	219	220	224
						235	245						
1651	DMS		REAL	ARRAY		REFS	8	334	345	353	366	398	
						DEFINED	300	304	305	306	309	310	311
						313	314	315	318	319	320	322	323
						324	325	328	329	334	345	353	
1617	FK		REAL			REFS	175	271	284	370	DEFINED	72	

VARIABLES		SN	TYPE		RELOCATION							
1615	I		INTEGER			REFS	59	60	2*78	113	114	116	173
							174	188	189	190	231	2*233	241	2*243
							249	254	257	2*273	274	280	281	2*286
							287	2*290	291	292	303	342	350	361
							2*369	370	375	376	377	378	381	383
							384	389	392	395	396	DEFINED	51	76
							110	133	158	179				
0	ICYCLE		INTEGER		STRCLU	REFS	29							
2100	IDDOF		INTEGER	ARRAY		REFS	11	257	DEFINED	233	243			
244	IDMODE		INTEGER	ARRAY	FLUT	REFS	32							
76	IDSTR		INTEGER	ARRAY	STORES	REFS	17	375	376					
40	IDYDOF		INTEGER	ARRAY	STORES	REFS	17	231	233	241	243	280	281	
							342	350	381					
2	IFLEX		INTEGER		INVERT	REFS	24							
5	IFMOD		INTEGER		LOCSTR	REFS	33	49	DEFINED	47	67			
3	IFMREF		INTEGER		LOCSTR	REFS	33							
1	IFSTRI		INTEGER		LOCSTR	REFS	33							
1650	II		INTEGER			REFS	366	2*369	370	396	398			
						DEFINED	360	394						
0	INVERT		INTEGER		INVERT	REFS	24							
41	IPERM		INTEGER	ARRAY	INVERT	REFS	24							
173	IPREV		INTEGER		INVERT	REFS	24							
1636	IRET	*	INTEGER			REFS	151							
2	ISTDOF		INTEGER	ARRAY	STORES	REFS	17							
1	ISTEP		INTEGER		STRCLU	REFS	29							
1614	ITAPEN		INTEGER			DEFINED	50	I/O REFS	376	378	384			
2	ITAPEP		INTEGER		COMRWP	REFS	30							
0	ITAPER		INTEGER		COMRWP	REFS	30							
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	31	50	82	83	84	85	86	
							87	88	89	90	91			
1	ITAPEW		INTEGER		COMRWP	REFS	30	I/O REFS	375	377	383	389	392	
							396	398	400	401	402			
1	IUA2		INTEGER		INVERT	REFS	24							
4	IUMOD		INTEGER		LOCSTR	REFS	33	49	52	62				
2	IUMREF		INTEGER		LOCSTR	REFS	33							
1632	IUSTF		INTEGER			REFS	109	111	131	134	DEFINED	96		
0	IUSTRI		INTEGER		LOCSTR	REFS	33							
1616	J		INTEGER			REFS	2*56	2*57	2*78	113	2*114	2*116	2*167	
							185	2*194	223	2*224	231	233	235	2*245
							257	258	259	2*267	280	281	285	300
							2*334	342	345	350	353	2*366	380	382
							383	384	388	389	2*392	2*398	400	401
						DEFINED	55	77	112	166	183	193	222	
							230	244	256	265	278	297	331	341
							349	364	379	387	391	397	400	401
1635	JCOL		INTEGER			REFS	131	134	135	143	151	175		
						DEFINED	174							
1634	JROW		INTEGER			REFS	131	133	143	151	156	175		
						DEFINED	173							
1633	K		INTEGER			REFS	118	135	159	2*163	185	2*224	232	
							233	235	242	243	245	249	2*267	2*286
							287	300	333	2*334	343	345	351	353
							2*366	381	383	384	389	398		
						DEFINED	118	135	159	162	184	223	229	
							232	239	242	255	266	285	298	332
							340	343	348	351	362	365	380	382
							388	398						

VARIABLES	SN	TYPE	RELOCATION							
7	KBPAGE	INTEGER	CLIST	REFS	15					
1613	KCOL	INTEGER		REFS	49	52	55	109	111	112	118
				151						
1	KCONST	INTEGER	STORES	REFS	17	289				
0	KFREE	INTEGER	KLUFF	REFS	9	64				
4	KLABEL	INTEGER	CLIST	REFS	15					
0	KOUNT	INTEGER	CLIST	REFS	15					
11	KOUNTH	INTEGER	CLIST	REFS	15					
12	KOUNTI	INTEGER	CLIST	REFS	15					
1	KPAGE	INTEGER	CLIST	REFS	15					
1612	KROW	INTEGER		REFS	49	51	109	110	125	
5	KTPAGE	INTEGER	CLIST	REFS	15					
1644	L	INTEGER		REFS	2*235	241	243	245	256	265	266
				2*282	300	2*334	2*345	2*353	364	365	397
				398	400	401	DEFINED	234	240	254	281
				299	333	339	361	395			
2	LINES	INTEGER	CLIST	REFS	15					
10	LINESG	INTEGER	CLIST	REFS	15					
3	LINEST	INTEGER	CLIST	REFS	15					
1645	M	INTEGER		REFS	258	259	2*345	2*353	DEFINED	257	344
				352						
2	M1	INTEGER	STRCLU	REFS	29					
3	M2	INTEGER	STRCLU	REFS	29					
4	M3	INTEGER	STRCLU	REFS	29					
5	M4	INTEGER	STRCLU	REFS	29					
2213	NAME	INTEGER ARRAY		REFS	12	49				
2215	NAME1	INTEGER ARRAY		REFS	26	109	131			
1637	ND	INTEGER		REFS	159	162	166	DEFINED	156	
2136	NDOF	INTEGER ARRAY		REFS	11	254	361	395	DEFINED	249	
174	NDOFT	INTEGER	INVERT	REFS	24	158				
243	NMODE	INTEGER	FLUT	REFS	32					
6	NPAGE	INTEGER	CLIST	REFS	15					
0	NROWS	INTEGER	F.P.	REFS	2*10	DEFINED	1			
77	NSTOR	INTEGER ARRAY	INVERT	REFS	24	173	174			
1607	NTYME	INTEGER		REFS	64	DEFINED	44	68		
1610	NU	INTEGER		REFS	59	DEFINED	45	65		
0	NUMSTR	INTEGER	STORES	REFS	17	179				
1611	NV	INTEGER		REFS	60	DEFINED	46	66		
1620	N1	INTEGER		REFS	125	151	DEFINED	82	I/O REFS	108	118
				120	149	157	159			
1631	N10	* INTEGER		DEFINED	91					
1621	N2	INTEGER		REFS	125	143	DEFINED	83	I/O REFS	132	135
				141						
1622	N3	INTEGER		REFS	125	151	DEFINED	84	I/O REFS	148	
1623	N4	INTEGER		REFS	125	143	151	DEFINED	85		
				I/O REFS	150						
1624	N5	INTEGER		REFS	125	143	DEFINED	86			
1625	N6	INTEGER		REFS	125	DEFINED	87				
1626	N7	INTEGER		REFS	125	DEFINED	88				
1627	N8	INTEGER		REFS	125	DEFINED	89				
1630	N9	* INTEGER		DEFINED	90						
2143	ROE	REAL ARRAY		REFS	12	52	56	57			
362	SCALE	REAL ARRAY	STORES	REFS	17						
11	STPOLD	REAL	STRCLU	REFS	29						
653	STRFDN	REAL ARRAY	STORES	REFS	17	78	392	DEFINED	175		
615	STRFDO	REAL ARRAY	STORES	REFS	17	DEFINED	78				
463	STRFI	REAL ARRAY	STORES	REFS	17						

VARIABLES	SN	TYPE		RELOCATION							
557	STRFN	REAL	ARRAY	STORES	REFS	17					
521	STRFO	REAL	ARRAY	STORES	REFS	17					
305	STRIDN	REAL	ARRAY	STORES	REFS	17	286	2*290	383	384	
					DEFINED	287	291	292			
266	STRIDO	REAL	ARRAY	STORES	REFS	17	DEFINED	286			
122	STRII	REAL	ARRAY	STORES	REFS	17					
160	STRIN	REAL	ARRAY	STORES	REFS	17					
141	STRIO	REAL	ARRAY	STORES	REFS	17					
343	STRRDN	REAL	ARRAY	STORES	REFS	17	369	389	DEFINED	370	
324	STRRDO	REAL	ARRAY	STORES	REFS	17	DEFINED	369			
177	STRRI	REAL	ARRAY	STORES	REFS	17					
235	STRRN	REAL	ARRAY	STORES	REFS	17	188	189	190		
216	STRRO	REAL	ARRAY	STORES	REFS	17					
261	STRWDN	REAL	ARRAY	STORES	REFS	17	273	377	378	DEFINED	274
254	STRWDO	REAL	ARRAY	STORES	REFS	17	DEFINED	273			
103	STRWI	REAL	ARRAY	STORES	REFS	17					
115	STRWN	REAL	ARRAY	STORES	REFS	17	303				
110	STRWO	REAL	ARRAY	STORES	REFS	17					
1641	SX	REAL			REFS	208	209	2*210	217	218	2*220	306
					311	315	328	DEFINED	188			
1642	SY	REAL			REFS	204	2*205	209	216	219	2*220	305
					314	320	329	DEFINED	189			
1643	SZ	REAL			REFS	197	2*205	207	2*210	218	219	310
					319	323	325	DEFINED	190			
0	UMOD	COMPLEX	ARRAY	FLUT	REFS	4	32	56				
2025	VAR	REAL	ARRAY		REFS	8	377	378	383	384	389	
					DEFINED	39						
10145	VAR2	REAL	ARRAY		REFS	37	392	DEFINED	38			
0	VECTS	COMPLEX	ARRAY	F.P.	REFS	4	10	2*267	2*366	400	401	
					DEFINED	1	258	259				
240	VF	REAL		FLUT	REFS	32	72					
120	VMOD	COMPLEX	ARRAY	FLUT	REFS	4	32	57				
10	VNEW	REAL		STRCLU	REFS	29						
7	VOLD	REAL		STRCLU	REFS	29						
6	VS	REAL		STRCLU	REFS	29						
1647	W	REAL			REFS	304	305	306	309	310	311	313
					314	315	318	319	320	322	323	324
					325	328	329	DEFINED	303			
241	WW	REAL		FLUT	REFS	32	175					
1646	X	REAL			REFS	291	292	DEFINED	290			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES						
CHANGE		1	102						
DCLOSE		1	62						
GEDLAB		6	49	109	131				
GETROW		4	52	111	134				
INV		13	125						
MESAGE		3	42						
PROGNA		2	41						
TIMEB		2	101	103	124	126	142	144	152	177
TRIXY		11	151						
TRPOSE		8	143						

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES						
AIMAG	REAL	1	INTRIN	171	270	283	368			
CMPLX	COMPLEX	2	INTRIN	53	54	160	161	264	279	363

INLINE	FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES				
	REAL	REAL	1	INTRIN	171	270	283	368	

STATEMENT	LABELS		DEF LINE	REFERENCES					
0	3		58	55					
17	4		48	69					
0	5		61	51					
75	6		70	64					
0	10		186	183	184				
0	20		195	193					
0	30		225	222	223				
0	35		236	234					
436	40		237	230	231				
0	44		246	244					
464	45		247	240	241				
0	50		260	256					
0	60		268	265	266				
602	70		288	278	280				
0	72		346	344					
612	73		293	289					
747	74		355	349	350				
0	75		301	297	298	299			
0	76		335	331	332	333			
0	77		356	339					
722	78		347	341	342				
0	79		354	352					
1073	80		385	379	381				
0	81		371	360					
0	82		367	364	365				
0	83		390	387					
0	84		393	391					
0	90		399	394	397				
0	95		78	76	77				
160	101		116	113					
161	102		117	112	115				
0	103		119	110					
0	105		136	133					
0	120		165	162					
0	130		169	166					
0	140		176	158					
0	200		410	179					
1550	9000	FMT	413	375	376				
1556	9001	FMT	414	377	378	383	384	389	392
1523	9002	FMT	404	398					
1515	9003	FMT	403	396					
1526	9004	FMT	405	400					
1535	9005	FMT	407	401					
1544	9006	FMT	409	402					

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
24	5	I	51 61	40B	EXT REFS NOT INNER
36	3	J	55 58	11B	OPT
100	95	I	76 78	13B	NOT INNER
104	95	J	77 78	3B	INSTACK
145	103	I	110 119	26B	EXT REFS NOT INNER
154	102	J	112 117	6B	INSTACK
207	105	I	133 136	12B	EXT REFS
246	140	I	158 176	60B	EXT REFS NOT INNER

VARIABLES	SN	TYPE	RELOCATION								
1634	K	INTEGER		REFS	318	357	DEFINED	318	357		
7	KBPAGE	INTEGER	CLIST	REFS	40						
1562	KCOL	INTEGER		REFS	61	64	74	251	254		
1621	KK	INTEGER		REFS	284	285	297	312	313	327	
				DEFINED	272	367					
4	KLABEL	INTEGER	CLIST	REFS	40						
24	KLUB	INTEGER	KLUES	REFS	27						
4	KLUBAL	INTEGER	KLUES	REFS	27						
3	KLUMD	INTEGER	KLUES	REFS	27						
1	KLUNAL	INTEGER	KLUES	REFS	27						
25	KLUQ	INTEGER	KLUES	REFS	27						
0	KLUSE	INTEGER	KLUES	REFS	27						
1616	KNEW	INTEGER		REFS	226	229	231	DEFINED	223	224	
1576	KOLD	INTEGER		REFS	226	DEFINED	129	229			
0	KOUNT	INTEGER	CLIST	REFS	40	122	125	136	200	203	205
					207	210	237	240	242	246	267	309
					311	314	316	320	321	330	334	336
					338	341	343	359	371	374	376	378
					382	DEFINED	119	122	125	136	201	205
					207	210	238	242	246	264	267	270
					311	314	316	320	322	332	336	338
					341	343	359	366	372	376	378	382
11	KOUNTH	INTEGER	CLIST	REFS	40	203	240	309	334	374	
12	KOUNTI	INTEGER	CLIST	REFS	40						
1600	KOWNT	INTEGER		REFS	141	209	DEFINED	131	141		
1	KPAGE	INTEGER	CLIST	REFS	40						
1561	KROW	INTEGER		REFS	61	63	64	73	145	251	253
					280						
5	KTPAGE	INTEGER	CLIST	REFS	40						
0	KVAR	INTEGER	F.P.	REFS	2*6	DEFINED	1				
1615	LEFT	INTEGER		REFS	201	238	322	332	372		
				DEFINED	200	237	321	330	371		
2	LINES	INTEGER	CLIST	REFS	40	119	200	201	237	238	264
					270	321	322	330	332	366	371	372
10	LINESG	INTEGER	CLIST	REFS	40						
3	LINEST	INTEGER	CLIST	REFS	40						
121	MBDOF	INTEGER	ARRAY BAL	REFS	30						
1627	MEMB	INTEGER		REFS	318	DEFINED	287				
26	MORBAL	INTEGER	KLUES	REFS	27						
5	MSADD	INTEGER	KLUES	REFS	27						
1636	NAME	INTEGER	ARRAY	REFS	6	61	64	251			
13	NBAR	INTEGER	KLUES	REFS	27						
20	NCYC	INTEGER	KLUES	REFS	27	118					
1635	NEED	INTEGER		REFS	332	DEFINED	331				
14	NFIX	INTEGER	KLUES	REFS	27						
0	NMBAL	INTEGER	BAL	REFS	30	84	85	180	181	329	331
					344						
243	NMODE	INTEGER	FLUT	REFS	38						
21	NNN	INTEGER	KLUES	REFS	27	100	102	103	DEFINED	103	
1640	NOTE	INTEGER	ARRAY	REFS	8	318	357	DEFINED	43		
6	NPAGE	INTEGER	CLIST	REFS	40						
6	NPASS	INTEGER	KLUES	REFS	27						
1575	NREDES	INTEGER		REFS	121	204	241	266	310	335	375
				DEFINED	118						
1624	NT	INTEGER		REFS	286	345	364	380	DEFINED	276	286
					345						
12	NVAR	INTEGER	COLS	REFS	33						

VARIABLES	SN	TYPE		RELOCATION							
100	IUDUM2	INTEGER		PLACES	REFS	10	56	57			
102	IUDUM3	INTEGER		PLACES	REFS	10					
4	IUGO1	INTEGER		PLACES	REFS	10					
5	IUGO2	INTEGER		PLACES	REFS	10					
6	IUGO3	INTEGER		PLACES	REFS	10					
7	IUGO4	INTEGER		PLACES	REFS	10					
140	IUINCK	INTEGER		PLACES	REFS	10					
136	IUINCM	INTEGER		PLACES	REFS	10					
0	IUIN1	INTEGER		PLACES	REFS	10					
1	IUIN2	INTEGER		PLACES	REFS	10					
30	IUKS	INTEGER		PLACES	REFS	10					
104	IUL	INTEGER		PLACES	REFS	10					
114	IULR	INTEGER		PLACES	REFS	10					
56	IUMD	INTEGER		PLACES	REFS	10					
64	IUMDB	INTEGER		PLACES	REFS	10					
36	IUMDBI	INTEGER		PLACES	REFS	10					
60	IUMEMF	INTEGER		PLACES	REFS	10					
24	IUMEMN	INTEGER		PLACES	REFS	10					
50	IUMEMO	INTEGER		PLACES	REFS	10					
124	IUMODK	INTEGER		PLACES	REFS	10					
122	IUMODM	INTEGER		PLACES	REFS	10					
2	IUOUT1	INTEGER		PLACES	REFS	10					
3	IUOUT2	INTEGER		PLACES	REFS	10					
134	IUPH	INTEGER		PLACES	REFS	10					
126	IUPHT	INTEGER		PLACES	REFS	10					
120	IUPHTF	INTEGER		PLACES	REFS	10					
17	IUPR	INTEGER		PLACES	REFS	10	I/O REFS	121	124	135	204	206
						209	241	244	245	266	268	310	312
						313	315	318	335	337	340	342	357
						364	365	375	377	380	381		
132	IUQ	INTEGER		PLACES	REFS	10						
130	IUQT	INTEGER		PLACES	REFS	10						
10	IUSCR	INTEGER		PLACES	REFS	10						
26	IUSTFN	INTEGER		PLACES	REFS	10						
62	IUSTFO	INTEGER		PLACES	REFS	10						
74	IUWT	INTEGER		PLACES	REFS	10						
46	IUWTI	INTEGER		PLACES	REFS	10						
22	IUY	INTEGER		PLACES	REFS	10						
106	IUYT	INTEGER		PLACES	REFS	10						
110	IUZ	INTEGER		PLACES	REFS	10						
112	IUZR	INTEGER		PLACES	REFS	10						
11	IWPUT	INTEGER		COLS	REFS	33						
1564	J	INTEGER			REFS	79	89	93	94	318	2*323	2*324
						357	DEFINED	71	79	89	298	300	302
						304	305	351	354				
0	JCHART	INTEGER	ARRAY	F.P.	REFS	6	287	DEFINED	1				
21	JDRV	INTEGER		COLS	REFS	33	76	151	291				
22	JDRVO	INTEGER		COLS	REFS	33							
14	JINITT	INTEGER		COLS	REFS	33	289						
16	JMAXT	INTEGER		COLS	REFS	33	150	301					
15	JMINT	INTEGER		COLS	REFS	33	149	282					
20	JNEWT	INTEGER		COLS	REFS	33	75	173	281				
17	JOLDT	INTEGER		COLS	REFS	33	75	148	290				
23	JSPR1	INTEGER		COLS	REFS	33							
24	JSPR2	INTEGER		COLS	REFS	33							
25	JSPR3	INTEGER		COLS	REFS	33							
13	JWPUT	INTEGER		COLS	REFS	33	147	288					

VARIABLES	SN	TYPE		RELOCATION							
141	IFINCK	INTEGER		PLACES	REFS	10					
137	IFINCM	INTEGER		PLACES	REFS	10					
31	IFKS	INTEGER		PLACES	REFS	10					
105	IFL	INTEGER		PLACES	REFS	10					
115	IFLR	INTEGER		PLACES	REFS	10					
57	IFMD	INTEGER		PLACES	REFS	10					
65	IFMDB	INTEGER		PLACES	REFS	10					
37	IFMDBI	INTEGER		PLACES	REFS	10					
61	IFMEMF	INTEGER		PLACES	REFS	10					
25	IFMEMN	INTEGER		PLACES	REFS	10					
51	IFMEMO	INTEGER		PLACES	REFS	10					
125	IFMODK	INTEGER		PLACES	REFS	10					
123	IFMODM	INTEGER		PLACES	REFS	10					
135	IFPH	INTEGER		PLACES	REFS	10					
127	IFPHT	INTEGER		PLACES	REFS	10					
121	IFPHTF	INTEGER		PLACES	REFS	10					
133	IFQ	INTEGER		PLACES	REFS	10					
131	IFQT	INTEGER		PLACES	REFS	10					
11	IFSCR	INTEGER		PLACES	REFS	10					
27	IFSTFN	INTEGER		PLACES	REFS	10					
63	IFSTFO	INTEGER		PLACES	REFS	10					
12	IFS1	INTEGER		PLACES	REFS	10					
13	IFS2	INTEGER		PLACES	REFS	10					
14	IFS3	INTEGER		PLACES	REFS	10					
15	IFS4	INTEGER		PLACES	REFS	10					
75	IFWT	INTEGER		PLACES	REFS	10					
47	IFWTI	INTEGER		PLACES	REFS	10					
23	IFY	INTEGER		PLACES	REFS	10					
107	IFYT	INTEGER		PLACES	REFS	10					
111	IFZ	INTEGER		PLACES	REFS	10					
113	IFZR	INTEGER		PLACES	REFS	10					
10	IINITT	INTEGER		COLS	REFS	33					
2	IMAXT	INTEGER		COLS	REFS	33					
1	IMINT	INTEGER		COLS	REFS	33					
7	IMINTO	INTEGER		COLS	REFS	33					
4	IOLDT	INTEGER		COLS	REFS	33					
5	IOLDW	INTEGER		COLS	REFS	33					
0	IPOS	INTEGER	ARRAY	FILE	REFS	7	37				
2	IRED	INTEGER		KLUES	REFS	27					
6	ISRAT	INTEGER		COLS	REFS	33					
0	IT	INTEGER		COLS	REFS	33					
20	IUA	INTEGER		PLACES	REFS	10					
66	IUADD	INTEGER		PLACES	REFS	10					
40	IUADDI	INTEGER		PLACES	REFS	10					
32	IUB	INTEGER		PLACES	REFS	10					
70	IUBAL	INTEGER		PLACES	REFS	10					
42	IUBALI	INTEGER		PLACES	REFS	10					
116	IUBR	INTEGER		PLACES	REFS	10					
52	IUBT	INTEGER		PLACES	REFS	10					
16	IUCD	INTEGER		PLACES	REFS	10					
72	IUDESF	INTEGER		PLACES	REFS	10					
44	IUDESI	INTEGER		PLACES	REFS	10					
54	IUDESN	INTEGER		PLACES	REFS	10	56	64	65	251	254	256
					DEFINED	56						
34	IUDESO	INTEGER		PLACES	REFS	10	57	61	66	74	82	
					DEFINED	57						
76	IUDUM1	INTEGER		PLACES	REFS	10						

VARIABLES SN	TYPE	RELOCATION									
0 CHART	REAL	ARRAY	F.P.	REFS	6	74	75	76	147	148	149
				150	151	254	281	282	288	289	290
				291	301	DEFINED	1	75	173		
242 CSCL	REAL		FLUT	REFS	38						
15 D	REAL		KLUES	REFS	27	153	299				
27 DBAL	REAL		KLUES	REFS	27	182	352				
16 DEL	REAL		KLUES	REFS	27	110	111				
1617 DEMU	REAL			REFS	232	DEFINED	231				
1631 DRV	REAL			REFS	294	318	DEFINED	291			
215 DRVMB	REAL	ARRAY	BAL	REFS	30	87	88	183	184	192	348
				357							
241 DRVMBO	REAL	ARRAY	BAL	REFS	30						
1567 DVDES	REAL			REFS	110	111	112	113	114	124	224
				DEFINED	102	106					
1633 DVEL	REAL			REFS	296	318	350	357	DEFINED	294	348
1602 DVLIN	REAL			REFS	171	192	209	2*217	218	219	224
				244	245	DEFINED	143	171	192		
1601 DVOLD	REAL			REFS	218	244	245	DEFINED	133	219	
5 DW	REAL		WAYTS	REFS	39	170	177	191	198	209	268
				DEFINED	142	170	191				
1612 DWEL	REAL			REFS	170	171	191	192	294	295	318
				348	349	357	DEFINED	169	190	292	346
1632 DWELT	REAL			REFS	318	357	DEFINED	293	347		
12 DWMAX	REAL		KLUES	REFS	27						
1614 DWMB	REAL			REFS	259	268	DEFINED	198			
1613 DWST	REAL			REFS	198	258	268	DEFINED	177		
1563 EMU	REAL			REFS	78	88	94	157	184	209	231
				232	DEFINED	70	78	88	94	232	
11 EPS1	REAL		KLUES	REFS	27	106					
17 EPS2	REAL		KLUES	REFS	27	112					
1565 I	INTEGER			REFS	74	2*75	76	2*86	87	88	147
				148	149	150	151	173	182	183	3*184
				185	187	2*190	192	254	281	282	287
				288	289	290	291	301	2*346	2*347	348
				352	353	4*357	DEFINED	73	85	145	181
				253	280	344					
22 IBAND	INTEGER		KLUES	REFS	27						
1 IDBAL	INTEGER	ARRAY	BAL	REFS	30	357					
3 IDENS	INTEGER		COLS	REFS	33						
244 IDMODE	INTEGER	ARRAY	FLUT	REFS	38						
7 IDNOPT	INTEGER		KLUES	REFS	27						
21 IFA	INTEGER		PLACES	REFS	10						
67 IFADD	INTEGER		PLACES	REFS	10						
41 IFADDI	INTEGER		PLACES	REFS	10						
33 IFB	INTEGER		PLACES	REFS	10						
71 IFBAL	INTEGER		PLACES	REFS	10						
43 IFBALI	INTEGER		PLACES	REFS	10						
117 IFBR	INTEGER		PLACES	REFS	10						
53 IFBT	INTEGER		PLACES	REFS	10						
73 IFDESF	INTEGER		PLACES	REFS	10						
45 IFDESI	INTEGER		PLACES	REFS	10						
55 IFDESN	INTEGER		PLACES	REFS	10	58	64	251	DEFINED	58	
35 IFDESO	INTEGER		PLACES	REFS	10	59	61	DEFINED	59		
77 IFDUM1	INTEGER		PLACES	REFS	10						
101 IFDUM2	INTEGER		PLACES	REFS	10	58	59				
103 IFDUM3	INTEGER		PLACES	REFS	10						
23 IFIN	INTEGER		KLUES	REFS	27						

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400               5                15H       (POUNDS),/)                                    FLTDES   401
                9003 FORMAT(10X,I5,3(F15.4,5X),/)                                         FLTDES   402
                9004 FORMAT(10X,51HAN ACCEPTABLE PREDICTED STEP SIZE HAS BEEN OBTAINED.   FLTDES   403
                  1          21H - ACCEPT THIS DESIGN,/)                                  FLTDES   404
                9005 FORMAT(10X,41HTHE DESIRED STEP SIZE CANNOT BE ATTAINED. ,            FLTDES   405
405               1     /,10X,52HALL DESIGN VARIABLES ARE AT CONSTRAINTS OR MAXIMUM .      FLTDES   406
                  2          37HCUT VALUES. ACCEPT THE LAST REDESIGN )                    FLTDES   407
                9006 FORMAT(//,10X,  34H.....WEIGHT SUMMARY.....,                         FLTDES   408
                  1   ///,10X,45HINITIAL REFERENCE WEIGHT.....,F12.4,                     FLTDES   409
                  2    //,10X,45HSTRUCT. WEIGHT CHANGE IN THIS REDESIGN.....,F12.4,      FLTDES   410
410               3    //,10X,45HMASS BAL. WEIGHT CHANGE IN THIS REDESIGN.....,F12.4,     FLTDES   411
                  4    //,10X,45HTOTAL WEIGHT CHANGE IN THIS REDESIGN.....,F12.4,        FLTDES   412
                  5  ////,10X,45HCUMULATIVE STRUCT. WEIGHT CHANGE.....,F12.4,           FLTDES   413
                  6    //,10X,45HCUMULATIVE MASS BAL. WEIGHT CHANGE.....,F12.4,         FLTDES   414
                  7    //,10X,45HCUMULATIVE TOTAL WEIGHT CHANGE.....,F12.4,             FLTDES   415
415               8    //,10X,45HPERCENTAGE WEIGHT CHANGE (CUMULATIVE).....,F12.4,       FLTDES   416
                  9    //,10X,45HTOTAL NEW WEIGHT.....,F12.4,                           FLTDES   417
                  A    //,)                                                             FLTDES   418
                9007 FORMAT(10X,46H********** FLUTTER CRITICAL ELEMENTS (REDESIGN,      FLTDES   419
                  1          20H DETAILS) **********,/)                                   FLTDES   420
420             9008 FORMAT(10X,42H********** NON-CRITICAL ELEMENTS (REDESIGN,          FLTDES   421
                  1          20H DETAILS) **********,/)                                   FLTDES   422
                9009 FORMAT(/,10X,    6HMEMBER,3OH     DERIVATIVE       OLD GAGE,       FLTDES   423
                  1               45H       NEW GAGE        DELTA W        DELTA V,      FLTDES   424
                  2               15H  DELTA W (CUM), 12H  CONSTRAINT,/)                  FLTDES   425
425             9010 FORMAT(/,10X,I6,6F15.4,4X,2A4)                                       FLTDES   426
                9011 FORMAT(/,10X,   32H**** MASS BALANCE VARIABLES ****,/)               FLTDES   427
                9012 FORMAT(/,10X,    6HMEMBER,3OH     DERIVATIVE          OLD W,       FLTDES   428
                  1               45H          NEW W        DELTA W        DELTA V,      FLTDES   429
                  2               15H  DELTA W (CUM), 12H  CONSTRAINT,/)                  FLTDES   430
430             9013 FORMAT(/,10X,    9HTHERE ARE,I4,    26H FLUTTER CRITICAL ELEMENTS,  FLTDES   431
                  1       /,10X,I4,27H ARE CONSTRAINED BY MAX CUT,                        FLTDES   432
                  2       /,10X,I4,28H ARE CONSTRAINED BY MAX GAGE)                       FLTDES   433
                9014 FORMAT(/,10X,    9HTHERE ARE,I4,    22H NON-CRITICAL ELEMENTS,      FLTDES   434
                  1       /,10X,I4,28H ARE CONSTRAINED BY MIN GAGE,                       FLTDES   435
435               2       /,10X,I4,26H ARE CONSTRAINED BY STRESS)                         FLTDES   436
                9015 FORMAT(10X,49HIN THIS REDESIGN CYCLE, THESE ELEMENTS ACCOUNTED .     FLTDES   437
                  1          21HFOR A WGHT. CHANGE OF,F9.3,19H AND A (PREDICTED) .        FLTDES   438
                  2          12HVEL. STEP OF,F9.3)                                        FLTDES   439
              C                                                                           FLTDES   440
440                RETURN                                                               FLTDES   441
                   END                                                                  FLTDES   442
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	FLTDES	1	440

VARIABLES	SN	TYPE	RELOCATION							
1577	A	REAL		REFS	228	231	DEFINED	130	228	
1607	BOT	REAL		REFS	158	161	185	187	300	353
				DEFINED	153	182	299	352		
1574	BOT2	REAL		REFS	2*116	DEFINED	114			

```
                  KOUNT=KOUNT+3                                                  FLTDES   344
                  DO 360 I=1,NMBAL                                               FLTDES   345
345               NT=NT+1                                                        FLTDES   346
                  DWEL=VMBNEW(I)-VMBOLD(I)                                       FLTDES   347
                  DWELT=VMBNEW(I)-VMBIN(I)                                       FLTDES   348
                  DVEL=DWEL*DRVMB(I)                                             FLTDES   349
                  SMDWEL=SMDWEL+DWEL                                             FLTDES   350
350               SMDVEL=SMDVEL+DVEL                                             FLTDES   351
                  J=1                                                            FLTDES   352
                  BOT=DBAL*VMBOLD(I)                                             FLTDES   353
                  IF(VMBNEW(I).GT.BOT) GO TO 350                                 FLTDES   354
                  J=2                                                            FLTDES   355
355               N2=N2+1                                                        FLTDES   356
                350 CONTINUE                                                     FLTDES   357
                  WRITE(IUPR,9010) IDBAL(I),DRVMB(I),VMBOLD(I),VMBNEW(I),DWEL,DVEL,  FLTDES   358
                 1                 DWELT,(NOTE(K,J),K=1,2)                       FLTDES   359
                  KOUNT=KOUNT+2                                                  FLTDES   360
360             360 CONTINUE                                                     FLTDES   361
              C                                                                  FLTDES   362
                400 CONTINUE                                                     FLTDES   363
              C                                                                  FLTDES   364
                  WRITE(IUPR,9013) NT,N2,N3                                      FLTDES   365
365               WRITE(IUPR,9015) SMDWEL, SMDVEL                                FLTDES   366
                  KOUNT=LINES                                                    FLTDES   367
                  KK=1                                                           FLTDES   368
                  GO TO 270                                                      FLTDES   369
              C                                                                  FLTDES   370
370             500 CONTINUE                                                     FLTDES   371
                  LEFT=LINES-KOUNT                                               FLTDES   372
                  IF(LEFT.LT.5) KOUNT=LINES                                      FLTDES   373
                  CALL TITLES(2)                                                 FLTDES   374
                  IF(KOUNT.GT.KOUNTH) GO TO 510                                  FLTDES   375
375               WRITE(IUPR,9000) NREDES                                        FLTDES   376
                  KOUNT=KOUNT+3                                                  FLTDES   377
                  WRITE(IUPR,9008)                                               FLTDES   378
                  KOUNT=KOUNT+2                                                  FLTDES   379
                510 CONTINUE                                                     FLTDES   380
380               WRITE(IUPR,9014) NT,N2,N3                                      FLTDES   381
                  WRITE(IUPR,9015) SMDWEL,SMDVEL                                 FLTDES   382
                  KOUNT=KOUNT+5                                                  FLTDES   383
              C                                                                  FLTDES   384
               9999 CONTINUE                                                     FLTDES   385
385               CALL TIMEB(11,11HFROM FLTDES)                                  FLTDES   386
                  CALL MESAGE(2,6,6HFLTDES)                                      FLTDES   387
              C                                                                  FLTDES   388
              C                                                                  FLTDES   389
               9000 FORMAT(/,10X,   24HFLUTTER REDESIGN CYCLE =,I3,/)            FLTDES   390
390            9001 FORMAT(//,10X,  36HDESIRED FLUTTER VELOCITY STEP SIZE =,F11.4,  FLTDES   391
                 1                   6H KNOTS,                                 FLTDES   392
                 2       //,10X,   47HA LINEARLY PREDICTED STEP SIZE WILL BE ACCEPTED  FLTDES   393
                 3                  20H IF IT FALLS BEWTEEN,F11.4,4H AND,F11.4.  FLTDES   394
                 4                   6H KNOTS,/)                               FLTDES   395
395            9002 FORMAT(/,10X,   46HITERATION HISTORY TO OBTAIN ACCEPTABLE FLUTTER,  FLTDES   396
                 1                  16H SPEED STEP SIZE,                       FLTDES   397
                 2      //,10X,     5HTRIAL, 15H       TARGET  ,5X,            FLTDES   398
                 3                  15H LIN. STEP SIZE,5X,    15H   WGHT. CHANGE,  FLTDES   399
                 4       /,10X,5X,15H     DERIVATIVE,5X,    15H        (KNOTS),5X,  FLTDES   400
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                NT=NT+1                                                  FLTDES   287
                MEMB=JCHART(1,I)                                         FLTDES   288
                WPUT=CHART(JWPUT,I)                                      FLTDES   289
                TINITT=CHART(JINITT,I)                                   FLTDES   290
290             TOLD=CHART(JOLDT,I)                                      FLTDES   291
                DRV=CHART(JDRV,I)                                        FLTDES   292
                DWEL=WPUT*(TNEW-TOLD)                                    FLTDES   293
                DWELT=WPUT*(TNEW-TINITT)                                 FLTDES   294
                DVEL=DWEL*DRV                                            FLTDES   295
295             SMDWEL=SMDWEL+DWEL                                       FLTDES   296
                SMDVEL=SMDVEL+DVEL                                       FLTDES   297
                IF(KK.EQ.1) GO TO 280                                    FLTDES   298
                J=1                                                      FLTDES   299
                BOT=D*TOLD                                               FLTDES   300
300             IF(TNEW.EQ.BOT) J=2                                      FLTDES   301
                TMAX=CHART(JMAXT,I)                                      FLTDES   302
                IF(TNEW.EQ.TMAX) J=3                                     FLTDES   303
                GO TO 290                                                FLTDES   304
            280 J=4                                                      FLTDES   305
305             IF(TMIN.EQ.TMINAB) J=5                                   FLTDES   306
          C                                                              FLTDES   307
            290 CONTINUE                                                 FLTDES   308
                CALL TITLES(2)                                           FLTDES   309
                IF(KOUNT.GT.KOUNTH) GO TO 292                            FLTDES   310
310             WRITE(IUPR,9000) NREDES                                  FLTDES   311
                KOUNT=KOUNT+3                                            FLTDES   312
                IF(KK.EQ.0) WRITE(IUPR,9007)                             FLTDES   313
                IF(KK.EQ.1) WRITE(IUPR,9008)                             FLTDES   314
                KOUNT=KOUNT+2                                            FLTDES   315
315             WRITE(IUPR,9009)                                         FLTDES   316
                KOUNT=KOUNT+3                                            FLTDES   317
            292 CONTINUE                                                 FLTDES   318
                WRITE(IUPR,9010) MEMB,DRV,TOLD,TNEW,DWEL,DVEL,DWELT,     FLTDES   319
               1                 (NOTE(K,J),K=1,2)                       FLTDES   320
320             KOUNT=KOUNT+2                                            FLTDES   321
                LEFT=LINES-KOUNT                                         FLTDES   322
                IF(LEFT.LT.2) KOUNT=LINES                                FLTDES   323
                IF(J.EQ.2.OR.J.EQ.4) N2=N2+1                             FLTDES   324
                IF(J.EQ.3.OR.J.EQ.5) N3=N3+1                             FLTDES   325
325         300 CONTINUE                                                 FLTDES   326
          C                                                              FLTDES   327
                IF(KK.EQ.1) GO TO 500                                    FLTDES   328
          C                                                              FLTDES   329
                IF(NMBAL.EQ.0) GO TO 400                                 FLTDES   330
330             LEFT=LINES-KOUNT                                         FLTDES   331
                NEED=11+(2*NMBAL)                                        FLTDES   332
                IF(LEFT.LT.NEED) KOUNT=LINES                             FLTDES   333
                CALL TITLES(2)                                           FLTDES   334
                IF(KOUNT.GT.KOUNTH) GO TO 310                            FLTDES   335
335             WRITE(IUPR,9000) NREDES                                  FLTDES   336
                KOUNT=KOUNT+3                                            FLTDES   337
                WRITE(IUPR,9007)                                         FLTDES   338
                KOUNT=KOUNT+2                                            FLTDES   339
            310 CONTINUE                                                 FLTDES   340
340             WRITE(IUPR,9011)                                         FLTDES   341
                KOUNT=KOUNT+3                                            FLTDES   342
                WRITE(IUPR,9012)                                         FLTDES   343
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                KOLD=KNEW                                                  FLTDES  230
230           C                                                            FLTDES  231
            150 DEMU=KNEW*A*EMU                                            FLTDES  232
                EMU=EMU+DEMU                                               FLTDES  233
                GO TO 50                                                   FLTDES  234
              C                                                            FLTDES  235
235           C                                                            FLTDES  236
            200 CONTINUE                                                   FLTDES  237
                LEFT=LINES-KOUNT                                           FLTDES  238
                IF(LEFT.LT.2) KOUNT=LINES                                  FLTDES  239
                CALL TITLES(2)                                             FLTDES  240
240             IF(KOUNT.GT.KOUNTH) GO TO 210                              FLTDES  241
                WRITE(IUPR,9000) NREDES                                    FLTDES  242
                KOUNT=KOUNT+3                                              FLTDES  243
            210 CONTINUE                                                   FLTDES  244
                IF(DVLIN.NE.DVOLD) WRITE(IUPR,9004)                        FLTDES  245
245             IF(DVLIN.EQ.DVOLD) WRITE(IUPR,9005)                        FLTDES  246
                KOUNT=KOUNT+2                                              FLTDES  247
              C                                                            FLTDES  248
              C                                                            FLTDES  249
              C THE DESIRED STEP HAS BEEN ACHIEVED. WRITE OUT THE NEW DESIGN ARRAY.  FLTDES  250
250           C                                                            FLTDES  251
                CALL PUDLAB(8HFLTDESO1,IUDESN,NAME,IFDESN,KROW,KCOL)       FLTDES  252
              C                                                            FLTDES  253
                DO 250 I=1,KROW                                            FLTDES  254
            250 CALL PUTROW(IUDESN,2,CHART(1,I),KCOL)                      FLTDES  255
255           C                                                            FLTDES  256
                CALL DCLOSE(IUDESN)                                        FLTDES  257
              C                                                            FLTDES  258
                WST=WST+DWST                                               FLTDES  259
                WMB=WMB+DWMB                                               FLTDES  260
260             WBOTH=WST+WMB                                              FLTDES  261
                WPRES=WINITT+WBOTH                                         FLTDES  262
                WPCT=100.*(WBOTH/WINITT)                                   FLTDES  263
              C                                                            FLTDES  264
                KOUNT=LINES                                                FLTDES  265
265             CALL TITLES(2)                                             FLTDES  266
                WRITE(IUPR,9000) NREDES                                    FLTDES  267
                KOUNT=KOUNT+3                                              FLTDES  268
                WRITE(IUPR,9006) WINITT,DWST,DWMB,DW,WST,WMB,WBOTH,WPCT,WPRES  FLTDES  269
              C                                                            FLTDES  270
270             KOUNT=LINES                                                FLTDES  271
              C                                                            FLTDES  272
                KK=0                                                       FLTDES  273
            270 CONTINUE                                                   FLTDES  274
                SMDWEL=0.0                                                 FLTDES  275
275             SMDVEL=0.0                                                 FLTDES  276
                NT=0                                                       FLTDES  277
                N2=0                                                       FLTDES  278
                N3=0                                                       FLTDES  279
              C                                                            FLTDES  280
280             DO 300 I=1,KROW                                            FLTDES  281
                TNEW=CHART(JNEWT,I)                                        FLTDES  282
                TMIN=CHART(JMINT,I)                                        FLTDES  283
                TMINAB=ABS(TMIN)                                           FLTDES  284
                IF(KK.EQ.0.AND.TNEW.EQ.TMINAB) GO TO 300                   FLTDES  285
285             IF(KK.EQ.1.AND.TNEW.GT.TMINAB) GO TO 300                   FLTDES  286
```

```
                C                                                                FLTDES   173
                      CHART(JNEWT,I)=TNEW                                        FLTDES   174
                C                                                                FLTDES   175
175               100 CONTINUE                                                   FLTDES   176
                C                                                                FLTDES   177
                      DWST=DW                                                    FLTDES   178
                C NOW, REDESIGN MASS BALANCE VARIABLES-IF ANY.                   FLTDES   179
                C                                                                FLTDES   180
180                   IF(NMBAL.EQ.0) GO TO 140                                   FLTDES   181
                      DO 130 I=1,NMBAL                                           FLTDES   182
                      BOT=DBAL*VMBOLD(I)                                         FLTDES   183
                      IF(DRVMB(I).LT.0.) GO TO 110                               FLTDES   184
                      VMBNEW(I)=VMBOLD(I)*SQRT(DRVMB(I)/EMU)                     FLTDES   185
185                   IF(VMBNEW(I).LT.BOT) GO TO 110                             FLTDES   186
                      GO TO 120                                                  FLTDES   187
                  110 VMBNEW(I)=BOT                                              FLTDES   188
                  120 CONTINUE                                                   FLTDES   189
                C                                                                FLTDES   190
190                   DWEL=VMBNEW(I)-VMBOLD(I)                                   FLTDES   191
                      DW=DW+DWEL                                                 FLTDES   192
                      DVLIN=DVLIN+(DRVMB(I)*DWEL)                                FLTDES   193
                  130 CONTINUE                                                   FLTDES   194
                C                                                                FLTDES   195
195             C                                                                FLTDES   196
                  140 CONTINUE                                                   FLTDES   197
                C                                                                FLTDES   198
                      DWMB=DW-DWST                                               FLTDES   199
                C                                                                FLTDES   200
200                   LEFT=LINES-KOUNT                                           FLTDES   201
                      IF(LEFT.LT.2) KOUNT=LINES                                  FLTDES   202
                      CALL TITLES(2)                                             FLTDES   203
                      IF(KOUNT.GT.KOUNTH) GO TO 142                              FLTDES   204
                      WRITE(IUPR,9000) NREDES                                    FLTDES   205
205                   KOUNT=KOUNT+3                                              FLTDES   206
                      WRITE(IUPR,9002)                                           FLTDES   207
                      KOUNT=KOUNT+6                                              FLTDES   208
                  142 CONTINUE                                                   FLTDES   209
                      WRITE(IUPR,9003) KOWNT,EMU,DVLIN,DW                        FLTDES   210
210                   KOUNT=KOUNT+2                                              FLTDES   211
                C                                                                FLTDES   212
                C COMPARE COMPUTED STEP SIZE (DVLIN) WITH DESIRED STEP SIZE (DVDES).  FLTDES   213
                C IF THE DEL OR EPS2 TEST IS SATISFIED, ACCEPT THE NEW DESIGN AND WRITE  FLTDES   214
                C OUT THE NEW DESIGN ARRAY. OTHERWISE, ADJUST THE TARGET DERIVATIVE(EMU)  FLTDES   215
215             C AND REPEAT THE REDESIGN PROCEDURE.                             FLTDES   216
                C                                                                FLTDES   217
                      IF(DVLIN.GE.VBOT.AND.DVLIN.LE.VTOP) GO TO 200              FLTDES   218
                      IF(DVLIN.EQ.DVOLD) GO TO 200                               FLTDES   219
                      DVOLD=DVLIN                                                FLTDES   220
220             C                                                                FLTDES   221
                C THE COMPUTED STEP SIZE IS NOT ACCEPTABLE. ADJUST TARGET DERIVATIVE.  FLTDES   222
                C                                                                FLTDES   223
                      KNEW=-1                                                    FLTDES   224
                      IF(DVLIN.GT.DVDES) KNEW=1                                  FLTDES   225
225             C                                                                FLTDES   226
                      IF(KNEW.EQ.KOLD) GO TO 150                                 FLTDES   227
                C                                                                FLTDES   228
                      A=0.1*A                                                    FLTDES   229
```

```
115                IF(VTOP.LT.TOP2) VTOP=TOP2                                FLTDES  116
                   IF(VBOT.GT.BOT2) VBOT=BOT2                                FLTDES  117
             C                                                               FLTDES  118
                   NREDES=NCYC+1                                             FLTDES  119
                   KOUNT=LINES                                               FLTDES  120
120                CALL TITLES(2)                                            FLTDES  121
                   WRITE(IUPR,9000) NREDES                                   FLTDES  122
                   KOUNT=KOUNT+3                                             FLTDES  123
             C                                                               FLTDES  124
                   WRITE(IUPR,9001) DVDES,VBOT,VTOP                          FLTDES  125
125                KOUNT=KOUNT+6                                             FLTDES  126
             C                                                               FLTDES  127
             C INITIALIZE KOLD, A AND KOUNT.                                 FLTDES  128
             C                                                               FLTDES  129
                   KOLD=0                                                    FLTDES  130
130                A=1.0                                                     FLTDES  131
                   KOWNT=0                                                   FLTDES  132
             C                                                               FLTDES  133
                   DVOLD=100000.                                             FLTDES  134
             C                                                               FLTDES  135
135                WRITE(IUPR,9002)                                          FLTDES  136
                   KOUNT=KOUNT+6                                             FLTDES  137
                50 CONTINUE                                                  FLTDES  138
             C                                                               FLTDES  139
             C REDESIGN THE STRUCTURE USING THE LATEST TARGET DERIVATIVE.    FLTDES  140
140          C                                                               FLTDES  141
                   KOWNT=KOWNT+1                                             FLTDES  142
                   DW=0.0                                                    FLTDES  143
                   DVLIN=0.0                                                 FLTDES  144
             C                                                               FLTDES  145
145                DO 100 I=1,KROW                                           FLTDES  146
             C                                                               FLTDES  147
                   WPUT=CHART(JWPUT,I)                                       FLTDES  148
                   TOLD=CHART(JOLDT,I)                                       FLTDES  149
                   TMIN=CHART(JMINT,I)                                       FLTDES  150
150                TMAX=CHART(JMAXT,I)                                       FLTDES  151
                   VDV=CHART(JDRV,I)                                         FLTDES  152
             C                                                               FLTDES  153
                   BOT=D*TOLD                                                FLTDES  154
             C                                                               FLTDES  155
155                IF(VDV.LT.0.) GO TO 60                                    FLTDES  156
             C                                                               FLTDES  157
                   TNEW=TOLD*SQRT(VDV/EMU)                                   FLTDES  158
                   IF(TNEW.LT.BOT) GO TO 60                                  FLTDES  159
                   GO TO 70                                                  FLTDES  160
160          C                                                               FLTDES  161
                60 TNEW=BOT                                                  FLTDES  162
             C                                                               FLTDES  163
                70 TMINAB=ABS(TMIN)                                          FLTDES  164
                   IF(TNEW.LT.TMINAB) TNEW=TMINAB                            FLTDES  165
165                IF(TMAX.EQ.0.0) GO TO 80                                  FLTDES  166
                   IF(TNEW.GT.TMAX) TNEW=TMAX                                FLTDES  167
                80 CONTINUE                                                  FLTDES  168
             C                                                               FLTDES  169
                   DWEL=WPUT*(TNEW-TOLD)                                     FLTDES  170
170                DW=DW+DWEL                                                FLTDES  171
                   DVLIN=DVLIN+(VDV*DWEL)                                    FLTDES  172
```

```
                IFDESN=IFDUM2-IFDESN                                    FLTDES     59
                IFDESO=IFDUM2-IFDESO                                    FLTDES     60
60          C                                                           FLTDES     61
                CALL GEDLAB(8HFLTDESO1,IUDESO,NAME,IFDESO,KROW,KCOL)    FLTDES     62
            C                                                           FLTDES     63
                IF (KROW .NE. O) GOTO 5                                 FLTDES     64
                CALL PUDLAB (8HFLTDES83,IUDESN,NAME,IFDESN,KROW,KCOL)   FLTDES     65
65              CALL DCLOSE(IUDESN)                                     FLTDES     66
                CALL DCLOSE(IUDESO)                                     FLTDES     67
                GOTO 9999                                               FLTDES     68
            C                                                           FLTDES     69
              5 CONTINUE                                                FLTDES     70
70              EMU=O.O                                                 FLTDES     71
                J=O                                                     FLTDES     72
            C                                                           FLTDES     73
                DO 10 I=1,KROW                                          FLTDES     74
                CALL GETROW(IUDESO,1,CHART(1,I),KCOL)                   FLTDES     75
75              CHART(JOLDT,I)=CHART(JNEWT,I)                           FLTDES     76
                VDV=CHART(JDRV,I)                                       FLTDES     77
                IF(VDV.LE.O.) GO TO 10                                  FLTDES     78
                EMU=EMU+VDV                                             FLTDES     79
                J=J+1                                                   FLTDES     80
80            10 CONTINUE                                               FLTDES     81
            C                                                           FLTDES     82
                CALL DCLOSE(IUDESO)                                     FLTDES     83
            C                                                           FLTDES     84
                IF(NMBAL.EQ.O) GO TO 18                                 FLTDES     85
85              DO 15 I=1,NMBAL                                         FLTDES     86
                VMBOLD(I)=VMBNEW(I)                                     FLTDES     87
                IF(DRVMB(I).LE.O.) GO TO 15                             FLTDES     88
                EMU=EMU+DRVMB(I)                                        FLTDES     89
                J=J+1                                                   FLTDES     90
90            15 CONTINUE                                               FLTDES     91
            C                                                           FLTDES     92
              18 CONTINUE                                               FLTDES     93
                IF(J.EQ.O) GO TO 19                                     FLTDES     94
                EMU=O.8*(EMU/J)                                         FLTDES     95
95            19 CONTINUE                                               FLTDES     96
            C                                                           FLTDES     97
            C                                                           FLTDES     98
            C DETERMINE THE DESIRED FLUTTER VELOCITY STEP SIZE, DVDES.  FLTDES     99
            C                                                           FLTDES    100
100             IF(NNN.EQ.1) GO TO 20                                   FLTDES    101
            C                                                           FLTDES    102
                DVDES=(VDES-VF)/NNN                                     FLTDES    103
                NNN=NNN-1                                               FLTDES    104
                GO TO 30                                                FLTDES    105
105         C                                                           FLTDES    106
              20 DVDES=VDES*(1.O+(EPS1/2.O))-VF                         FLTDES    107
            C                                                           FLTDES    108
              30 CONTINUE                                               FLTDES    109
            C                                                           FLTDES    110
110             VTOP=DVDES+DEL                                          FLTDES    111
                VBOT=DVDES-DEL                                          FLTDES    112
                WID2=EPS2*ABS(DVDES)                                    FLTDES    113
                TOP2=DVDES+WID2                                         FLTDES    114
                BOT2=DVDES-WID2                                         FLTDES    115
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      SUBROUTINE FLTDES(CHART,JCHART,KVAR)                              FLTDES     2
C                                                                       FLTDES     3
C                                                                       FLTDES     4
      COMPLEX UMOD,VMOD                                                 FLTDES     5
C                                                                       FLTDES     6
      DIMENSION CHART(KVAR,1),JCHART(KVAR,1),NAME(2)                    FLTDES     7
      DIMENSION IPOS(20)                                                FLTDES     8
      DIMENSION NOTE(2,5)                                               FLTDES     9
C                                                                       FLTDES    10
      COMMON/PLACES/ IUIN1,IUIN2,IUOUT1,IUOUT2,IUGO1,IUGO2,IUGO3,IUGO4, FLTDES    11
     1               IUSCR,IFSCR,IFS1,IFS2,IFS3,IFS4,IUCD,IUPR,         FLTDES    12
     2               IUA,IFA,IUY,IFY,IUMEMN,IFMEMN,IUSTFN,IFSTFN,       FLTDES    13
     3               IUKS,IFKS,IUB,IFB,IUDESO,IFDESO,                   FLTDES    14
     4               IUMDBI,IFMDBI,IUADDI,IFADDI,IUBALI,IFBALI,         FLTDES    15
     5               IUDESI,IFDESI,IUWTI,IFWTI,                         FLTDES    16
     6               IUMEMO,IFMEMO,IUBT,IFBT,                           FLTDES    17
     7               IUDESN,IFDESN,IUMD,IFMD,                           FLTDES    18
     8               IUMEMF,IFMEMF,                                     FLTDES    19
     9               IUSTFO,IFSTFO,IUMDB,IFMDB,IUADD,IFADD,IUBAL,IFBAL, FLTDES    20
     A               IUDESF,IFDESF,IUWT,IFWT,                           FLTDES    21
     B               IUDUM1,IFDUM1,IUDUM2,IFDUM2,IUDUM3,IFDUM3,         FLTDES    22
     C               IUL,IFL,IUYT,IFYT,IUZ,IFZ,IUZR,IFZR,IULR,IFLR,     FLTDES    23
     D               IUBR,IFBR,                                         FLTDES    24
     E               IUPHTF,IFPHTF,IUMODM,IFMODM,                       FLTDES    25
     F               IUMODK,IFMODK,IUPHT,IFPHT,IUQT,IFQT,IUQ,IFQ,       FLTDES    26
     G               IUPH,IFPH,IUINCM,IFINCM,IUINCK,IFINCK              FLTDES    27
      COMMON/KLUES/ KLUSE,KLUNAL,IRED,KLUMD,KLUBAL,MSADD,NPASS,IDNOPT,  FLTDES    28
     1              VDES,EPS1,DWMAX,NBAR,NFIX,D,DEL,EPS2,NCYC,NNN,IBAND, FLTDES    29
     2              IFIN,KLUB,KLUQ,MORBAL,DBAL                          FLTDES    30
      COMMON/BAL/ NMBAL,IDBAL(20),VMBIN(20),VMBOLD(20),VMBNEW(20),      FLTDES    31
     1            MBDOF(20,3),DRVMB(20),DRVMBO(20),                     FLTDES    32
     2            S1MB(20),S2MB(20),S3MB(20)                            FLTDES    33
      COMMON/COLS/ IT,IMINT,IMAXT,IDENS,IOLDT,IOLDW,ISRAT,IMINTO,       FLTDES    34
     A             IINITT,IWPUT,                                        FLTDES    35
     1             NVAR,JWPUT,JINITT,JMINT,JMAXT,JOLDT,JNEWT,JDRV,      FLTDES    36
     2             JDRVO,JSPR1,JSPR2,JSPR3                              FLTDES    37
      COMMON /FILE  / IPOS                                              FLTDES    38
      COMMON /FLUT/ UMOD(40),VMOD(40),VF,WW,CSCL,NMODE,IDMODE(40)       FLTDES    39
      COMMON/WAYTS/ WINITT,WST,WMB,WBOTH,WPRES,DW                       FLTDES    40
      COMMON /CLIST / KOUNT,KPAGE,LINES,LINEST,KLABEL,KTPAGE,NPAGE      FLTDES    41
     1              ,KBPAGE,LINESG,KOUNTH,KOUNTI                       FLTDES    42
C                                                                       FLTDES    43
      DATA NOTE/4H     ,4H     ,4HMAX ,4HCUT ,4HMAX ,4HGAGE,4HMIN ,4HGAGE, FLTDES    44
     14HSTRE,4HSS  /                                                    FLTDES    45
C                                                                       FLTDES    46
      CALL PROGNA(4H(FLT,4HDES))                                        FLTDES    47
      CALL MESAGE(1,6,6HFLTDES)                                         FLTDES    48
      CALL TIMEB(11,11HFROM FLTDES)                                     FLTDES    49
C                                                                       FLTDES    50
C                                                                       FLTDES    51
C 1. READ ENTIRE DESIGN ARRAY INTO CORE.                                FLTDES    52
C 2. SET OLD GAGE (ROW JOLDT) EQUAL TO NEW GAGE (ROW JNEWT)             FLTDES    53
C    FOR MASS BALANCE, SET OLD WEIGHT EQUAL TO NEW WEIGHT.              FLTDES    54
C 3. COMPUTE THE INITIAL TARGET DERIVATIVE.                             FLTDES    55
C                                                                       FLTDES    56
      IUDESN=IUDUM2-IUDESN                                              FLTDES    57
      IUDESO=IUDUM2-IUDESO                                              FLTDES    58
```

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)	BIAS	NAME	(LENGTH)	BIAS	NAME	(LENGTH)
STRCLU	10	0	ICYCLE	(1)	1	ISTEP	(1)	2	M1	(1)
		3	M2	(1)	4	M3	(1)	5	M4	(1)
		6	VS	(1)	7	VOLD	(1)	8	VNEW	(1)
		9	STPOLD	(1)						
COMRWP	3	0	ITAPER	(1)	1	ITAPEW	(1)	2	ITAPEP	(1)
CTAPES	50	0	ITAPES	(50)						
FLUT	204	0	UMOD	(80)	80	VMOD	(80)	160	VF	(1)
		161	WW	(1)	162	CSCL	(1)	163	NMODE	(1)
		164	IDMODE	(40)						
LOCSTR	6	0	IUSTRI	(1)	1	IFSTRI	(1)	2	IUMREF	(1)
		3	IFMREF	(1)	4	IUMOD	(1)	5	IFMOD	(1)

STATISTICS

PROGRAM LENGTH	10235B	4253
CM LABELED COMMON LENGTH	1543B	867

520000B CM USED

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
263	120	K	162 165	6B	INSTACK
277	130	J	166 169	6B	INSTACK
331	200	I	179 410	663B	EXT REFS NOT INNER
332	10	J	183 186	13B	NOT INNER
337	10	K	184 186	2B	INSTACK
355	20	J	193 195	3B	INSTACK
400	30	J	222 225	15B	NOT INNER
407	30	K	223 225	3B	INSTACK
417	40	J	230 237	22B	NOT INNER
433	35	L	234 236	2B	INSTACK
443	45	L	240 247	24B	NOT INNER
461	44	J	244 246	2B	INSTACK
502	50	J	256 260	11B	OPT
516	60	J	265 268	27B	NOT INNER
531	60	K	266 268	11B	OPT
534	70	J	278 288	21B	OPT
613	75	J	297 301	17B	NOT INNER
614	75	K	298 301	14B	NOT INNER
622	75	L	299 301	2B	INSTACK
654	76	J	331 335	23B	NOT INNER
655	76	K	332 335	20B	NOT INNER
666	76	L	333 335	3B	INSTACK
700	77	L	339 356	54B	NOT INNER
702	78	J	341 347	23B	NOT INNER
717	72	M	344 346	2B	INSTACK
727	74	J	349 355	23B	NOT INNER
744	79	M	352 354	2B	INSTACK
755	81	II	360 371	47B	NOT INNER
762	82	J	364 367	30B	NOT INNER
776	82	K	365 367	11B	OPT
1050	80	J	379 385	26B	EXT REFS
1077	83	J	387 390	14B	EXT REFS
1114	84	J	391 393	12B	EXT REFS
1127	90	II	394 399	30B	EXT REFS NOT INNER
1134	90	J	397 399	21B	EXT REFS NOT INNER
1137		K	398 398	12B	EXT REFS
1162		J	400 400	10B	EXT REFS
1176		J	401 401	10B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
KLUFF	1	0 KFREE (1)		
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)
		9 KOUNTH (1)	10 KOUNTI (1)	
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)
		397 STRFDO (30)	427 STRFDN (30)	
INVERT	125	0 INVERT (1)	1 IUA2 (1)	2 IFLEX (1)
		3 AORD (30)	33 IPERM (30)	63 NSTOR (60)
		123 IPREV (1)	124 NDOFT (1)	

VARIABLES	SN	TYPE		RELOCATION							
1625	N2	INTEGER			REFS	323	355	364	380	DEFINED	277	323
					355							
1626	N3	INTEGER			REFS	324	364	380	DEFINED	278	324	
1623	SMDVEL	REAL			REFS	296	350	365	381	DEFINED	275	296
					350							
1622	SMDWEL	REAL			REFS	295	349	365	381	DEFINED	274	295
					349							
265	S1MB	REAL	ARRAY	BAL	REFS	30						
311	S2MB	REAL	ARRAY	BAL	REFS	30						
335	S3MB	REAL	ARRAY	BAL	REFS	30						
1630	TINITT	REAL			REFS	293	DEFINED	289				
1606	TMAX	REAL			REFS	165	2*166	302	DEFINED	150	301	
1605	TMIN	REAL			REFS	163	283	305	DEFINED	149	282	
1611	TMINAB	REAL			REFS	2*164	284	285	305	DEFINED	163	283
1610	TNEW	REAL			REFS	158	164	166	169	173	284	285
					292	293	300	302	318	DEFINED	157	161
					164	166	281					
1604	TOLD	REAL			REFS	153	157	169	292	299	318	
					DEFINED	148	290					
1573	TOP2	REAL			REFS	2*115	DEFINED	113				
0	UMOD	COMPLEX	ARRAY	FLUT	REFS	4	38					
1571	VBOT	REAL			REFS	116	124	217	DEFINED	111	116	
10	VDES	REAL		KLUES	REFS	27	102	106				
1566	VDV	REAL			REFS	77	78	155	157	171		
					DEFINED	76	151					
240	VF	REAL		FLUT	REFS	38	102	106				
25	VMBIN	REAL	ARRAY	BAL	REFS	30	347					
75	VMBNEW	REAL	ARRAY	BAL	REFS	30	86	185	190	346	347	353
					357	DEFINED	184	187				
51	VMBOLD	REAL	ARRAY	BAL	REFS	30	182	184	190	346	352	357
					DEFINED	86						
120	VMOD	COMPLEX	ARRAY	FLUT	REFS	4	38					
1570	VTOP	REAL			REFS	115	124	217	DEFINED	110	115	
3	WBOTH	REAL		WAYTS	REFS	39	261	262	268	DEFINED	260	
1572	WID2	REAL			REFS	113	114	DEFINED	112			
0	WINITT	REAL		WAYTS	REFS	39	261	262	268			
2	WMB	REAL		WAYTS	REFS	39	259	260	268	DEFINED	259	
1620	WPCT	REAL			REFS	268	DEFINED	262				
4	WPRES	REAL		WAYTS	REFS	39	268	DEFINED	261			
1603	WPUT	REAL			REFS	169	292	293	DEFINED	147	288	
1	WST	REAL		WAYTS	REFS	39	258	260	268	DEFINED	258	
241	WW	REAL		FLUT	REFS	38						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES						
DCLOSE		1		65	66	82	256			
GEDLAB		6		61						
GETROW		4		74						
MESAGE		3		47	386					
PROGNA		2		46						
PUDLAB		6		64	251					
PUTROW		4		254						
SQRT	REAL	1	LIBRARY	157	184					
TIMEB		2		48	385					
TITLES		1		120	202	239	265	308	333	373

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES					
ABS	REAL	1	INTRIN	112	163	283			

STATEMENT LABELS			DEF LINE	REFERENCES						
36	5		69	63						
60	10		80	73	77					
76	15		90	85	87					
100	18		92	84						
104	19		95	93						
112	20		106	100						
117	30		108	104						
156	50		137	233						
206	60		161	155	158					
210	70		163	159						
217	80		167	165						
0	100		175	145						
247	110		187	183	185					
251	120		188	186						
0	130		193	181						
261	140		196	180						
302	142		208	203						
323	150		231	226						
330	200		236	217	218					
344	210		243	240						
0	250		254	253						
412	270		273	368						
473	280		304	297						
477	290		307	303						
522	292		317	309						
547	300		325	280	284	285				
575	310		339	334						
626	350		356	353						
0	360		360	344						
646	400		362	329						
655	500		370	327						
674	510		379	374						
1200	9000	FMT	389	121	204	241	266	310	335	375
1205	9001	FMT	390	124						
1227	9002	FMT	395	135	206					
1255	9003	FMT	401	209						
1260	9004	FMT	402	244						
1272	9005	FMT	404	245						
1312	9006	FMT	407	268						
1405	9007	FMT	418	312	337					
1416	9008	FMT	420	313	377					
1427	9009	FMT	422	315						
1445	9010	FMT	425	318	357					
1451	9011	FMT	426	340						
1457	9012	FMT	427	342						
1475	9013	FMT	430	364						
1513	9014	FMT	433	380						
1530	9015	FMT	436	365	381					
702	9999		384	67						

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
41	10	I	73 80	228	EXT REFS
70	15	I	85 90	78	INSTACK

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
162	100	I	145 175	51B	EXT REFS
236	130	I	181 193	23B	EXT REFS
360	250	I	253 254	7B	EXT REFS
416	300	I	280 325	134B	EXT REFS
605	360	I	344 360	41B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
PLACES	98	0 IUIN1 (1)	1 IUIN2 (1)	2 IUOUT1 (1)
		3 IUOUT2 (1)	4 IUGO1 (1)	5 IUGO2 (1)
		6 IUGO3 (1)	7 IUGO4 (1)	8 IUSCR (1)
		9 IFSCR (1)	10 IFS1 (1)	11 IFS2 (1)
		12 IFS3 (1)	13 IFS4 (1)	14 IUCD (1)
		15 IUPR (1)	16 IUA (1)	17 IFA (1)
		18 IUY (1)	19 IFY (1)	20 IUMEMN (1)
		21 IFMEMN (1)	22 IUSTFN (1)	23 IFSTFN (1)
		24 IUKS (1)	25 IFKS (1)	26 IUB (1)
		27 IFB (1)	28 IUDESO (1)	29 IFDESO (1)
		30 IUMDBI (1)	31 IFMDBI (1)	32 IUADDI (1)
		33 IFADDI (1)	34 IUBALI (1)	35 IFBALI (1)
		36 IUDESI (1)	37 IFDESI (1)	38 IUWTI (1)
		39 IFWTI (1)	40 IUMEMO (1)	41 IFMEMO (1)
		42 IUBT (1)	43 IFBT (1)	44 IUDESN (1)
		45 IFDESN (1)	46 IUMD (1)	47 IFMD (1)
		48 IUMEMF (1)	49 IFMEMF (1)	50 IUSTFO (1)
		51 IFSTFO (1)	52 IUMDB (1)	53 IFMDB (1)
		54 IUADD (1)	55 IFADD (1)	56 IUBAL (1)
		57 IFBAL (1)	58 IUDESF (1)	59 IFDESF (1)
		60 IUWT (1)	61 IFWT (1)	62 IUDUM1 (1)
		63 IFDUM1 (1)	64 IUDUM2 (1)	65 IFDUM2 (1)
		66 IUDUM3 (1)	67 IFDUM3 (1)	68 IUL (1)
		69 IFL (1)	70 IUYT (1)	71 IFYT (1)
		72 IUZ (1)	73 IFZ (1)	74 IUZR (1)
		75 IFZR (1)	76 IULR (1)	77 IFLR (1)
		78 IUBR (1)	79 IFBR (1)	80 IUPHTF (1)
		81 IFPHTF (1)	82 IUMODM (1)	83 IFMODM (1)
		84 IUMODK (1)	85 IFMODK (1)	86 IUPHT (1)
		87 IFPHT (1)	88 IUQT (1)	89 IFQT (1)
		90 IUQ (1)	91 IFQ (1)	92 IUPH (1)
		93 IFPH (1)	94 IUINCM (1)	95 IFINCM (1)
		96 IUINCK (1)	97 IFINCK (1)	
KLUES	24	0 KLUSE (1)	1 KLUNAL (1)	2 IRED (1)
		3 KLUMD (1)	4 KLUBAL (1)	5 MSADD (1)
		6 NPASS (1)	7 IDNOPT (1)	8 VDES (1)
		9 EPS1 (1)	10 DWMAX (1)	11 NBAR (1)
		12 NFIX (1)	13 D (1)	14 DEL (1)
		15 EPS2 (1)	16 NCYC (1)	17 NNN (1)
		18 IBAND (1)	19 IFIN (1)	20 KLUB (1)
		21 KLUQ (1)	22 MORBAL (1)	23 DBAL (1)
BAL	241	0 NMBAL (1)	1 IDBAL (20)	21 VMBIN (20)
		41 VMBOLD (20)	61 VMBNEW (20)	81 MBDOF (60)
		141 DRVMB (20)	161 DRVMBO (20)	181 S1MB (20)
		201 S2MB (20)	221 S3MB (20)	
COLS	22	0 IT (1)	1 IMINT (1)	2 IMAXT (1)
		3 IDENS (1)	4 IOLDT (1)	5 IOLDW (1)
		6 ISRAT (1)	7 IMINTO (1)	8 IINITT (1)
		9 IWPUT (1)	10 NVAR (1)	11 JWPUT (1)
		12 JINITT (1)	13 JMINT (1)	14 JMAXT (1)

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
		15 JOLDT (1)	16 JNEWT (1)	17 JDRV (1)			
		18 JDRVO (1)	19 JSPR1 (1)	20 JSPR2 (1)			
		21 JSPR3 (1)					
FILE	20	0 IPOS (20)					
FLUT	204	0 UMOD (80)	80 VMOD (80)	160 VF (1)			
		161 WW (1)	162 CSCL (1)	163 NMODE (1)			
		164 IDMODE (40)					
WAYTS	6	0 WINITT (1)	1 WST (1)	2 WMB (1)			
		3 WBOTH (1)	4 WPRES (1)	5 DW (1)			
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)			
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)			
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)			
		9 KOUNTH (1)	10 KOUNTI (1)				

STATISTICS

PROGRAM LENGTH	1722B	978
CM LABELED COMMON LENGTH	1162B	626
520000B CM USED		

```
      C45700, SUB. PACK (PACK ROWS OF MATRICES BY ELIMINATING THE ZEROES)
      C
      C*****************************************************************
      C                                                               *
      C***  SUBROUTINE PACK   (IFIRST,ICOUNT,IOUTPT,IOUTCT,IWORD) *********
      C                                                               *
      C***  OBJECTIVE  ***************************************************
      C     ---------                                                 *
      C     USED TO PACK ROWS OF A MATRIX SO THEY MAY BE WRITTEN ON A DATA  *
      C     SET IN AN EFFICIENT MANNER   THIS IS DONE BY REPRESENTING       *
      C     STRINGS OF ZEROES BY A SINGLE FIXED POINT NEGATIVE INTEGER WHERE *
      C     THE VALUE OF THE INTEGER REPRESENTS THE NUMBER OF ZEROES IN THE  *
      C     STRING.  NON-ZERO NUMBERS ARE PRECEEDED BY A FIXED POINT NUMBER  *
      C     INDICATING THE NUMBER OF NON-ZERO NUMBERS THAT FOLLOW.  A SINGLE *
      C     ZERO IN A STRING IS REPRESENTED EXPLICITLY                      *
      C     FOR EXAMPLE GIVE THE FOLLOWING ROW OF A MATRIX.                 *
      C         0., 0., 1., 2., 0., 5., 7., 0., 0., 0., 0., 0., 0.,        *
      C     IT WOULD BE PACKED TO BECOME                                    *
      C        -2, 5, 1., 2., 0., 5., 7., -6                               *
      C                                                                     *
      C     THE SUBROUTINE MAY BE USED IN ONE OF TWO WAYS                   *
      C                                                                     *
      C     USAGE 1.                                                        *
      C                                                                     *
      C     CALL PACK (VAR(2), IMAX, VAR(2), IOUT, VAR(1))                  *
      C                                                                     *
      C     IN THE ABOVE EXAMPLE THE VARIABLE VAR(I) IS DIMENSIONED FOR ONE  *
      C     MORE (IMAX+1) THAN THE NUMBER OF VALUES (IMAX).  THE ARRAY      *
      C     WHICH IS TO BE PACKED MUST BE LOCATED IN VAR(I+1), I=1,...,IMAX. *
      C     THE RESULT WILL BE THE PACKED ARRAY CONSISTING OF IOUT ELEMENTS, *
      C     (VAR(I), I=1,...,IOUT).                                         *
      C                                                                     *
      C     USAGE 2.                                                        *
      C                                                                     *
      C     EQUIVALENCE (VAR(1), VARP(2)), (WORD, VARP(1))                  *
      C                                                                     *
      C     CALL PACK (VAR, IMAX, VAR, IOUT, WORD)                          *
      C                                                                     *
      C     IN THE ABOVE EXAMPLE THE VARIABLE VAR(I) IS DIMENSIONED FOR THE  *
      C     NUMBER OF VALUES (IMAX) WHEREAS THE VARIABLE VARP(I) IS         *
      C     DIMENSIONED FOR ONE MORE (IMAX+1) THAN THE NUMBER OF VALUES     *
      C     (IMAX).  THE ARRAY WHICH IS TO BE PACKED MUST BE LOCATED IN     *
      C     VAR(I), I=1,...,IMAX.  THE RESULT WILL BE THE PACKED ARRAY      *
      C     CONSISTING OF IOUT ELEMENTS, (VARP(I), I=1,...,IOUT).           *
      C                                                                     *
      C***  INPUT/OUTPUT  ************************************************
      C     ------------                                                    *
      C     THE SUBROUTINE RECEIVES A ROW OF A MATRIX AND RETURNS TO THE    *
      C     CALLING ROUTINE A PACKED ROW.                                   *
      C                                                                     *
      C***  SUMMARY OF SYMBOLS  ******************************************
      C     ------------------                                              *
      C                                                                     *
      C.... ICOUNT ....... INPUT                                           *
      C     NUMBER OF ELEMENTS IN THE ROW TO BE PACKED.  IN THE EXAMPLE THIS *
      C     WOULD BE 13.                                                    *
      C                                                                     *
```

```
      C.... IFIRST(I) .... INPUT                                          * PACK      59
      C     ROW OF THE MATRIX WHICH IS TO BE PACKED.                      * PACK      60
   60 C     NOTE THAT THIS VARIABLE IN THE CALLING PROGRAM MUST BE        * PACK      61
      C     DIMENSIONED FOR ONE MORE THAN THE NUMBER OF VALUES IN THE ARRAY * PACK     62
      C     IF THE SUBROUTINE IS CALLED ACCORDING TO USAGE 1, SHOWN ABOVE. * PACK     63
      C                                                                   * PACK      64
      C.... IOUTCT ..... OUTPUT                                           * PACK      65
   65 C     NUMBER OF ELEMENTS IN THE PACKED ARRAY MINUS ONE (THE FIRST WORD * PACK    66
      C     IS NOT INCLUDED IN THE COUNT) RETURNED TO THE CALLING PROGRAM. * PACK      67
      C     IN THE EXAMPLE THIS WOULD BE SEVEN BECAUSE THE FIRST WORD IS  * PACK      68
      C     NOT INCLUDED IN THE COUNT.  THE USER MUST INCREMENT THIS      * PACK      69
      C     VARIABLE BY ONE, IN THE CALLING PROGRAM, IN ORDER TO HAVE THE * PACK      70
   70 C     PROPER COUNT FOR THE NUMBER OF ELEMENTS IN THE PACKED ARRAY.  * PACK      71
      C                                                                   * PACK      72
      C.... IOUTPT(I)..... OUTPUT                                         * PACK      73
      C     PACKED ROW RETURNED TO CALLING PROGRAM.                       * PACK      74
      C                                                                   * PACK      75
   75 C.... IWORD ..... OUTPUT                                           * PACK      76
      C     VALUE OF FIRST WORD IN PACKED ROW.  IN THE EXAMPLE THIS WOULD * PACK      77
      C     BE -2.                                                        PACK      78
      C                                                                   * PACK      79
      C.... JINT ..... INTERMEDIATE                                       * PACK      80
   80 C     COUNTING INDEX FOR THE NUMBER OF ZERO VALUES EXISTING WITHIN  * PACK      81
      C     THE  NON-ZERO VALUES IN THE ROW WHICH IS TO BE PACKED.        * PACK      82
      C                                                                   * PACK      83
      C.... JOUT ..... INTERMEDIATE                                       * PACK      84
      C     LOCATION IN THE OUTPUT VARIABLE IOUTPT(JOUT) OF THE NUMBER OF * PACK      85
   85 C     NON-ZERO VALUES REPRESENTED BY JREAL, IOUTPT(JOUT) = JREAL.   * PACK      86
      C                                                                   * PACK      87
      C     JREAL ..... INTERMEDIATE                                      * PACK      88
      C     COUNTING INDEX FOR THE NUMBER OF NON-ZERO VALUES EXISTING     * PACK      89
      C     WITHIN THE ZERO VALUES IN THE ROW WHICH IS TO BE PACKED.      * PACK      90
   90 C                                                                   * PACK      91
      C***  ERROR MESSAGES  ************************************************* PACK    92
      C     --------------                                                * PACK      93
      C     NONE.                                                         * PACK      94
      C                                                                   * PACK      95
   95 C*************************************************************************** PACK 96
      C                                                                     PACK      97
            SUBROUTINE PACK (IFIRST,ICOUNT,IOUTPT,IOUTCT,IWORD)             PACK      98
      C                                                                     PACK      99
            DIMENSION IFIRST(ICOUNT),IOUTPT(ICOUNT)                         PACK     100
  100 C                                                                     PACK     101
      C                                                                     PACK     102
      C INITIALIZE THE VARIABLES                                            PACK     103
      C                                                                     PACK     104
            JREAL=0                                                         PACK     105
  105       JINT=0                                                          PACK     106
            IOUTCT=-1                                                       PACK     107
            JOUT=0                                                          PACK     108
      C                                                                     PACK     109
      C                                                                     PACK     110
  110 C PACK THE ARRAY AND DEFINE APPROPRIATE INDICES                       PACK     111
      C                                                                     PACK     112
            DO 45 I=1,ICOUNT                                                PACK     113
            IF (IFIRST(I)) 10,30,10                                         PACK     114
         10 IF (JREAL.LE.0) IOUTCT=IOUTCT+1                                 PACK     115
```

```
115              13 JREAL=JREAL+1                                          PACK      116
                    IF (JINT-1) 20,15,22                                   PACK      117
                 15 JREAL=JREAL+1                                          PACK      118
                    IOUTCT=IOUTCT+1                                        PACK      119
                    IOUTPT(IOUTCT)=0                                       PACK      120
120                 JINT=0                                                 PACK      121
                 20 IOUTCT=IOUTCT+1                                        PACK      122
                    IOUTPT(IOUTCT)=IFIRST(I)                               PACK      123
                    GO TO 45                                               PACK      124
                 22 IF (IOUTCT) 24,24,25                                   PACK      125
125              24 IWORD=-JINT                                            PACK      126
                    GO TO 26                                               PACK      127
                 25 IOUTPT(IOUTCT)=-JINT                                   PACK      128
                 26 JINT=0                                                 PACK      129
                    IOUTCT=IOUTCT+2                                        PACK      130
130                 JOUT=IOUTCT-1                                          PACK      131
                    IOUTPT(IOUTCT)=IFIRST(I)                               PACK      132
                    GO TO 45                                               PACK      133
                 30 JINT=JINT+1                                            PACK      134
                    IF (JREAL.EQ.0) GO TO 45                               PACK      135
135              35 IF (JINT.EQ.1) GO TO 45                                PACK      136
                    IF (JOUT.GT.0) GO TO 40                                PACK      137
                    IWORD=JREAL                                            PACK      138
                    GO TO 42                                               PACK      139
                 40 IOUTPT(JOUT)=JREAL                                     PACK      140
140              42     CONTINUE                                           PACK      141
                    JREAL=0                                                PACK      142
                 45 CONTINUE                                               PACK      143
                C                                                          PACK      144
                C INVESTIGATE SPECIAL CASES SUCH AS.                       PACK      145
145             C     1. LEADING ZEROS                                     PACK      146
                C     2. TRAILING ZEROES                                   PACK      147
                C     3. ALL ZEROES IN THE ARRAY                           PACK      148
                C     4. ALL VALUES IN THE ARRAY                           PACK      149
                C                                                          PACK      150
150                 IF (JINT-1) 52,50,60                                   PACK      151
                 50 IF (JREAL.EQ.0) GO TO 70                               PACK      152
                    IOUTCT=IOUTCT+1                                        PACK      153
                    IOUTPT(IOUTCT)=0                                       PACK      154
                    JREAL=JREAL+1                                          PACK      155
155              52 IF (JOUT.GT.0) GO TO 55                                PACK      156
                    IWORD=JREAL                                            PACK      157
                    GO TO 100                                              PACK      158
                 55 IOUTPT(JOUT)=JREAL                                     PACK      159
                    GO TO 100                                              PACK      160
160              60 IOUTCT=IOUTCT+1                                        PACK      161
                    IF (IOUTCT.GT.0) GO TO 62                              PACK      162
                    IWORD=-JINT                                            PACK      163
                    GO TO 100                                              PACK      164
                 62     CONTINUE                                           PACK      165
165                 IOUTPT(IOUTCT)=-JINT                                   PACK      166
                    GO TO 100                                              PACK      167
                C                                                          PACK      168
                C                                                          PACK      169
                C ARRAY WHICH IS TO BE PACKED CONSISTS OF ONE ZERO.        PACK      170
170             C                                                          PACK      171
                 70 IWORD=-1                                               PACK      172
```

```
                    IOUTCT=0                                                    PACK      173
                C                                                               PACK      174
                  100 CONTINUE                                                  PACK      175
    175         C                                                               PACK      176
                    RETURN                                                      PACK      177
                    END                                                         PACK      178
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	PACK	97	176

VARIABLES	SN	TYPE		RELOCATION								
116	I	INTEGER			REFS	113	122	131	DEFINED	112		
0	ICOUNT	INTEGER		F.P.	REFS	2*99	112	DEFINED	97			
0	IFIRST	INTEGER	ARRAY	F.P.	REFS	99	113	122	131	DEFINED	97	
0	IOUTCT	INTEGER		F.P.	REFS	114	118	119	121	122	124	127
					129	130	131	152	153	160	161	165
					DEFINED	97	106	114	118	121	129	152
					160	172						
0	IOUTPT	INTEGER	ARRAY	F.P.	REFS	99	DEFINED	97	119	122	127	131
					139	153	158	165				
0	IWORD	INTEGER		F.P.	DEFINED	97	125	137	156	162	171	
114	JINT	INTEGER			REFS	116	125	127	133	135	150	162
					165	DEFINED	105	120	128	133		
115	JOUT	INTEGER			REFS	136	139	155	158	DEFINED	107	130
113	JREAL	INTEGER			REFS	114	115	117	134	137	139	151
					154	156	158	DEFINED	104	115	117	141
					154							

STATEMENT LABELS			DEF LINE	REFERENCES				
0	10	INACTIVE	114	2*113				
0	13	INACTIVE	115					
0	15	INACTIVE	117	116				
30	20		121	116				
32	22		124	116				
0	24	INACTIVE	125	2*124				
36	25		127	124				
37	26		128	126				
44	30		133	113				
0	35	INACTIVE	135					
53	40		139	136				
55	42		140	138				
56	45		142	112	123	132	134	135
0	50	INACTIVE	151	150				
70	52		155	150				
74	55		158	155				
77	60		160	150				
104	62		164	161				
110	70		171	151				
112	100		174	157	159	163	166	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
20	45	I	112 142	37B	OPT

STATISTICS

PROGRAM LENGTH	123B	83
52000B CM USED		

```
      C45700, SUB. UNPACK (UNPACK ROWS OF MATRICES THAT HAVE BEEN PACKED)      UNPACK      2
      C                                                                        UNPACK      3
      C************************************************************************ UNPACK      4
      C                                                                       * UNPACK      5
      C***  SUBROUTINE UNPACK (IFRIST,ICOUNT,IOUTPT,IOUTCT,NLZERS) ********** UNPACK      6
      C                                                                       * UNPACK      7
      C***  OBJECTIVE  ******************************************************* UNPACK      8
      C     ---------                                                         * UNPACK      9
      C     UNPACKS ROWS OF MATRICES THAT HAVE BEEN PACKED BY SUBROUTINE      * UNPACK     10
      C     PACK.                                                             * UNPACK     11
      C                                                                       * UNPACK     12
      C     THE SUBROUTINE MAY BE USED IN ONE OF TWO WAYS.                    * UNPACK     13
      C                                                                       * UNPACK     14
      C     USAGE 1.                                                          * UNPACK     15
      C                                                                       * UNPACK     16
      C     IM =  ((IMAX+1) - IN) + 1                                         * UNPACK     17
      C     CALL UNPACK (VAR(IM),IN,VAR,IMAX,NLZERS)                          * UNPACK     18
      C                                                                       * UNPACK     19
      C     IN THE ABOVE EXAMPLE THE VARIABLE VAR(I) IS DIMENSIONED FOR ONE   * UNPACK     20
      C     MORE (IMAX+1) THAN THE NUMBER OF VALUES (IMAX).  THE ARRAY        * UNPACK     21
      C     WHICH IS TO BE UNPACKED MUST BE LOCACTED IN V(IM) AS SHOWN BELOW. * UNPACK     22
      C                                                                       * UNPACK     23
      C     DO XXX J=1,...,IN                                                 * UNPACK     24
      C     IM       =  (IMAX+1) - J + 1                                      * UNPACK     25
      C     JM       =  IN - J + 1                                            * UNPACK     26
      C XXX VAR(IM) =  VAR(JM)                                                * UNPACK     27
      C     THE RESULT WILL BE THE UNPACKED ARRAY CONSISTING OF IMAX          * UNPACK     28
      C     ELEMENTS (VAR(I), I=1,...,IMAX).                                  * UNPACK     29
      C                                                                       * UNPACK     30
      C     USAGE 2.                                                          * UNPACK     31
      C                                                                       * UNPACK     32
      C     CALL UNPACK (VAR,IN,VARU,IMAX,NLZERS)                             * UNPACK     33
      C                                                                       * UNPACK     34
      C     IN THE ABOVE EXAMPLE THE VARIABLE VAR(I) IS DIMENSIONED FOR ONE   * UNPACK     35
      C     MORE (IMAX+1) THAN THE NUMBER OF VALUES (IMAX) WHEREAS THE        * UNPACK     36
      C     VARIABLE VARU(I) IS DIMENSIONED FOR IMAX.  THE ARRAY WHICH IS TO  * UNPACK     37
      C     BE UNPACKED MUST BE LOCATED IN VAR(I), I=1,...,IN.                * UNPACK     38
      C     THE RESULT WILL BE THE UNPACKED ARRAY CONSISTING OF IMAX          * UNPACK     39
      C     ELEMENTS (VARU(I), I=1,...,IMAX).                                 * UNPACK     40
      C                                                                       * UNPACK     41
      C***  INPUT/OUTPUT  ***************************************************** UNPACK     42
      C     ------------                                                      * UNPACK     43
      C     USING A PACKED ROW OF A MATRIX, THE SUBROUTINE GENERATES A ROW    * UNPACK     44
      C     OF A MATRIX WITH EXPLICIT ZEROES.                                 * UNPACK     45
      C                                                                       * UNPACK     46
      C***  SUMMARY OF SYMBOLS  ********************************************** UNPACK     47
      C     ------------------                                                * UNPACK     48
      C.... ICOUNT ....... INPUT                                             * UNPACK     49
      C     NUMBER OF ELEMENTS IN THE PACKED ROW.                             * UNPACK     50
      C                                                                       * UNPACK     51
      C.... IFIRST(I) .... INPUT                                              * UNPACK     52
      C     ROW OF THE MATRIX WHICH IS TO BE UNPACKED.                        * UNPACK     53
      C     NOTE THAT THIS VARIABLE IN THE CALLING PROGRAM MUST BE            * UNPACK     54
      C     DIMENSIONED FOR ONE MORE (IOUTCT+1) THAN THE NUMBER OF VALUES     * UNPACK     55
      C     IN THE UNPACKED ARRAY (IOUPT(I)) FOR BOTH USAGES SHOWN ABOVE.     * UNPACK     56
      C                                                                       * UNPACK     57
      C.... IPT ......... INTERMEDIATE                                        * UNPACK     58
```

```
      C     COUNTINT INDEX FOR THE PACKED VARIABLE                          * UNPACK     59
      C                                                                     * UNPACK     60
60    C.... IOUTCT ..... INPUT                                             * UNPACK     61
      C     NUMBER OF ELEMENTS IN THE UNPACKED ROW.                         * UNPACK     62
      C                                                                     * UNPACK     63
      C.... IOUTPT(I)..... OUTPUT                                          * UNPACK     64
      C     UNPACKED ROW OF THE MATRIX RETURNED TO THE CALLING PROGRAM.     * UNPACK     65
65    C                                                                     * UNPACK     66
      C.... JPT ..... INTERMEDIATE                                         * UNPACK     67
      C     COUNTING INDEX FOR THE UNPACKED VARIABLE.                       * UNPACK     68
      C                                                                     * UNPACK     69
      C.... NLZERS ..... OUTPUT                                            * UNPACK     70
70    C     NUMBER OF LEADING ZEROS IN THE PACKED ROW.                      * UNPACK     71
      C                                                                     * UNPACK     72
      C***  ERROR MESSAGES  *************************************************** UNPACK     73
      C     --------------                                                  * UNPACK     74
      C     NONE.                                                           * UNPACK     75
75    C                                                                     * UNPACK     76
      C*********************************************************************** UNPACK     77
      C                                                                       UNPACK     78
            SUBROUTINE UNPACK (IFIRST,ICOUNT,IOUTPT,IOUTCT,NLZERS)            UNPACK     79
      C                                                                       UNPACK     80
80          DIMENSION IFIRST(ICOUNT),IOUTPT(IOUTCT)                         UNPACK     81
      C                                                                       UNPACK     82
      C                                                                       UNPACK     83
      C FUNCTION DEFINITION                                                   UNPACK     84
            MINOF(K1,K2) =  MINO(K1,K2)                                       UNPACK     85
85    C                                                                       UNPACK     86
            KERROR = 1                                                        UNPACK     87
            IF (IFIRST(1)) 7,99,13                                            UNPACK     88
          7 NLZERS=-IFIRST(1)                                                 UNPACK     89
            DO 10 I=1,NLZERS                                                  UNPACK     90
90        10 IOUTPT(I)=0                                                      UNPACK     91
            JPT=NLZERS+1                                                      UNPACK     92
            IPT=2                                                             UNPACK     93
            IF(JPT-IOUTCT) 19,19,37                                           UNPACK     94
         13 IPT=1                                                             UNPACK     95
95          JPT=1                                                           UNPACK     96
            IF (IFIRST(2)) 28,16,28                                           UNPACK     97
         16 NLZERS=1                                                          UNPACK     98
            GO TO 31                                                          UNPACK     99
         19     CONTINUE                                                     UNPACK    100
100         IF (IFIRST(IPT)) 22,99,31                                       UNPACK    101
         22 IEND=MINOF(IOUTCT,(JPT-IFIRST(IPT)-1))                            UNPACK    102
            DO 25 I=JPT,IEND                                                  UNPACK    103
         25 IOUTPT(I)=0                                                       UNPACK    104
            JPT=IEND+1                                                        UNPACK    105
105         IPT=IPT+1                                                       UNPACK    106
            IF (JPT-IOUTCT) 19,19,37                                          UNPACK    107
         28 NLZERS=0                                                          UNPACK    108
         31 IST=IPT+1                                                         UNPACK    109
            ISTEP=MINOF(IFIRST(IPT),(IOUTCT-JPT+1))                           UNPACK    110
110         IEND=IPT+ISTEP                                                  UNPACK    111
            DO 34 I=IST,IEND                                                  UNPACK    112
            IOUTPT(JPT)=IFIRST(I)                                             UNPACK    113
         34 JPT=JPT+1                                                         UNPACK    114
            IPT=IEND+1                                                        UNPACK    115
```

```
115                IF (JPT-IOUTCT) 19,19,37                              UNPACK    116
                 C                                                       UNPACK    117
                    37 GO TO 100                                         UNPACK    118
                    99 KERROR = 2                                        UNPACK    119
                 C                                                       UNPACK    120
120                100 CONTINUE                                          UNPACK    121
                 C                                                       UNPACK    122
                      RETURN                                             UNPACK    123
                      END                                                UNPACK    124
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	UNPACK	78	122

VARIABLES

	SN	TYPE		RELOCATION								
105	I	INTEGER			REFS	90	103	112	DEFINED	89	102	111
0	ICOUNT	INTEGER		F.P.	REFS	80	DEFINED	78				
110	IEND	INTEGER			REFS	102	104	111	114	DEFINED	101	110
0	IFIRST	INTEGER	ARRAY	F.P.	REFS	80	87	88	96	100	101	109
						112	DEFINED	78				
0	IOUTCT	INTEGER		F.P.	REFS	80	93	101	106	109	115	
					DEFINED	78						
0	IOUTPT	INTEGER	ARRAY	F.P.	REFS	80	DEFINED	78	90	103	112	
107	IPT	INTEGER			REFS	100	101	105	108	109	110	
					DEFINED	92	94	105	114			
111	IST	INTEGER			REFS	111	DEFINED	108				
112	ISTEP	INTEGER			REFS	110	DEFINED	109				
106	JPT	INTEGER			REFS	93	101	102	106	109	112	113
					115	DEFINED	91	95	104	113		
104	KERROR	INTEGER			DEFINED	86	118					
0	NLZERS	INTEGER		F.P.	REFS	89	91	DEFINED	78	88	97	107

INLINE FUNCTIONS

	TYPE	ARGS		DEF LINE	REFERENCES	
MINO	INTEGER	0	INTRIN		101	109
MINOF	INTEGER	2	SF	84	101	109

STATEMENT LABELS

			DEF LINE	REFERENCES		
0	7	INACTIVE	88	87		
0	10		90	89		
24	13		94	87		
0	16	INACTIVE	97	96		
31	19		99	2*93	2*106	2*115
0	22	INACTIVE	101	100		
0	25		103	102		
53	28		107	2*96		
54	31		108	98	100	
0	34		113	111		
101	37		117	93	106	115
102	99		118	87	100	
103	100		120	117		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	10	I	89 90	2B	INSTACK
43	25	I	102 103	2B	INSTACK
71	34	I	111 113	2B	INSTACK

STATISTICS
PROGRAM LENGTH 113B 75
52000B CM USED

```
      C45700, SUB  PUTROW (PUT ROW OF A MATRIX ON TAPE)                    PUTROW     2
      C                                                                    PUTROW     3
      C*****************************************************************   PUTROW     4
      C                                                                  *  PUTROW     5
      C***  SUBROUTINE PUTROW (NTAPE ,IPACK ,BUFFER,ICOUNT) ************   PUTROW     6
      C                                                                  *  PUTROW     7
      C***  OBJECTIVE  ***************************************************   PUTROW     8
      C     ---------                                                    *  PUTROW     9
      C     PUTS OUT A ROW OF A MATRIX ON THE UNIT SPECIFIED AND IN THE  *  PUTROW    10
      C     FORMAT DESIGNATED BY IPACK.  THE ROW CONSISTS OF ICOUNT      *  PUTROW    11
      C     CONSECUTIVE ELEMENTS.                                        *  PUTROW    12
      C                                                                  *  PUTROW    13
      C***  INPUT/OUTPUT  ************************************************   PUTROW    14
      C     ------------                                                 *  PUTROW    15
      C     THE SUBROUTINE RECEIVES A ROW OF A MATRIX FROM THE CALLING   *  PUTROW    16
      C     ROUTINE AND WRITES IT ON THE SPECIFIED UNIT IN EITHER PACKED OR  PUTROW    17
      C     UNPACKED FORM.                                               *  PUTROW    18
      C                                                                  *  PUTROW    19
      C***  SUMMARY OF SYMBOLS  ******************************************   PUTROW    20
      C     ------------------                                           *  PUTROW    21
      C.... BUFFER(I) .... INPUT                                         *  PUTROW    22
      C     ARRAY HOLDING ONE ROW OF A THE MATRIX WHICH IS TO BE STORED ON   PUTROW    23
      C     DATA SET UNIT NTAPE.                                         *  PUTROW    24
      C     NOTE THAT WHEN THE PACKING FACTOR IS -1 THIS VARIABLE MUST BE    PUTROW    25
      C     DIMENSIONED TO ICOUNT+1 IN THE CALLING PROGRAM.  FOR OTHER VALUES  PUTROW    26
      C     OF THE PACKING FACTORS. THIS VARIABLE IS DIMENSIONED TO ICOUNT.  *  PUTROW    27
      C                                                                  *  PUTROW    28
      C.... ICOUNT ..... INPUT                                          *  PUTROW    29
      C     NUMBER OF ELEMENTS IN THE ARRAY BUFFER(I) AT THE TIME THE    *  PUTROW    30
      C     SUBROUTINE PUTROW IS CALLED.                                 *  PUTROW    31
      C     A VALUE OF ZERO (0) OR MINUS ONE (-1) WILL WRITE AN END OF FILE  PUTROW    32
      C     ON DATA SET NTAPE AND RETURN TO THE CALLING PROGRAM.         *  PUTROW    33
      C                                                                  *  PUTROW    34
      C.... IPACK ..... INPUT                                            *  PUTROW    35
      C     CONTROL WORD FOR PACKING AND/OR UNPACKING THE DATA.          *  PUTROW    36
      C     PACKING IS DONE IN THE USER'S ARRAY, WHICH HOLDS THE ROW,    *  PUTROW    37
      C     HOWEVER, PROVISIONS HAVE BEEN MADE TO RESTORE THE ROW        *  PUTROW    38
      C     IF ABSOLUTELY NECESSARY.  VARIOUS VALUES ASSIGNED TO IPACK ARE.  PUTROW    39
      C     IPACK = 0,  1. ROW IN STORAGE, BUFFER(I), IS PACKED.         *  PUTROW    40
      C                 2. LEAVE ROW IN STORAGE, BUFFER(I), PACKED.      *  PUTROW    41
      C                 3. STORE PACKED ROW, BUFFER(I), ON DATA SET NTAPE.  PUTROW    42
      C                 4. RETURN PACKED ROW IN BUFFER(I).               *  PUTROW    43
      C     IPACK = 1,  1. ROW IN STORAGE, BUFFER(I), IS UNPACKED.       *  PUTROW    44
      C                 2. PACK ROW USING BUFFER(I).                     *  PUTROW    45
      C                 3. STORE PACKED ROW, BUFFER(I), ON DATA SET NTAPE.  PUTROW    46
      C                 4. RETURN PACKED ROW IN BUFFER(I).               *  PUTROW    47
      C     IPACK =-1,  1. ROW IN STORAGE, BUFFER(I), IS UNPACKED.       *  PUTROW    48
      C                 2. PACK ROW USING BUFFER(I).                     *  PUTROW    49
      C                 3. STORE PACKED ROW, BUFFER(I), ON DATA SET NTAPE.  PUTROW    50
      C                 4. RETURN UNPACKED ROW IN BUFFER(I).             *  PUTROW    51
      C     IPACK = 2,  1. ROW IN STORAGE, BUFFER(I), IS UNPACKED.       *  PUTROW    52
      C                 2. DO NOT PACK ROW USING BUFFER(I).              *  PUTROW    53
      C                 3. STORE UNPACKED ROW, BUFFER(I), ON DATA SET NTAPE.  PUTROW    54
      C                 4. RETURN UNPACKED ROW IN BUFFER(I).             *  PUTROW    55
      C                                                                  *  PUTROW    56
      C.... NTAPE ..... INPUT                                            *  PUTROW    57
      C     DATA SET UNIT FOR STORING THE MATRIX.                        *  PUTROW    58
```

```
      C45730, SUB  ERROR (ADDRESSING ERROR (OC5))                          ERROR       2
      C                                                                    ERROR       3
      C***  SUBROUTINE ERROR  ************************************************ ERROR       4
      C                                                                   * ERROR       5
      C                                                                   * ERROR       6
      C***  OBJECTIVE  ****************************************************** ERROR       7
      C     ---------                                                     * ERROR       8
      C                                                                   * ERROR       9
      C     CAUSES A OC5 (ADDRESSING) ERROR TO PROVIDE A DUMP IN          * ERROR      10
      C     CASE OF OTHER ERRORS THAT MAY OCCUR DURING EXECUTION OF THE   * ERROR      11
      C     PROGRAM.  THE SUBROUTINE ERROR IS AN ARGUMENT TO ERRSET -     * ERROR      12
      C     EXTENDED ERROR HANDLING PACKAGE - PROVIDED BY THE COMPUTER    * ERROR      13
      C     MANAGEMENT.                                                   * ERROR      14
      C                                                                   * ERROR      15
      C                                                                   * ERROR      16
      C************************************************************ ********** ERROR      17
      C                                                                    ERROR      18
            SUBROUTINE ERROR                                               ERROR      19
      C                                                                    ERROR      20
            DIMENSION A(1)                                                 ERROR      21
            I      =  300000                                               ERROR      22
            A(I)   =  0.0                                                  ERROR      23
      C                                                                    ERROR      24
            RETURN                                                         ERROR      25
            END                                                            ERROR      26
```

SYMBOLIC REFERENCE MAP (R=3)

```
ENTRY POINTS     DEF LINE     REFERENCES
    1  ERROR          18        24

VARIABLES     SN  TYPE           RELOCATION
    7  A          REAL       ARRAY                REFS        20    DEFINED       22
    6  I          INTEGER                         REFS        22    DEFINED       21

STATISTICS
  PROGRAM LENGTH                  10B       8
         520008 CM USED
```

SYMBOLIC REFERENCE MAP (R=3)

```
ENTRY POINTS      DEF LINE      REFERENCES
    3  WORDS           43         53

VARIABLES     SN  TYPE            RELOCATION
    0  DESCRI     REAL        ARRAY      F.P.          REFS         45         50    DEFINED        43
   16  N          INTEGER                               REFS       2*50    DEFINED         49
    0  NWORDS     INTEGER                  F.P.         REFS       2*45         49    DEFINED        43
    0  TITLE      REAL        ARRAY      F.P.          REFS         45    DEFINED         43         50

STATEMENT LABELS              DEF LINE    REFERENCES
    0  50           INACTIVE      48
    0  100                        51          49

LOOPS  LABEL     INDEX      FROM-TO     LENGTH     PROPERTIES
   12  100       N            49 51         28      INSTACK

STATISTICS
  PROGRAM LENGTH                  178       15
          520008 CM USED
```

```
      C45730, SUB. WORDS (STORING OF ALPHAMERIC INFORMATION IN VARIABLES)
      C
      C***  SUBROUTINE WORDS (TITLE,NWORDS,DESCRI)  ************************
      C                                                                     *
      C                                                                     *
      C***  OBJECTIVE  ******************************************************
      C     ---------                                                       *
      C                                                                     *
      C     TO STORE THE ALPHAMERIC INFORMATION GIVEN BY THE VARIABLE       *
      C     DESCRI(N) INTO THE VARIABLE TITLE(N).                           *
      C                                                                     *
      C                                                                     *
      C***  SUMMARY OF FORTRAN SYMBOLS  *************************************
      C     --------------------------                                      *
      C                                                                     *
      C.... DESCRI(N) .... INPUT                                            *
      C     HOLLERITH CHARACTERSTRING DEFINED BY EITHER OF THE FOLLOWING TWO *
      C     WAYS IN THE CALLING STATEMENT.                                  *
      C     1.  NUMC H ABC...XYZ WHERE NUMC REPRESENTS THE NUMBER OF        *
      C         ALPHAMERIC CHARACTERS, H IS THE HOLLERITH CONTROL, AND      *
      C         ABC...XYZ REPRESENTS THE ALPHAMERIC CHARACTERS.             *
      C         BLANKS ON EITHER SIDE OF THE HOLLERITH CONTROL H ARE NOT    *
      C         REQUIRED.  THESE BLANKS ARE INCLUDED HERE FOR CLARITY.      *
      C     2.  @ABC...XYZ@ WHERE THE APOSTROPHES @ @ REPLACE THE NUMBER    *
      C         OF ALPHAMERIC CHARACTERS AND HOLLERITH CONTROL AND ABC...XYZ *
      C         ONCE AGAIN REPRESENTS THE ALPHAMERIC CHARACTERS              *
      C                                                                     *
      C.... NWORDS ....... INPUT                                            *
      C     NUMBER OF WORDS CONSISTING OF @NUMCW@ ALPHAMERIC CHARACTERS TO  *
      C     BE STORED IN THE VARIABLE TITLE(N).  NOTE THAT                  *
      C     NWORDS = (NUMC-1)/NUMCW + 1, WHERE NUMC REPRESENTS THE NUMBER   *
      C     OF ALPHAMERIC CHARACTERS AND NUMCW REPRESENTS THE NUMBER OF     *
      C     CHARACTERS PER WORD BASED UPON THE COMPUTER INSTALLATION.       *
      C                                                                     *
      C.... TITLE(N) ..... OUTPUT                                           *
      C     VARIABLE TO STORE THE HOLLERITH CHARACTERSTRING CONSISTING OF   *
      C     NUMCW ALPHAMERIC CHARACTERS PER WORD.  NOTE THAT THE LAST WORD  *
      C     MAY CONSIST FROM ONE TO NUMCW CHARACTERS.                       *
      C                                                                     *
      C                                                                     *
      C*********************************************************************
      C
            SUBROUTINE WORDS  (TITLE,NWORDS,DESCRI)
      C
            DIMENSION TITLE(NWORDS)     ,DESCRI(NWORDS)
      C
      C
         50 CONTINUE
            DO 100 N=1,NWORDS
            TITLE(N) =  DESCRI(N)
        100 CONTINUE
      C
            RETURN
            END
```

```
WORDS       2
WORDS       3
WORDS       4
WORDS       5
WORDS       6
WORDS       7
WORDS       8
WORDS       9
WORDS      10
WORDS      11
WORDS      12
WORDS      13
WORDS      14
WORDS      15
WORDS      16
WORDS      17
WORDS      18
WORDS      19
WORDS      20
WORDS      21
WORDS      22
WORDS      23
WORDS      24
WORDS      25
WORDS      26
WORDS      27
WORDS      28
WORDS      29
WORDS      30
WORDS      31
WORDS      32
WORDS      33
WORDS      34
WORDS      35
WORDS      36
WORDS      37
WORDS      38
WORDS      39
WORDS      40
WORDS      41
WORDS      42
WORDS      43
WORDS      44
WORDS      45
WORDS      46
WORDS      47
WORDS      48
WORDS      49
WORDS      50
WORDS      51
WORDS      52
WORDS      53
WORDS      54
WORDS      55
```

```
VARIABLES     SN  TYPE            RELOCATION
     0  ITAPEO     INTEGER           F.P.       DEFINED      29   I/O REFS      35      37      39
     0  KPAGE      INTEGER           F.P.         REFS       32        35      37   DEFINED    29
    54  L          INTEGER                        REFS       35        37      39   DEFINED    33
     0  LINES      INTEGER           F.P.         REFS       32        33   DEFINED    29
        VARIABLES USED AS FILE NAMES, SEE ABOVE

STATEMENT LABELS              DEF LINE   REFERENCES
     0  100          INACTIVE     34
     0  150          INACTIVE     36
     0  160          INACTIVE     38
     0  200                       40        33
    36  300                       41        32
    50  1000     FMT              43        35
    52  2000     FMT              44        37        39

LOOPS  LABEL    INDEX      FROM-TO    LENGTH    PROPERTIES
    13  200     L           33 40       23B              EXT REFS

STATISTICS
  PROGRAM LENGTH                 61B      49
          52000B CM USED
```

```
      C45730, SUB. PLB(NEW PAGE AND/OR SKIP A NUMBER OF LINES - VERSION B)     PLB        2
      C                                                                        PLB        3
      C***  SUBROUTINE PLB (KPAGE,LINES,ITAPEO)  ****************************** PLB        4
      C                                                                      * PLB        5
      C                                                                      * PLB        6
      C***  OBJECTIVE  ********************************************************* PLB        7
      C     ---------                                                        * PLB        8
      C                                                                      * PLB        9
      C     TO START A NEW PAGE AND/OR SKIP A NUMBER OF LINES                * PLB       10
      C                                                                      * PLB       11
      C                                                                      * PLB       12
      C***  SUMMARY OF FORTRAN SYMBOLS  **************************************** PLB       13
      C     --------------------------                                       * PLB       14
      C                                                                      * PLB       15
      C.... ITAPEO ....... INPUT                                            * PLB       16
      C     TAPE NUMBER FOR STORING COMPUTER RESULTS ON A FORMATTED TAPE.    * PLB       17
      C                                                                      * PLB       18
      C.... KPAGE ........ INPUT                                            * PLB       19
      C     CONTROL WORD FOR STARTING A NEW PAGE.                            * PLB       20
      C     KPAGE = 1, DO NOT START A NEW PAGE.                              * PLB       21
      C     KPAGE = 2, START A NEW PAGE.                                     * PLB       22
      C                                                                      * PLB       23
      C.... LINES ........ INPUT                                            * PLB       24
      C     NUMBER OF LINES TO BE SKIPPED BETWEEN LISTED INFORMATION.        * PLB       25
      C                                                                      * PLB       26
      C                                                                      * PLB       27
      C******************************************************************** PLB       28
      C                                                                        PLB       29
            SUBROUTINE PLB (KPAGE,LINES,ITAPEO)                                PLB       30
      C                                                                        PLB       31
      C                                                                        PLB       32
            IF (KPAGE .EQ. 1 .AND. LINES  .EQ. 0) GO TO 300                    PLB       33
            DO 200 L=1,LINES                                                   PLB       34
          100 CONTINUE                                                         PLB       35
            IF (KPAGE .EQ. 2 .AND. L .EQ. 1) WRITE (ITAPEO,1000)               PLB       36
          150 CONTINUE                                                         PLB       37
            IF (KPAGE .EQ. 1 .AND. L .EQ. 1) WRITE (ITAPEO,2000)               PLB       38
          160 CONTINUE                                                         PLB       39
            IF (L .GT. 1) WRITE (ITAPEO,2000)                                  PLB       40
          200 CONTINUE                                                         PLB       41
          300 CONTINUE                                                         PLB       42
      C                                                                        PLB       43
         1000 FORMAT ( 1H1)                                                    PLB       44
         2000 FORMAT (  )                                                      PLB       45
      C                                                                        PLB       46
            RETURN                                                             PLB       47
            END                                                                PLB       48
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 PLB	29	46

VARIABLES	SN	TYPE	RELOCATION								
102	KLUES	INTEGER	ARRAY	REFS	55	73	76	80	DEFINED	70	
101	KSUM	INTEGER		REFS	73	74	DEFINED	71	73		
0	NCC	INTEGER	F.P.	REFS	66	70	72	75	DEFINED	53	66

VARIABLES USED AS FILE NAMES, SEE ABOVE

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
IABS	INTEGER	1	INTRIN		76
IABSF	INTEGER	1	SF	59	76

STATEMENT LABELS			DEF LINE	REFERENCES		
0	50		65	63		
20	100		70	82		
0	110		73	72		
51	150		81	75	77	78
54	160		83	74	80	
0	170		90	87		
75	5020	FMT	92	70		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
12	50	I	63 65	2B	INSTACK	
33	110	J	72 73	4B	INSTACK	
42	150	J	75 81	12B	OPT	EXITS
61	170	I	87 90	6B	INSTACK	

STATISTICS

PROGRAM LENGTH		132B	90
	520008 CM USED		

```
                C FUNCTION DEFINITION                                                  CLUES      59
                     IABSF(I)   =  IABS(I)                                             CLUES      60
      60        C                                                                      CLUES      61
                C                                                                      CLUES      62
                C INITIALIZE THE VARIABLES                                             CLUES      63
                     DO 50 I=1,KLUED                                                   CLUES      64
                     KLUE(I)=  0                                                       CLUES      65
      65          50 CONTINUE                                                        CLUES      66
                     IF (NCC   .GT. 20   ) NCC   = 20                                  CLUES      67
                C                                                                      CLUES      68
                C                                                                      CLUES      69
                C READ DATA FOR THE CONTROL WORD OPTIONS                               CLUES      70
      70          100 READ (ITAPER,5020) (KLUES(J), J=1,NCC)                         CLUES      71
                     KSUM = 0                                                          CLUES      72
                     DO 110 J = 1,NCC                                                  CLUES      73
                  110 IF (KLUES(J) .NE. 0) KSUM = KSUM + 1                           CLUES      74
                     IF (KSUM .EQ. 0) GO TO 160                                        CLUES      75
      75             DO 150 J=1,NCC                                                  CLUES      76
                     I      =  IABSF(KLUES(J))                                         CLUES      77
                     IF (I .EQ. 0    ) GO TO 150                                       CLUES      78
                     IF (I .GT. KLUED) GO TO 150                                       CLUES      79
                     KLUE(I)=  I                                                       CLUES      80
      80             IF (KLUES(J) .LT. 0) GO TO 160                                  CLUES      81
                  150 CONTINUE                                                       CLUES      82
                     GO TO 100                                                         CLUES      83
                  160 CONTINUE                                                       CLUES      84
                C                                                                      CLUES      85
      85        C CHANGE THE VALUE OF THE INPUT DATA CONTROL WORD OPTIONS FROM ZERO TO  CLUES      86
                C ONE AND FROM THE I'TH VALUE TO TWO.                                  CLUES      87
                     DO 170 I=1,KLUED                                                  CLUES      88
                     IF (KLUE(I) .EQ. I) KLUE(I) = 2                                   CLUES      89
                     IF (KLUE(I) .EQ. 0) KLUE(I) = 1                                   CLUES      90
      90            170 CONTINUE                                                     CLUES      91
                C                                                                      CLUES      92
                 5020 FORMAT ( 2014 )                                                  CLUES      93
                C                                                                      CLUES      94
                     RETURN                                                            CLUES      95
      95             END                                                             CLUES      96
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CLUES	53	94

VARIABLES

		SN	TYPE		RELOCATION								
77	I		INTEGER			REFS	64	77	78	2*79	3*88	2*89	
						DEFINED	63	76	87				
0	ITAPER		INTEGER		F.P.	DEFINED	53	I/O REFS	70				
100	J		INTEGER			REFS	70	73	76	80	DEFINED	70	72
						75							
0	KLUE		INTEGER	ARRAY	F.P.	REFS	55	88	89	DEFINED	53	64	79
						88	89						
0	KLUED		INTEGER		F.P.	REFS	55	63	78	87	DEFINED	53	

```
      C457OO. SUB. CLUES (READ CONTROL WORD OPTIONS (CLUES))                    CLUES      2
      C                                                                         CLUES      3
      C***  SUBROUTINE CLUES (ITAPER,NCC,KLUED,KLUE)  ************************ CLUES      4
      C                                                                       * CLUES      5
      C***  OBJECTIVE  ********************************************************** CLUES      6
      C     ---------                                                         * CLUES      7
      C     TO READ CONTROL WORD OPTIONS (CLUES) AND TO MINIMIZE THE AMOUNT   * CLUES      8
      C     OF DATA ASSOCIATED WITH THESE OPTIONS THAT MUST BE ENTERED INTO   * CLUES      9
      C     THE PROGRAM FROM CARDS.  A ZERO VALUE IS USED FOR ELIMINATING     * CLUES     10
      C     THE OPTIONS WHEREAS A VALUE CORRESPONDING TO THE INDEX ASSOCIATED* CLUES     11
      C     WITH THE SEQUENTIAL NUMBER OF THE VARIABLE, KLUE(I), IS USED FOR  * CLUES     12
      C     EXERCISING THE OPTION.  IN ORDER TO MINIMIZE THE AMOUNT OF DATA   * CLUES     13
      C     THE USER MUST PROVIDE, THE CONTROL WORD OPTION KLUE(I) IS         * CLUES     14
      C     INITIALIZED TO ZERO WITHIN THE PROGRAM.  THE USER IS REQUIRED TO  * CLUES     15
      C     PROVIDE DATA ONLY FOR THOSE OPTIONS WHICH HE WANTS EXERCISED      * CLUES     16
      C     PUNCHED WITHIN FOUR COLUMNS RIGHT JUSTIFIED.                      * CLUES     17
      C                                                                       * CLUES     18
      C     AFTER THE CONTROL WORD OPTIONS ARE ENTERED FROM CARDS, THE        * CLUES     19
      C     PROGRAM CHANGES THESE VALUES.                                     * CLUES     20
      C     A VALUE OF ONE (CORRESPONDING TO THE ORIGINAL ZERO VALUE)         * CLUES     21
      C     INDICATES THAT THE OPTION IS TO BE DELETED WHEREAS A VALUE OF TWO* CLUES     22
      C     (CORRESPONDING TO THE ORIGINAL I'TH VALUE) INDICATES THAT THE     * CLUES     23
      C     OPTION IS TO BE EXERCISED.                                        * CLUES     24
      C                                                                       * CLUES     25
      C                                                                       * CLUES     26
      C***  SUMMARY OF SYMBOLS  ************************************************ CLUES     27
      C     ------------------                                                * CLUES     28
      C                                                                       * CLUES     29
      C.... ITAPER ....... INPUT                                            * CLUES     30
      C     FORMATTED INPUT UNIT IN USER'S PROGRAM                            * CLUES     31
      C                                                                       * CLUES     32
      C.... NCC .......... INPUT                                            * CLUES     33
      C     NUMBER OF CONTROL WORD OPTIONS (CLUES) THAT MAY BE PUNCHED ON A   * CLUES     34
      C     SINGLE CARD.  BASED UPON A FORMAT OF 2OI4 FOR READING THE DATA    * CLUES     35
      C     ASSOCIATED WITH THE VARIABLE KLUE(I) THE VARIABLE NCC MAY HAVE A  * CLUES     36
      C     VALUE EQUAL TO OR LESS THAN 2O.                                   * CLUES     37
      C                                                                       * CLUES     38
      C.... KLUE(I) ..... OUTPUT                                            * CLUES     39
      C     INPUT DATA CONTROL WORD OPTIONS (CLUES) FOR INDICATING, THROUGH   * CLUES     40
      C     CARD INPUT DATA, WHETHER TO PERFORM THE I'TH OPTION OR NOT.       * CLUES     41
      C     KLUE(I) = O, DO NOT PERFORM THE I'TH OPTION.                      * CLUES     42
      C             = I, PERFORM THE I'TH OPTION.                             * CLUES     43
      C     SUBSEQUENT TO ENTERING THE DATA THE PROGRAM CHANGES THE VALUES    * CLUES     44
      C     OF THE OPTIONS.                                                   * CLUES     45
      C     KLUE(I) = 1, DO NOT PERFORM THE I'TH OPTION.                      * CLUES     46
      C             = 2, PERFORM THE I'TH OPTION.                             * CLUES     47
      C                                                                       * CLUES     48
      C.... KLUED .........INPUT                                            * CLUES     49
      C     DIMENSION OF THE VARIABLE KLUE(I) IN THE CALLING PROGRAM          * CLUES     50
      C                                                                       * CLUES     51
      C************************************************************************ CLUES     52
      C                                                                         CLUES     53
            SUBROUTINE CLUES (ITAPER,NCC,KLUED,KLUE)                            CLUES     54
      C                                                                         CLUES     55
            DIMENSION KLUE(KLUED)        ,KLUES(2O)                           CLUES     56
      C                                                                         CLUES     57
      C                                                                         CLUES     58
```

```
 115                RETURN                                                GETROW    116
                    END                                                   GETROW    117
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	GETROW	60	115

VARIABLES

	SN		TYPE	RELOCATION								
0		BUFFER	REAL	ARRAY	F.P.	REFS	63	80	88	90	2*91	99	3*100
						DEFINED	60	92					
0		ICOUNT	INTEGER		F.P.	REFS	63	75	86	91	100	101	
						DEFINED	60	81	101	105			
150		IEND	INTEGER			REFS	87	88	89	92	98		
						DEFINED	86	97					
146		IOPK	INTEGER			REFS	77	DEFINED	74	110			
0		IPACK	INTEGER		F.P.	REFS	77	81	104	DEFINED	60		
151		ISTART	INTEGER			REFS	89	90	91	DEFINED	87		
154		IWD2	INTEGER			REFS	109	110					
145		IWORD	INTEGER			REFS	70	71	74	79	81	87	91
							97	100	105	DEFINED	75		
147		NBYTE	INTEGER			REFS	80	90	99	DEFINED	79	89	98
153	*	NLZERS	INTEGER			REFS	91						
0		NTAPE	INTEGER		F.P.	REFS	70	80	90	99	109		
						DEFINED	60						
152		SAVE	REAL			REFS	92	DEFINED	88				

EXTERNALS

	TYPE	ARGS	REFERENCES				
DREAD		3	70	80	90	99	109
PACK		5	100				
UNPACK		5	91				

INLINE FUNCTIONS

	TYPE	ARGS		DEF LINE	REFERENCES	
IABS	INTEGER	1	INTRIN		74	110
IABSF	INTEGER	1	SF	67	74	110

STATEMENT LABELS

			DEF LINE	REFERENCES				
0	7	INACTIVE	72	2*71				
14	12		76	111				
0	15	INACTIVE	78	77				
31	17		84	77				
54	20		95	77				
75	22		104	71				
0	23	INACTIVE	105	104				
101	24		109	2*104				
107	100		113	82	93	102	107	

STATISTICS

PROGRAM LENGTH 155B 109

520008 CM USED

```
      C*********************************************************************** GETROW    59
      C                                                                       GETROW    60
60          SUBROUTINE GETROW (NTAPE,IPACK,BUFFER,ICOUNT)                     GETROW    61
      C                                                                       GETROW    62
      C                                                                       GETROW    63
            DIMENSION BUFFER(ICOUNT)                                          GETROW    64
      C                                                                       GETROW    65
65    C                                                                       GETROW    66
      C FUNCTION DEFINITION                                                   GETROW    67
            IABSF(I)     =  IABS(I)                                           GETROW    68
      C                                                                       GETROW    69
      C     PICK UP FIRST WORD AVAILABLE AND IF IT EXISTS GO TO 7             GETROW    70
70          CALL DREAD (NTAPE,IWORD,4)                                        GETROW    71
            IF (IWORD) 7,7,22                                                 GETROW    72
          7     CONTINUE                                                      GETROW    73
      C         WE HAVE READ PACKING FACTOR                                   GETROW    74
            IOPK = IABSF(IWORD)                                               GETROW    75
75          IWORD=ICOUNT                                                      GETROW    76
         12     CONTINUE                                                      GETROW    77
            IF (IPACK+IOPK-2) 20,15,17                                        GETROW    78
         15     CONTINUE                                                      GETROW    79
            NBYTE = 4*IWORD                                                   GETROW    80
80          CALL DREAD (NTAPE,BUFFER(1),NBYTE)                                GETROW    81
            IF (IPACK.EQ.0) ICOUNT=IWORD                                      GETROW    82
            GO TO 100                                                         GETROW    83
      C                                                                       GETROW    84
         17     CONTINUE                                                      GETROW    85
85    C         MUST UNPACK, READ DATA INTO END OF ROW                        GETROW    86
            IEND=ICOUNT+1                                                     GETROW    87
            ISTART=IEND-IWORD+1                                               GETROW    88
            SAVE=BUFFER(IEND)                                                 GETROW    89
            NBYTE = (IEND-ISTART+1)*4                                         GETROW    90
90          CALL DREAD (NTAPE,BUFFER(ISTART),NBYTE)                           GETROW    91
            CALL UNPACK (BUFFER(ISTART),IWORD,BUFFER,ICOUNT,NLZERS)           GETROW    92
            BUFFER(IEND)=SAVE                                                 GETROW    93
            GO TO 100                                                         GETROW    94
      C                                                                       GETROW    95
95       20     CONTINUE                                                      GETROW    96
      C         MUST PACK DATA, THIS MAY EXPAND IT                            GETROW    97
            IEND=IWORD+1                                                      GETROW    98
            NBYTE = (IEND-1)*4                                                GETROW    99
            CALL DREAD (NTAPE,BUFFER(2),NBYTE)                                GETROW   100
100         CALL PACK (BUFFER(2),IWORD,BUFFER(2),ICOUNT,BUFFER(1))            GETROW   101
            ICOUNT = ICOUNT+1                                                 GETROW   102
            GO TO 100                                                         GETROW   103
      C                                                                       GETROW   104
         22 IF (IPACK) 23,24,24                                               GETROW   105
105      23 ICOUNT=IWORD                                                      GETROW   106
      C         USER WANTS COUNT ONLY                                         GETROW   107
            GO TO 100                                                         GETROW   108
      C                                                                       GETROW   109
         24 CALL DREAD (NTAPE,IWD2,4)                                         GETROW   110
110         IOPK = IABSF(IWD2)                                                GETROW   111
            GO TO 12                                                          GETROW   112
      C                                                                       GETROW   113
        100 CONTINUE                                                          GETROW   114
      C                                                                       GETROW   115
```

```
      C45700, SUB. GETROW (GET ROW OF A MATRIX)                                  GETROW     2
      C                                                                          GETROW     3
      C*************************************************************************** GETROW     4
      C                                                                        * GETROW     5
      C***  SUBROUTINE GETROW (NTAPE ,IPACK ,BUFFER,ICOUNT) ******************** GETROW     6
      C                                                                        * GETROW     7
      C***  OBJECTIVE  ********************************************************** GETROW     8
      C     ---------                                                          * GETROW     9
      C     OBTAINS THE NEXT ROW OF THE MATRIX ON THE SPECIFIED UNIT AND       * GETROW    10
      C     STORES THE ROW IN A BUFFER.                                        * GETROW    11
      C                                                                        * GETROW    12
      C     PRIOR TO A GETROW CALL, THERE MUST BE, A GETLAB CALL. (ONCE PER    * GETROW    13
      C     MATRIX)                                                            * GETROW    14
      C                                                                        * GETROW    15
      C***  INPUT/OUTPUT  ******************************************************* GETROW    16
      C     ------------                                                       * GETROW    17
      C     THIS PROGRAM READS A ROW OF THE MATRIX FROM THE SPECIFIED UNIT     * GETROW    18
      C     FOR USE BY THE CALLING ROUTINE.                                    * GETROW    19
      C                                                                        * GETROW    20
      C***  SUMMARY OF SYMBOLS  ************************************************ GETROW    21
      C     ------------------                                                 * GETROW    22
      C.... BUFFER(I) .... OUTPUT                                              * GETROW    23
      C     ARRAY HOLDING ONE ROW OF A MATRIX WHICH IS READ FROM DATA SET      * GETROW    24
      C     NTAPE.                                                             * GETROW    25
      C     NOTE THAT IN THE CALLING PROGRAM THE ARRAY BUFFER(I) MUST BE       * GETROW    26
      C     DIMENSIONED FOR ONE MORE THAN THE NUMBER OF VALUES IN THE          * GETROW    27
      C     UNPACKED ARRAY.                                                    * GETROW    28
      C                                                                        * GETROW    29
      C.... ICOUNT ....... INPUT/OUTPUT                                        * GETROW    30
      C     NUMBER OF WORDS IN A ROW.                                          * GETROW    31
      C     ROUTINE WILL SET ICOUNT = 0 IF NO ROWS REMAIN.                     * GETROW    32
      C                                                                        * GETROW    33
      C.... IPACK ....... INPUT/OUTPUT                                         * GETROW    34
      C     PACKING DESIGNATOR WHERE                                           * GETROW    35
      C     IPACK = 0, RETURN ROW, BUFFER(I), IN PACKED FORM.                  * GETROW    36
      C           = 1, RETURN ROW, BUFFER(I), IN UNPACKED FORM.                * GETROW    37
      C           =-1, RETURN COUNT OF NUMBER OF WORDS IN A ROW WITHOUT        * GETROW    38
      C                READING ROW FROM DATA SET NTAPE.                        * GETROW    39
      C     NOTE THAT THE PACKING DESIGNATOR IPACK IN THIS SUBROUTINE HAS A     * GETROW    40
      C     DIFFERENT MEANING THAN THAT IN SUBROUTINE PUTROW. IN USING THIS    * GETROW    41
      C     SUBROUTINE IPACK MUST HAVE ONE OF THE THREE VALUES GIVEN ABOVE.    * GETROW    42
      C                                                                        * GETROW    43
      C     IF IPACK IS SET TO -1 BY CALLER, THEN NO TRANSMISSION WILL TAKE    * GETROW    44
      C     PLACE BUT ICOUNT WILL BE SET.  THIS IS THE METHOD CALLER WILL      * GETROW    45
      C     USE TO SEE HOW MANY ELEMENTS ARE IN THE NEXT ROW.  WHEN IPACK      * GETROW    46
      C     IS SET TO -1, ICOUNT REPRESENTS THE NUMBER OF WORDS IN THE ROW     * GETROW    47
      C     AS IT APPEARS ON THE VOLUME (DISK OR TAPE).  ICOUNT SHOULD NOT     * GETROW    48
      C     BE RESET BY CALLER SINCE IT IS USED WHEN THE ROW IS ACTUALLY       * GETROW    49
      C     REQUESTED.                                                         * GETROW    50
      C                                                                        * GETROW    51
      C.... NTAPE ....... INPUT/OUTPUT                                         * GETROW    52
      C     DATA SET UNIT FROM WHICH THE ROW OF THE MATRIX IS TO BE READ.      * GETROW    53
      C                                                                        * GETROW    54
      C***  ERROR MESSAGES  ****************************************************** GETROW    55
      C     --------------                                                     * GETROW    56
      C     NONE.                                                              * GETROW    57
      C                                                                        * GETROW    58
```

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
IABS	INTEGER	1	INTRIN		80
IABSF	INTEGER	1	SF	73	80

STATEMENT LABELS			DEF LINE	REFERENCES		
0	7	INACTIVE	77			
17	10		84	81		
20	11		85	83		
24	15		87	107		
43	17		95	90		
62	20		102	85		
72	30		108	99		
100	32		115	120		
107	40		121	116		
121	50		126	76		
124	100		128	93	100	124

STATISTICS

PROGRAM LENGTH 200B 128

52000B CM USED

```
115                32     CONTINUE                                                    PUTROW   116
                          IF (J .EQ. 0) GO TO 40                                      PUTROW   117
                          BUFFER(I)=BUFFER(J)                                         PUTROW   118
                          I=I-1                                                       PUTROW   119
                          J=J-1                                                       PUTROW   120
120                       IF (J.GT.0) GO TO 32                                        PUTROW   121
                       40 BUFFER(I)=WORD                                              PUTROW   122
                          CALL UNPACK (BUFFER(I),ICORE(1),BUFFER,ICOUNT,NLZERS)       PUTROW   123
                          BUFFER(ISAVE)=SAVE                                          PUTROW   124
                          GO TO 100                                                   PUTROW   125
125                    C                                                              PUTROW   126
                       50 CALL DCLOSE (NTAPE)                                         PUTROW   127
                       C                                                              PUTROW   128
                      100 CONTINUE                                                    PUTROW   129
                          RETURN                                                      PUTROW   130
130                       END                                                         PUTROW   131
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	PUTROW	65	129

VARIABLES	SN	TYPE		RELOCATION								
0	BUFFER	REAL	ARRAY	F.P.	REFS	68	92	97	2*104	112	117	2*122
					DEFINED	65	117	121	123			
173	I	INTEGER			REFS	117	118	121	122	DEFINED	113	118
176	ICORE	INTEGER	ARRAY		REFS	69	88	89	122	DEFINED	82	84
						86	105					
0	ICOUNT	INTEGER		F.P.	REFS	68	75	2*76	86	104	111	122
					DEFINED	65						
170	IOUTCT	INTEGER			REFS	104	105	106	114			
0	IPACK	INTEGER		F.P.	REFS	80	99	DEFINED	65			
165	IPAK	INTEGER			REFS	81	85	90	DEFINED	80		
164	IROW	INTEGER			REFS	91	96	DEFINED	75	106		
171	ISAVE	INTEGER			REFS	112	113	123	DEFINED	111		
174	J	INTEGER			REFS	116	117	119	120	DEFINED	114	119
166	NBYTE	INTEGER			REFS	92	97	DEFINED	91	96		
175	NLZERS	* INTEGER			REFS	122						
0	NTAPE	INTEGER		F.P.	REFS	88	89	92	95	97	98	126
					DEFINED	65						
172	SAVE	REAL			REFS	123	DEFINED	112				
167	WORD	REAL			REFS	95	104	121				

EXTERNALS	TYPE	ARGS	REFERENCES		
DCLOSE		1	126		
DWRITE		3	88	89	92
PACK		5	104		
PRITE		3	95	97	
UNPACK		5	122		
WEND		1	98		

```
      C                                                                      * PUTROW     59
      C***  ERROR MESSAGES  ************************************************ PUTROW     60
60    C     --------------                                                   * PUTROW     61
      C     NONE.                                                            * PUTROW     62
      C                                                                      * PUTROW     63
      C********************************************************************** PUTROW     64
      C                                                                        PUTROW     65
65          SUBROUTINE PUTROW (NTAPE,IPACK,BUFFER,ICOUNT)                    PUTROW     66
      C                                                                        PUTROW     67
      C                                                                        PUTROW     68
            DIMENSION BUFFER(ICOUNT)                                         PUTROW     69
            DIMENSION  ICORE(2)                                              PUTROW     70
70    C                                                                        PUTROW     71
      C                                                                        PUTROW     72
      C FUNCTION DEFINITION                                                  PUTROW     73
            IABSF(I)     =  IABS(I)                                          PUTROW     74
      C                                                                      PUTROW     75
75          IROW=ICOUNT                                                      PUTROW     76
            IF((ICOUNT.EQ.0).OR.(ICOUNT.EQ.-1))GO TO 50                      PUTROW     77
          7     CONTINUE                                                     PUTROW     78
      C*    DETERMINE 2ND WORD OF RECORD  -2 IF DATA IS PACKED- ZEROS GATHERED PUTROW     79
      C*                                  -1 IF DATA IS UNPACKED-EXPLICIT ZERO PUTROW     80
80          IPAK    =  IABSF(IPACK)                                          PUTROW     81
            IF  (IPAK.EQ.2) GO TO 10                                         PUTROW     82
            ICORE(2)= -2                                                     PUTROW     83
            GO TO 11                                                         PUTROW     84
         10 ICORE(2)= -1                                                     PUTROW     85
85       11 IF  (IPAK.EQ.1) GO TO 20                                         PUTROW     86
            ICORE(1)= ICOUNT                                                 PUTROW     87
         15     CONTINUE                                                     PUTROW     88
            CALL DWRITE (NTAPE,ICORE(1),4)                                   PUTROW     89
            CALL DWRITE (NTAPE,ICORE(2),4)                                   PUTROW     90
90          IF (IPAK.EQ.1) GO TO 17                                          PUTROW     91
            NBYTE = 4*IROW                                                   PUTROW     92
            CALL DWRITE (NTAPE,BUFFER(1),NBYTE)                              PUTROW     93
            GO TO 100                                                        PUTROW     94
      C                                                                      PUTROW     95
95       17 CALL PRITE (NTAPE,WORD,4)                                        PUTROW     96
            NBYTE = 4*IROW                                                   PUTROW     97
            CALL PRITE (NTAPE,BUFFER(1),NBYTE)                               PUTROW     98
            CALL WEND (NTAPE)                                                PUTROW     99
            IF (IPACK.EQ.-1) GO TO 30                                        PUTROW    100
100         GO TO 100                                                        PUTROW    101
      C                                                                      PUTROW    102
         20     CONTINUE                                                     PUTROW    103
      C*     WE MUST PACK DATA                                               PUTROW    104
            CALL PACK (BUFFER,ICOUNT,BUFFER,IOUTCT,WORD)                     PUTROW    105
105         ICORE(1)=IOUTCT+1                                                PUTROW    106
            IROW=IOUTCT                                                      PUTROW    107
            GO TO 15                                                         PUTROW    108
         30     CONTINUE                                                     PUTROW    109
      C*        USER WANTS ROW BACK EXPANDED                                 PUTROW    110
110   C*        FIRST MOVE DATA, THEN UNPACK IT                              PUTROW    111
            ISAVE=ICOUNT+1                                                   PUTROW    112
            SAVE=BUFFER(ISAVE)                                               PUTROW    113
            I=ISAVE                                                          PUTROW    114
            J=IOUTCT                                                         PUTROW    115
```

```
                C45700. SUB  DVALUE (INITIALIZE DECIMAL VARIABLES)                    DVALUE      2
                C                                                                     DVALUE      3
                C***  SUBROUTINE DVALUE  ********************************************** DVALUE      4
                C                                                                   * DVALUE      5
              5 C***  OBJECTIVE  ****************************************************** DVALUE      6
                C     ---------                                                     * DVALUE      7
                C                                                                   * DVALUE      8
                C     TO INITIALIZE DECIMAL VARIABLES TO ANY DESIRED VALUE.         * DVALUE      9
                C                                                                   * DVALUE     10
             10 C                                                                   * DVALUE     11
                C***  SUMMARY OF SYMBOLS  ********************************************** DVALUE     12
                C     ------------------                                            * DVALUE     13
                C                                                                   * DVALUE     14
                C.... DVAR(I)  ... OUTPUT                                           * DVALUE     15
             15 C     DECIMAL  TYPE MULTIDIMENSIONED VARIABLE IN THE CALLING PROGRAM * DVALUE     16
                C     WHICH IS TO BE INITIALIZED TO THE VALUE GIVEN BY DVARI.       * DVALUE     17
                C                                                                   * DVALUE     18
                C.... DVARI  ....  INPUT                                            * DVALUE     19
                C     NUMERICAL VALUE IN DECIMAL FORM FOR INITIALIZING THE VARIABLE * DVALUE     20
             20 C     DVAR(I).                                                      * DVALUE     21
                C                                                                   * DVALUE     22
                C...  MAX  ..... INPUT                                              * DVALUE     23
                C     NUMBER OF LOCATIONS IN THE CALLING PROGRAM WHICH ARE TO BE    * DVALUE     24
                C     INITIALIZED TO THE GIVEN VALUE. FOR A SINGLY SUBSCRIPTED VARIABLE* DVALUE   25
             25 C     THE INDEX 'MAX' SHOULD BE EQUAL TO THE DIMENSION OF THE VARIABLE * DVALUE   26
                C     IN THE CALLING PROGRAM.  FOR A DOUBLY SUBSCRIPTED VARIABLE IN THE* DVALUE   27
                C     CALLING PROGRAM THE INDEX 'MAX' IS EQUAL TO THE PRODUCT OF THE  * DVALUE   28
                C     TWO DIMENSIONS.  IF A VARIABLE IN THE CALLING PROGRAM IS      * DVALUE     29
                C     DIMENSIONED AS DVAR(ID,JD) THEN, MAX = ID*JD.                 * DVALUE     30
             30 C                                                                   * DVALUE     31
                C                                                                   * DVALUE     32
                C******************************************************************** DVALUE     33
                C                                                                     DVALUE     34
                      SUBROUTINE DVALUE (DVAR,DVARI,MAX)                              DVALUE     35
             35 C                                                                     DVALUE     36
                      DIMENSION DVAR(MAX)                                             DVALUE     37
                C                                                                     DVALUE     38
                      DO 100 I=1,MAX                                                  DVALUE     39
                      DVAR(I) =  DVARI                                                DVALUE     40
             40   100 CONTINUE                                                       DVALUE     41
                C                                                                     DVALUE     42
                      RETURN                                                          DVALUE     43
                      END                                                             DVALUE     44
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	DVALUE	34	42

VARIABLES

		SN	TYPE		RELOCATION					
0	DVAR		REAL	ARRAY	F.P.	REFS	36	DEFINED	34	39
0	DVARI		REAL		F.P.	REFS	39	DEFINED	34	
16	I		INTEGER			REFS	39	DEFINED	38	

VARIABLES SN TYPE RELOCATION

0	MAX	INTEGER	F.P.	REFS	36	38	DEFINED	34	

STATEMENT LABELS

		DEF LINE	REFERENCES
0	100	40	38

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	100	I	38 40	2B	INSTACK

STATISTICS

PROGRAM LENGTH	21B	17

520000B CM USED

```
      C45700, SUB. IVALUE (INITIALIZE INTEGER VARIABLES)                    IVALUE     2
      C                                                                     IVALUE     3
      C***  SUBROUTINE IVALUE  ********************************************** IVALUE     4
      C                                                                     * IVALUE     5
      C***  OBJECTIVE  ****************************************************** IVALUE     6
      C     ---------                                                       * IVALUE     7
      C                                                                     * IVALUE     8
      C     TO INITIALIZE INTEGER VARIABLES TO ANY DESIRED VALUE.           * IVALUE     9
      C                                                                     * IVALUE    10
      C                                                                     * IVALUE    11
      C***  SUMMARY OF SYMBOLS  ********************************************** IVALUE    12
      C     ------------------                                              * IVALUE    13
      C                                                                     * IVALUE    14
      C.... IVAR(I)  ... OUTPUT                                             * IVALUE    15
      C     INTEGER TYPE MULTIDIMENSIONED VARIABLE IN THE CALLING PROGRAM   * IVALUE    16
      C     WHICH IS TO BE INITIALIZED TO THE VALUE GIVE BY IVARI.          * IVALUE    17
      C                                                                     * IVALUE    18
      C.... IVARI ..... INPUT                                               * IVALUE    19
      C     NUMERICAL VALUE IN INTEGER FORM FOR INITIALIZING THE VARIABLE   * IVALUE    20
      C     IVAR(I).                                                        * IVALUE    21
      C                                                                     * IVALUE    22
      C.... MAX  ..... INPUT                                                * IVALUE    23
      C     NUMBER OF LOCATIONS IN THE CALLING PROGRAM WHICH ARE TO BE      * IVALUE    24
      C     INITIALIZED TO THE GIVEN VALUE. FOR A SINGLY SUBSCRIPTED VARIABLE* IVALUE    25
      C     THE INDEX 'MAX' SHOULD BE EQUAL TO THE DIMENSION OF THE VARIABLE * IVALUE    26
      C     IN THE CALLING PROGRAM.  FOR A DOUBLY SUBSCRIPTED VARIABLE IN THE* IVALUE    27
      C     CALLING PROGRAM THE INDEX 'MAX' IS EQUAL TO THE PRODUCT OF THE  * IVALUE    28
      C     TWO DIMENSIONS.  IF A VARIABLE IN THE CALLING PROGRAM IS        * IVALUE    29
      C     DIMENSIONED AS IVAR(ID,JD) THEN, MAX = ID*JD.                   * IVALUE    30
      C                                                                     * IVALUE    31
      C                                                                     * IVALUE    32
      C*************************************************************************** IVALUE    33
      C                                                                     IVALUE     34
            SUBROUTINE IVALUE (IVAR,IVARI,MAX)                              IVALUE     35
      C                                                                     IVALUE     36
            DIMENSION IVAR(MAX)                                             IVALUE     37
      C                                                                     IVALUE     38
            DO 100 I=1,MAX                                                  IVALUE     39
            IVAR(I) =  IVARI                                                IVALUE     40
        100 CONTINUE                                                        IVALUE     41
      C                                                                     IVALUE     42
            RETURN                                                          IVALUE     43
            END                                                             IVALUE     44
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	IVALUE	34	42

VARIABLES	SN	TYPE		RELOCATION					
16	I	INTEGER			REFS	39	DEFINED	38	
0	IVAR	INTEGER	ARRAY	F.P.	REFS	36	DEFINED	34	39,
0	IVARI	INTEGER		F.P.	REFS	39	DEFINED	34	

VARIABLES SN TYPE RELOCATION
0 MAX INTEGER F.P. REFS 36 38 DEFINED 34

STATEMENT LABELS	DEF LINE	REFERENCES
0 100	40	38

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	100	I	38 40	28	INSTACK

STATISTICS
PROGRAM LENGTH 218 17
520008 CM USED

```
      C45700, SUB. EOFO1 (END OF FILE - VERSION 1)                          EOFO1    2
      C                                                                     EOFO1    3
      C*********************************************************************EOFO1    4
      C                                                                    * EOFO1    5
      C***  SUBROUTINE EOFO1  (ITAPER,TITLE ,LTITLE,KEOF) ******************** EOFO1    6
      C                                                                    * EOFO1    7
      C***  OBJECTIVE  ******************************************************* EOFO1    8
      C     ---------                                                      * EOFO1    9
      C     CHECKS FOR AN END OF FILE ON INPUT DATA SET UNIT ITAPER AND SETS * EOFO1   10
      C     THE END OF FILE CONTROL WORD OPTION TO ITS PROPER VALUE.       * EOFO1   11
      C     ALSO, A TITLE IS READ FROM CARDS CONSISTING OF TWENTY WORDS OR  * EOFO1   12
      C     LESS OF FOUR ALPHAMERIC CHARACTERS EACH.                       * EOFO1   13
      C                                                                    * EOFO1   14
      C***  INPUT/OUTPUT  ***************************************************** EOFO1   15
      C     ------------                                                   * EOFO1   16
      C     INPUT CONSISTS OF THE DATA SET NUMBER AND THE LENGTH OF THE    * EOFO1   17
      C     TITLE.  OUTPUT CONSISTS OF THE TITLE AND THE VALUE FOR THE END * EOFO1   18
      C     OF FILE CONTROL WORD OPTION.                                   * EOFO1   19
      C                                                                    * EOFO1   20
      C***  SUMMARY OF SYMBOLS  *********************************************** EOFO1   21
      C     ------------------                                             * EOFO1   22
      C.... ITAPER ....... INPUT                                           * EOFO1   23
      C     DATA SET UNIT NUMBER FOR ENTERING DATA FROM CARDS.             * EOFO1   24
      C                                                                    * EOFO1   25
      C.... KEOF ......... OUTPUT                                          * EOFO1   26
      C     CONTROL WORD OPTION INDICATING END OF FILE ON UNIT ITAPER.     * EOFO1   27
      C     KEOF = 1, END OF FILE ON UNIT ITAPER HAS NOT BEEN REACHED.     * EOFO1   28
      C     KEOF = 2, END OF FILE ON UNIT ITAPER HAS BEEN REACHED.         * EOFO1   29
      C                                                                    * EOFO1   30
      C.... LTITLE ....... INPUT                                           * EOFO1   31
      C     NUMBER OF WORDS, OF FOUR ALPHAMERIC CHARACTERS EACH, ASSOCIATED* EOFO1   32
      C     WITH THE VARIABLE TITLE(I).                                    * EOFO1   33
      C                                                                    * EOFO1   34
      C.... TITLE(I) .... OUTPUT                                           * EOFO1   35
      C     VARIABLE FOR STORING THE TITLE ENTERED FROM CARDS.             * EOFO1   36
      C                                                                    * EOFO1   37
      C***  ERROR MESSAGES  *************************************************** EOFO1   38
      C     --------------                                                 * EOFO1   39
      C     NONE.                                                          * EOFO1   40
      C                                                                    * EOFO1   41
      C*********************************************************************EOFO1   42
      C                                                                     EOFO1   43
            SUBROUTINE EOFO1 (ITAPER,TITLE,LTITLE,KEOF)                     EOFO1   44
      C                                                                     EOFO1   45
            DIMENSION TITLE(LTITLE)                                         EOFO1   46
      C                                                                     EOFO1   47
            KEOF   =  2                                                     EOFO1   48
      C                                                                     EOFO1   49
      CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   EOFO1   50
      C     READ  (ITAPER,2000,END=1000) TITLE                              EOFO1   51
      CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS      EOFO1   52
      C                                                                     EOFO1   53
      C                                                                     EOFO1   54
      CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS   EOFO1   55
            READ (ITAPER,2000) TITLE                                        EOFO1   56
            IF (EOF(ITAPER)) 1000, 500                                      EOFO1   57
      CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS      EOFO1   58
```

```
                C                                                       EOFO1      59
                  500 KEOF   =  1                                       EOFO1      60
60                1000 CONTINUE                                         EOFO1      61
                C                                                       EOFO1      62
                 2000 FORMAT ( 20A4)                                    EOFO1      63
                C                                                       EOFO1      64
                      RETURN                                            EOFO1      65
65                    END                                               EOFO1      66
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	EOFO1	43	64

VARIABLES

	SN	TYPE	RELOCATION							
0	ITAPER	INTEGER		F.P.	REFS	56	DEFINED	43	I/O REFS	55
0	KEOF	INTEGER		F.P.	DEFINED	43	47	59		
0	LTITLE	INTEGER		F.P.	REFS	45	DEFINED	43		
0	TITLE	REAL	ARRAY	F.P.	REFS	45	DEFINED	43	55	

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS

	TYPE	ARGS	REFERENCES
EOF	REAL	1	56

STATEMENT LABELS

			DEF LINE	REFERENCES
0	500	INACTIVE	59	56
21	1000		60	56
31	2000	FMT	62	55

STATISTICS

PROGRAM LENGTH 338 27

52000B CM USED

```
      C45700, SUB. RWBT (READ OR WRITE BINARY INPUT/OUTPUT UNITS)                RWBT       2
      C                                                                          RWBT       3
      C*************************************************************************** RWBT       4
      C                                                                         * RWBT       5
      C***  SUBROUTINE RWBT   (ITAPE ,VAR   ,NWORDS) ************************** RWBT       6
      C                                                                         * RWBT       7
      C***  OBJECTIVE  ********************************************************** RWBT       8
      C     ---------                                                           * RWBT       9
      C     READS OR WRITES A BINARY INPUT/OUTPUT UNIT IN SINGLE PRECISION      * RWBT      10
      C     USING A FAST I/O PROCEDURE BASED UPON THE DIMENSION OF THE          * RWBT      11
      C     VARIABLE BEING READ OR WRITTEN.  THE VARIABLE DIMENSION PASSED      * RWBT      12
      C     AS AN ARGUMENT INDICATES AN IMPLIED DO LOOP IN THE READ OR WRITE    * RWBT      13
      C     STATEMENT THEREFORE REDUCING THE NUMBER OF I/O OPERATIONS.          * RWBT      14
      C                                                                         * RWBT      15
      C***  INPUT/OUTPUT  ******************************************************* RWBT      16
      C     ------------                                                        * RWBT      17
      C     INPUT CONSIST OF STORING THE INFORMATION CONTAINED IN THE           * RWBT      18
      C     VARIABLE VAR(I) ON TAPE NTAPE.  OUTPUT CONSISTS OF STORING THE      * RWBT      19
      C     INFORMATION READ FROM TAPE NTAPE INTO THE VARIABLE VAR (I).         * RWBT      20
      C                                                                         * RWBT      21
      C***  SUMMARY OF SYMBOLS  ************************************************ RWBT      22
      C     ------------------                                                  * RWBT      23
      C.... ITAPE ........  INPUT                                              * RWBT      24
      C     INPUT/OUTPUT UNIT NUMBER FOR WRITING OR READING.  A NEGATIVE        * RWBT      25
      C     VALUE INDICATES A READ OPERATION WHEREAS A POSITIVE VALUE           * RWBT      26
      C     INDICATES A WRITE OPERATION.                                        * RWBT      27
      C                                                                         * RWBT      28
      C.... VAR(I) .......  INPUT/OUTPUT                                       * RWBT      29
      C     VARIABLE INTO WHICH INFORMATION IS STORED FOR A READ OPERATION      * RWBT      30
      C     OR INFORMATION IS TO BE TAKEN FOR A WRITE OPERATION.                * RWBT      31
      C                                                                         * RWBT      32
      C.... NWORDS .......  INPUT                                              * RWBT      33
      C     NUMBER OF WORDS ASSOCIATED WITH A READ OR WRITE OPERATION.          * RWBT      34
      C                                                                         * RWBT      35
      C***  ERROR MESSAGES  ****************************************************** RWBT      36
      C     --------------                                                      * RWBT      37
      C     NONE.                                                               * RWBT      38
      C                                                                         * RWBT      39
      C*************************************************************************** RWBT      40
      C                                                                          RWBT       41
            SUBROUTINE RWBT (ITAPE,VAR,NWORDS)                                   RWBT       42
      C                                                                          RWBT       43
            DIMENSION VAR(NWORDS)                                                RWBT       44
      C                                                                          RWBT       45
      C                                                                          RWBT       46
      C INITIAL CONDITIONS                                                       RWBT       47
            NTAPE  =  IABS(ITAPE)                                                RWBT       48
      C                                                                          RWBT       49
      C                                                                          RWBT       50
      C READ OR WRITE FROM TAPE ITAPE                                            RWBT       51
            IF (ITAPE .LT. 0) READ  (NTAPE) VAR                                  RWBT       52
            IF (ITAPE .GT. 0) WRITE (NTAPE) VAR                                  RWBT       53
      C                                                                          RWBT       54
            RETURN                                                               RWBT       55
            END                                                                  RWBT       56
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	RWBT	41	54

VARIABLES	SN	TYPE		RELOCATION						
0	ITAPE	INTEGER		F.P.	REFS	47	51	52	DEFINED	41
35	NTAPE	INTEGER			DEFINED	47	I/O REFS	51	52	
0	NWORDS	INTEGER		F.P.	REFS	43	DEFINED	41		
0	VAR	REAL	ARRAY	F.P.	REFS	43	52	DEFINED	41	51
	VARIABLES USED AS FILE NAMES, SEE ABOVE									

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
IABS	INTEGER	1	INTRIN		47

STATISTICS

PROGRAM LENGTH 368 30

520000B CM USED

```
      C                                                                      TITLES     2
      C45700, TITLES (LIST MAIN AND SUBTITLE AT TOP OF PAGE)                 TITLES     3
      C                                                                      TITLES     4
      C***  SUBROUTINE TITLES  ********************************************** TITLES     5
      C                                                                     * TITLES     6
      C***  COMPUTER VERSION  ********************************************** TITLES     7
      C     ----------------                                                * TITLES     8
      C                                                                     * TITLES     9
      C***  OBJECTIVE  ****************************************************** TITLES    10
      C     ---------                                                       * TITLES    11
      C     THE PURPOSE OF THIS PROGRAM                                     * TITLES    12
      C       1.  PRINT A PAGE NUMBER                                       * TITLES    13
      C       2.  PRINT A MAIN HEADING CONSISTING OF TWO LINES OF TEXT AND  * TITLES    14
      C           ONE LINE OF SPACING.                                      * TITLES    15
      C       3.  PRINT A SUBHEADING CONSISTING OF ONE LINE OF TEXT AND ONE * TITLES    16
      C           LINE FOR SPACING.                                         * TITLES    17
      C       4.  PRINT NONE OR ANY COMBINATION OF THE ABOVE THREE.         * TITLES    18
      C       5.  INCREMENT THE LINE COUNT APPROPRIATELY DEPENDING ON WHAT  * TITLES    19
      C           IS BEING LISTED (SEE ITEMS 1 TO 4 ABOVE)                  * TITLES    20
      C                                                                     * TITLES    21
      C***  SUMMARY OF FORTRAN SYMBOLS  ************************************ TITLES    22
      C     --------------------------                                      * TITLES    23
      C.... KTITLE ....... INPUT                                            * TITLES    24
      C     PROGRAMMING CONTROL WORD OPTION FOR LISTING ANY COMBINATION OF  * TITLES    25
      C     MAIN HEADING, SUBHEADING, AND PAGE NUMBER AND INCREMENT THE LINE * TITLES    26
      C     COUNT APPROPRIATELY                                             * TITLES    27
      C     KITTLE =-1,  DO NOT LIST NOR INCREMENT THE LINE COUNT FOR THE   * TITLES    28
      C                  MAIN HEADING AND SUBHEADING                        * TITLES    29
      C            = 0,  DO NOT LIST NOR INCREMENT THE LINE COUNT FOR THE   * TITLES    30
      C                  PAGE NUMBER, MAIN HEADING, AND SUBHEADING          * TITLES    31
      C            = 1, LIST THE PAGE NUMBER AND THE MAIN HEADING AND       * TITLES    32
      C                 INCREMENT THE LINE COUNT BY THREE (TWO LINES FOR THE * TITLES    33
      C                 MAIN HEADING PLUS ONE LINE FOR SPACING)             * TITLES    34
      C            = 2, LIST THE PAGE NUMBER, THE MAIN HEADING, AND THE     * TITLES    35
      C                 SUBHEADING AND INCREMENT THE LINE COUNT BY FIVE     * TITLES    36
      C                 (THREE LINES FOR THE MAIN HEADING AND SUBHEADING AND * TITLES    37
      C                 TWO LINES FOR SPACING)                              * TITLES    38
      C            = 3, LIST THE PAGE NUMBER AND THE SUBHEADING AND INCREMENT* TITLES    39
      C                 THE LINE COUNT BY TWO (ONE LINE FOR THE SUBHEADING  * TITLES    40
      C                 AND ONE LINE FOR SPACING)                           * TITLES    41
      C                                                                     * TITLES    42
      C***  ERROR MESSAGES  ************************************************ TITLES    43
      C     --------------                                                  * TITLES    44
      C                                                                     * TITLES    45
      C********************************************************************** TITLES    46
      C                                                                      TITLES    47
      C                                                                      TITLES    48
            SUBROUTINE TITLES (KTITLE)                                       TITLES    49
      C                                                                      TITLES    50
            INTEGER YES                                                      TITLES    51
      C                                                                      TITLES    52
            DIMENSION FMTAO(1)                                               TITLES    53
            DIMENSION FMTP(4)                                                TITLES    54
            DIMENSION SKIP(2)                                                TITLES    55
            DIMENSION TSH(1)       ,TMH(18,2)                                TITLES    56
            DIMENSION TFH(1)                                                 TITLES    57
      C                                                                      TITLES    58
```

```
                COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE     TITLES     59
               1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                        TITLES     60
60              COMMON /CFMTAO/ FMTAO                                               TITLES     61
                COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                                TITLES     62
                COMMON /REPORT/ KREPOR                                              TITLES     63
                COMMON /CTSH  / KTSH  ,LTSH  ,TSH                                   TITLES     64
                COMMON /CTMH  / KTMH  ,LTMH  ,TMH                                   TITLES     65
65              COMMON /CTFH  / KTFH  ,LTFH  ,TFH                                   TITLES     66
                COMMON /CONSTS/ NO    ,YES                                          TITLES     67
          C                                                                         TITLES     68
          C                                                                         TITLES     69
          C INITIAL CONDITIONS                                                      TITLES     70
70              DATA SKIP   /4H(110,4H( 73/                                         TITLES     71
                DATA FMTP   /4H(    ,4HX,   ,4H 1A4,4H,I5)/                         TITLES     72
                DATA PAGE   /4HPAGE/                                                TITLES     73
                FMTP(1)=  SKIP(KREPOR)                                              TITLES     74
                KOUNTH =  0                                                         TITLES     75
75              IF (KTMH .EQ. YES) KOUNTH = KOUNTH + 3                              TITLES     76
                IF (KTSH .EQ. YES) KOUNTH = KOUNTH + 2                              TITLES     77
                IF (KTFH .EQ. YES) KOUNTH = KOUNTH + 2                              TITLES     78
          C                                                                         TITLES     79
          C                                                                         TITLES     80
80        C LIST TITLES AND INCREMENT THE LINE KOUNT                                TITLES     81
          C                                                                         TITLES     82
                LSKIPS =  3                                                         TITLES     83
                LINESD =  LINES - (LSKIP+2)                                         TITLES     84
                IF (KOUNT  .GT. LINESD) GO TO 80                                    TITLES     85
85              IF (KTITLE .LT. 3     ) GO TO 80                                    TITLES     86
                IF (KTSH   .EQ. NO    ) GO TO 80                                    TITLES     87
                GO TO 110                                                           TITLES     88
             80 CONTINUE                                                            TITLES     89
                IF (KOUNT  .LT. LINES) GO TO 300                                    TITLES     90
90              IF (KTITLE .EQ. 0    ) GO TO 300                                    TITLES     91
          C                                                                         TITLES     92
          C LIST PAGE NUMBER                                                        TITLES     93
          C                                                                         TITLES     94
                LSKIP  =  LINEST -(KTPAGE-1)                                        TITLES     95
95              CALL PLB (KPAGE,LSKIP,ITAPEW)                                       TITLES     96
                IF (KTPAGE .EQ. 1) GO TO 90                                         TITLES     97
                NPAGE  =  NPAGE + 1                                                 TITLES     98
                WRITE (ITAPEW,FMTP)  PAGE,NPAGE                                     TITLES     99
             90 CONTINUE                                                            TITLES    100
100       C                                                                         TITLES    101
          C LIST MAIN HEADING                                                       TITLES    102
          C                                                                         TITLES    103
                KOUNT  =  0                                                         TITLES    104
                IF (KTITLE .EQ.-1) GO TO 300                                        TITLES    105
105             IF (KTMH .EQ. NO) GO TO 108                                         TITLES    106
                DO 100 I=1,2                                                        TITLES    107
            100 WRITE (ITAPEW,FMTAO) (TMH(L,I), L=1,LTMH)                           TITLES    108
                KOUNT  =  KOUNT + 2                                                 TITLES    109
            105 LSKIPS =  1                                                         TITLES    110
110         110 CALL PLB (1,LSKIPS,ITAPEW)                                          TITLES    111
                KOUNT  =  KOUNT + LSKIPS                                            TITLES    112
          C                                                                         TITLES    113
          C LIST SUBHEADING                                                         TITLES    114
          C                                                                         TITLES    115
```

```
                  108 CONTINUE                                                  TITLES   116
                      IF (KTITLE .LT. 2) GO TO 150                              TITLES   117
                      IF (KTSH .EQ. NO) GO TO 150                               TITLES   118
                      WRITE (ITAPEW,FMTAO) (TSH(L), L=1,LTSH)                   TITLES   119
                      CALL PLB (1,1,ITAPEW)                                     TITLES   120
                      KOUNT  =  KOUNT + 2                                       TITLES   121
                  150 CONTINUE                                                  TITLES   122
                  300 CONTINUE                                                  TITLES   123
                C                                                               TITLES   124
                C                                                               TITLES   125
                C LIST FUNCTION HEADING                                         TITLES   126
                C                                                               TITLES   127
                      IF (KOUNT .GT. KOUNTH) GO TO 400                          TITLES   128
                      IF (KTFH .EQ. NO) GO TO 400                               TITLES   129
                      WRITE (ITAPEW, FMTAO) (TFH(L), L=1,LTFH)                  TITLES   130
                      CALL PLB (1,1,ITAPEW)                                     TITLES   131
                      KOUNT  =  KOUNT + 2                                       TITLES   132
                  400 CONTINUE                                                  TITLES   133
                C                                                               TITLES   134
                      RETURN                                                    TITLES   135
                      END                                                       TITLES   136
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	TITLES	48	134

VARIABLES

		SN	TYPE		RELOCATION							
0	FMTAO		REAL	ARRAY	CFMTAO	REFS	52	60	107	118	129	
200	FMTP		REAL	ARRAY		REFS	53	98	DEFINED	71	73	
176	I		INTEGER			REFS	107	DEFINED	106			
2	ITAPEP		INTEGER		COMRWP	REFS	61					
0	ITAPER		INTEGER		COMRWP	REFS	61					
1	ITAPEW		INTEGER		COMRWP	REFS	61	95	110	119	130	
						I/O REFS	98	107	118	129		
7	KBPAGE		INTEGER		CLIST	REFS	58					
4	KLABEL		INTEGER		CLIST	REFS	58					
0	KOUNT		INTEGER		CLIST	REFS	58	84	89	108	111	120	127
						131	DEFINED	103	108	111	120	131	
11	KOUNTH		INTEGER		CLIST	REFS	58	75	76	77	127		
						DEFINED	74	75	76	77			
12	KOUNTI		INTEGER		CLIST	REFS	58						
1	KPAGE		INTEGER		CLIST	REFS	58	95					
0	KREPOR		INTEGER		REPORT	REFS	62	73					
0	KTFH		INTEGER		CTFH	REFS	65	77	128				
0	KTITLE		INTEGER		F.P.	REFS	85	90	104	116	DEFINED	48	
0	KTMH		INTEGER		CTMH	REFS	64	75	105				
5	KTPAGE		INTEGER		CLIST	REFS	58	94	96				
0	KTSH		INTEGER		CTSH	REFS	63	76	86	117			
177	L		INTEGER			REFS	107	118	129	DEFINED	107	118	129
2	LINES		INTEGER		CLIST	REFS	58	83	89				
174	LINESD		INTEGER			REFS	84	DEFINED	83				
10	LINESG		INTEGER		CLIST	REFS	58						

VARIABLES	SN	TYPE		RELOCATION							
3	LINEST	INTEGER		CLIST	REFS	58	94				
175	LSKIP	INTEGER			REFS	83	95	DEFINED	94		
173	LSKIPS	INTEGER			REFS	110	111	DEFINED	82	109	
1	LTFH	INTEGER		CTFH	REFS	65	129				
1	LTMH	INTEGER		CTMH	REFS	64	107				
1	LTSH	INTEGER		CTSH	REFS	63	118				
0	NO	INTEGER		CONSTS	REFS	66	86	105	117	128	
6	NPAGE	INTEGER		CLIST	REFS	58	97	98	DEFINED	97	
150	PAGE	REAL			REFS	98	DEFINED	72			
204	SKIP	REAL	ARRAY		REFS	54	73	DEFINED	70		
2	TFH	REAL	ARRAY	CTFH	REFS	56	65	129			
2	TMH	REAL	ARRAY	CTMH	REFS	55	64	107			
2	TSH	REAL	ARRAY	CTSH	REFS	55	63	118			
1	YES	INTEGER		CONSTS	REFS	50	66	75	76	77	

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES			
PLB		3	95	110	119	130

STATEMENT LABELS			DEF LINE	REFERENCES		
35	80		88	84	85	86
52	90		99	96		
0	100		107	106		
0	105	INACTIVE	109			
100	108		115	105		
74	110		110	87		
115	150		121	116	117	
115	300		122	89	90	104
133	400		132	127	128	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
60	100	I	106 107	12B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
CLIST	11	0 KOUNT (1)		1 KPAGE (1)		2 LINES (1)	
		3 LINEST (1)		4 KLABEL (1)		5 KTPAGE (1)	
		6 NPAGE (1)		7 KBPAGE (1)		8 LINESG (1)	
		9 KOUNTH (1)		10 KOUNTI (1)			
CFMTAO	1	0 FMTAO (1)					
COMRWP	3	0 ITAPER (1)		1 ITAPEW (1)		2 ITAPEP (1)	
REPORT	1	0 KREPOR (1)					
CTSH	3	0 KTSH (1)		1 LTSH (1)		2 TSH (1)	
CTMH	38	0 KTMH (1)		1 LTMH (1)		2 TMH (36)	
CTFH	3	0 KTFH (1)		1 LTFH (1)		2 TFH (1)	
CONSTS	2	0 NO (1)		1 YES (1)			

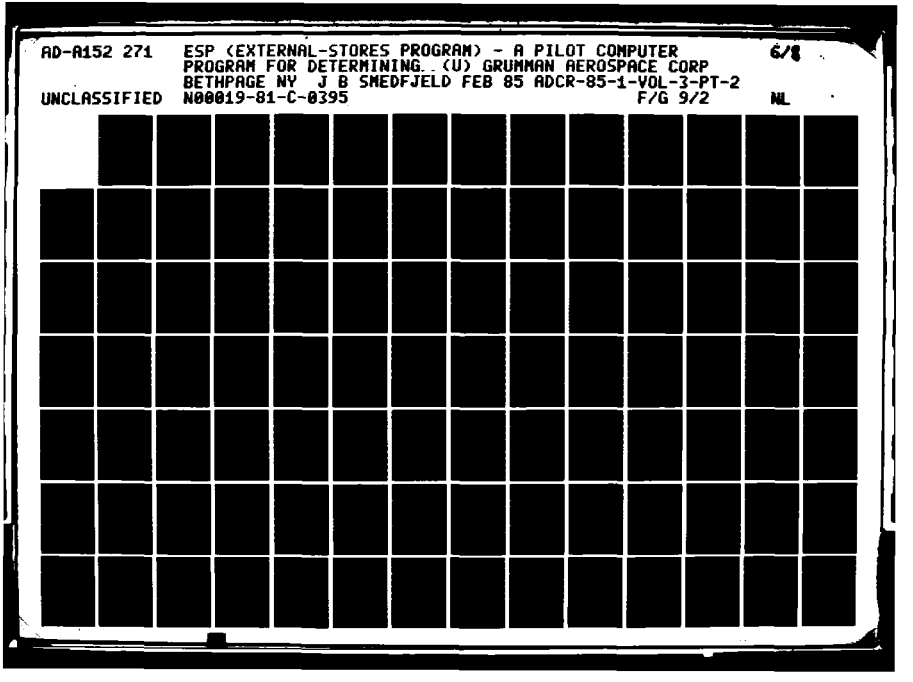
STATISTICS

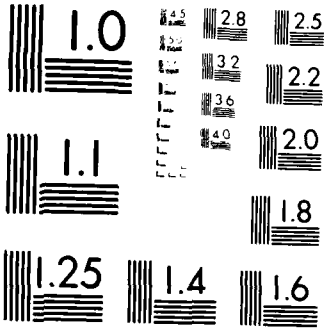
PROGRAM LENGTH	206B	134
CM LABELED COMMON LENGTH	76B	62

52000B CM USED

```
      C45700, SUB. TIMEA (COMPUTER TIME - VERSION A)                          TIMEA      2
      C                                                                       TIMEA      3
      C***  SUBROUTINE TIMEA ( KTITLE,KTIME,LTSH,TSH,NCHAR,TEXT)************** TIMEA      4
      C                                                                     * TIMEA      5
      C***  COMPUTER VERSION  ************************************************ TIMEA      6
      C     ----------------                                                * TIMEA      7
      C     IBM COMPUTER PROGRAM VERSION                                    * TIMEA      8
      C                                                                     * TIMEA      9
      C     FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED    * TIMEA     10
      C     BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM      * TIMEA     11
      C     COMPUTER AND SHOULD BE LEFT BLANK.                              * TIMEA     12
      C     FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED    * TIMEA     13
      C     BY CCDC IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE CDC      * TIMEA     14
      C     COMPUTER AND SHOULD HAVE A C IN COLUMN ONE.                     * TIMEA     15
      C                                                                     * TIMEA     16
      C     CDC COMPUTER PROGRAM VERSION                                    * TIMEA     17
      C                                                                     * TIMEA     18
      C     FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED    * TIMEA     19
      C     BY CCDC IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE CDC      * TIMEA     20
      C     COMPUTER AND SHOULD BE LEFT BLANK.                              * TIMEA     21
      C     FORTRAN STATEMENTS CONTAINED WITHIN THE TWO CARDS IDENTIFIED    * TIMEA     22
      C     BY CIBM IN COLUMNS ONE TO FOUR ARE ASSOCIATED WITH THE IBM      * TIMEA     23
      C     COMPUTER AND SHOULD HAVE A C IN COLUMN ONE.                     * TIMEA     24
      C                                                                     * TIMEA     25
      C***  OBJECTIVE  ******************************************************* TIMEA     26
      C     ---------                                                       * TIMEA     27
      C     CALCULATE AND LIST THE COMPUTER TIME AT DESIRED INTERVALS, WITH * TIMEA     28
      C     THE APPRPRIATE IDENTIFICATION.                                  * TIMEA     29
      C                                                                     * TIMEA     30
      C                                                                     * TIMEA     31
      C***  SUMMARY OF FORTRAN SYMBOLS  ************************************ TIMEA     32
      C     -------------------------                                       * TIMEA     33
      C.... ITAPEW ....... INPUT                                            * TIMEA     34
      C     TAPE NUMBER FOR STORING COMPUTER RESULTS ON A FORMATTED TAPE.   * TIMEA     35
      C                                                                     * TIMEA     36
      C...  KTIME ........ INPUT                                            * TIMEA     37
      C     CONTROL WORD ARGUMENT TO THE FUNCTION ICHRON.                   * TIMEA     38
      C     KTIME = 0, CALCULATE THE CURRENT TIME.                          * TIMEA     39
      C           = 1, INITIALIZE THE PROGRAM ICHRON TO CALCULATE THE TIME  * TIMEA     40
      C                TO 1/100'TH OF A SECOND (FOR IBM COMPUTER ONLY)      * TIMEA     41
      C           = 2, INITIALIZE THE PROGRAM ICHRON TO CALCULATE THE TIME  * TIMEA     42
      C                TO 1/60 'TH OF A SECOND.                             * TIMEA     43
      C           = 3, INITIALIZE THE PROGRAM ICHRON TO CALCULATE THE TIME  * TIMEA     44
      C                TO 1/10 'TH OF A SECOND (FOR IBM COMPUTER ONLY)      * TIMEA     45
      C                                                                     * TIMEA     46
      C...  NCHAR ........ INPUT                                            * TIMEA     47
      C     NUMBER OF ALPHAMERIC CHARACTERS WHICH                           * TIMEA     48
      C     MAKE UP THE CHARACTERSTRING TEXT(L).  AVALUE OF ZERO WILL SKIP  * TIMEA     49
      C     THE LISTING OF THE CHARACTERSTRING TEXT(L).                     * TIMEA     50
      C                                                                     * TIMEA     51
      C...  TEXT(L) ...... INPUT                                            * TIMEA     52
      C     HOLLERITH CHARACTERSTRING DEFINED BY EITHER OF THE FOLLOWING    * TIMEA     53
      C     THREE WAYS IN THE CALLING STATEMENT.                            * TIMEA     54
      C     1.  NUMC H A3C...XYZ WHERE NUMC REPRESENTS THE NUMBER OF        * TIMEA     55
      C         ALPHAMERIC CHARACTERS, H IS THE HOLLERITH CONTROL, AND      * TIMEA     56
      C         ABC...XYZ REPRESENTS THE ALPHAMERIC CHARACTERS.             * TIMEA     57
      C         BLANKS ON EITHER SIDE OF THE HOLLERITH CONTROL H ARE NOT    * TIMEA     58
```

```
C          REQUIRED.  THESE BLANKS ARE INCLUDED HERE FOR CLARITY.       * TIMEA      59
C      2.  'ABC...XYZ' WHERE THE APOSTROPHES ' ' REPLACE THE NUMBER     * TIMEA      60
C          OF ALPHAMERIC CHARACTERS AND HOLLERITH CONTROL AND ABC...XYZ * TIMEA      61
C          ONCE AGAIN REPRESENTS THE ALPHAMERIC CHARACTERS              * TIMEA      62
C      3.  IN THE CALLING PROGRAM DEFINE AN ARRAY NAME CORRESPONDING    * TIMEA      63
C          TO THE VARIABLE TEXT(L) AND STORE THE APPROPRIATE  ALPHAMERIC* TIMEA      64
C          INFORMATION THROUGH USE OF THE DATA STATEMENT OR THE         * TIMEA      65
C          SUBROUTINE WORDS.                                            * TIMEA      66
C                                                                       * TIMEA      67
C                                                                       * TIMEA      68
C***  ERROR MESSAGES *****************************************************TIMEA      69
C     --------------                                                    * TIMEA      70
C     NONE.                                                             * TIMEA      71
C                                                                       * TIMEA      72
C                                                                       * TIMEA      73
C*************************************************************************TIMEA      74
C                                                                         TIMEA      75
      SUBROUTINE TIMEA (KTITLE,KTIME,LTSHD,TSHD,NCHAR,TEXT)               TIMEA      76
C                                                                         TIMEA      77
      DIMENSION DENO(3)                                                   TIMEA      78
      DIMENSION TSH(1)             ,TEXT(1)                               TIMEA      79
C                                                                         TIMEA      80
      COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                                TIMEA      81
      COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE     TIMEA      82
     1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                       TIMEA      83
      COMMON /COMPUT/ KOMPUT,NCHARW                                       TIMEA      84
      COMMON /CTSH  / KTSH  ,LTSH  ,TSH                                   TIMEA      85
C                                                                         TIMEA      86
C                                                                         TIMEA      87
C INITIAL CONDITIONS                                                      TIMEA      88
  100 CONTINUE                                                            TIMEA      89
      IF (KTIME .EQ. 0) GO TO 150                                         TIMEA      90
      DENO(1) =  100.0                                                    TIMEA      91
      DENO(2) =  60.0                                                     TIMEA      92
      DENO(3) =  10.0                                                     TIMEA      93
C                                                                         TIMEA      94
CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS       TIMEA      95
C     TIME =  0.0                                                         TIMEA      96
C     MINUE  =  0                                                         TIMEA      97
C     NWORDS =  18                                                        TIMEA      98
CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS          TIMEA      99
C                                                                         TIMEA     100
C                                                                         TIMEA     101
CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS       TIMEA     102
      TIME   =  SECOND(DUMMY)                                             TIMEA     103
      MINUE  =  TIME/60.0                                                 TIMEA     104
      NWORDS =  8                                                         TIMEA     105
CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS          TIMEA     106
                                                                          TIMEA     107
  150 CONTINUE                                                            TIMEA     108
      LTEXT  =  (NCHAR-1)/NCHARW + 1                                      TIMEA     109
      IF (NCHAR .EQ. 0) LTEXT = 0                                         TIMEA     110
      INCS=1                                                              TIMEA     111
      INCT   =  (LTEXT-1)/NWORDS + 1                                      TIMEA     112
      IF (LTEXT .EQ. 0) INCT = 0                                          TIMEA     113
      KOUNTI =  INCS + INCT + 2                                           TIMEA     114
C                                                                         TIMEA     115
```


AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER 6/8
PROGRAM FOR DETERMINING..(U) GRUMMAN AEROSPACE CORP
BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2
UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
115          C                                                                  TIMEA    116
             C CALCULATE THE TIME                                               TIMEA    117
               200 CONTINUE                                                     TIMEA    118
                   MINUO  =  MINUE                                              TIMEA    119
                   SECOO  =  TIME                                               TIMEA    120
120          C                                                                  TIMEA    121
             CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS TIMEA    122
             C     IF (KTIME .GT. 0) KVALUE = KTIME                             TIMEA    123
             C     TIMEI  =  ICHRON(KTIME)                                      TIMEA    124
             C     TIME   =  TIMEI/DENO(KVALUE)                                 TIMEA    125
125          CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   TIMEA    126
             C                                                                  TIMEA    127
             C                                                                  TIMEA    128
             CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS TIMEA    129
                   TIME   =  SECOND(DUMMY)                                      TIMEA    130
130          CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS   TIMEA    131
             C                                                                  TIMEA    132
                   MINUE  =  TIME/60.0                                          TIMEA    133
                   TIMES  =  60*MINUE                                           TIMEA    134
                   SECOE  =  TIME - TIMES                                       TIMEA    135
135                SECOI  =  TIME - SECOO                                       TIMEA    136
                   MINUI  =  SECOI/60.0                                         TIMEA    137
                   FMINUI =  60*MINUI                                           TIMEA    138
                   SECOI  =  SECOI - FMINUI                                     TIMEA    139
             C                                                                  TIMEA    140
140          C                                                                  TIMEA    141
             C LIST THE TIME                                                    TIMEA    142
               300 CONTINUE                                                     TIMEA    143
                   LEFT=LINES-KOUNT                                             TIMEA    144
                   IF(LEFT.LT.KOUNTI) KOUNT=LINES                               TIMEA    145
145                CALL TITLES (KTITLE)                                         TIMEA    146
                   CALL PLB (1,1,ITAPEW)                                        TIMEA    147
                   IF (LTEXT .EQ. 0) GO TO 320                                  TIMEA    148
                   WRITE (ITAPEW,1000) (TEXT(L), L=1,LTEXT)                     TIMEA    149
               320 CONTINUE                                                     TIMEA    150
150                WRITE (ITAPEW,1100) MINUE,SECOE                              TIMEA    151
                   WRITE (ITAPEW,1200) MINUI,SECOI                              TIMEA    152
                   KOUNT=KOUNT+KOUNTI                                           TIMEA    153
             C                                                                  TIMEA    154
             CIBM  BEGINNING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS TIMEA    155
155          C1COO FORMAT ( 10X, 18A4)                                          TIMEA    156
             CIBM  ENDING OF STATEMENTS ASSOCIATED WITH IBM COMPUTER PROGRAMS   TIMEA    157
             C                                                                  TIMEA    158
             CCDC  BEGINNING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS TIMEA    159
              1000 FORMAT ( 10X, 8A10)                                          TIMEA    160
160          CCDC  ENDING OF STATEMENTS ASSOCIATED WITH CDC COMPUTER PROGRAMS   TIMEA    161
             C                                                                  TIMEA    162
              1100 FORMAT (10X,3X,24HELAPSED TIME IS .....                      TIMEA    163
                 1        ,2X,I4,2X,8HMINUTES,,5X,F5.2,2X,7HSECONDS)           TIMEA    164
              1200 FORMAT (10X,3X,24HINCREMENTAL TIME IS ....                   TIMEA    165
165              1        ,2X,I4,2X,8HMINUTES,,5X,F5.2,2X,7HSECONDS)           TIMEA    166
             C                                                                  TIMEA    167
                   RETURN                                                       TIMEA    168
                   END                                                          TIMEA    169
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
3 TIMEA 75 167

VARIABLES	SN	TYPE		RELOCATION								
177 DENO		REAL	ARRAY		REFS	77	DEFINED	90	91	92		
160 DUMMY		REAL			REFS	102	129					
174 FMINUI		REAL			REFS	138	DEFINED	137				
164 INCS		INTEGER			REFS	113	DEFINED	110				
165 INCT		INTEGER			REFS	113	DEFINED	111	112			
2 ITAPEP		INTEGER		COMRWP	REFS	80						
0 ITAPER		INTEGER		COMRWP	REFS	80						
1 ITAPEW		INTEGER		COMRWP	REFS	80	146	I/O REFS	148	150	151	
7 KBPAGE		INTEGER		CLIST	REFS	81						
4 KLABEL		INTEGER		CLIST	REFS	81						
0 KOMPUT		INTEGER		COMPUT	REFS	83						
0 KOUNT		INTEGER		CLIST	REFS	81	143	152	DEFINED	144	152	
11 KOUNTH		INTEGER		CLIST	REFS	81						
12 KOUNTI		INTEGER		CLIST	REFS	81	144	152	DEFINED	113		
1 KPAGE		INTEGER		CLIST	REFS	81						
0 KTIME		INTEGER		F.P.	REFS	89	DEFINED	75				
0 KTITLE		INTEGER		F.P.	REFS	145	DEFINED	75				
5 KTPAGE		INTEGER		CLIST	REFS	81						
0 KTSH		INTEGER		CTSH	REFS	84						
176 L		INTEGER			REFS	148	DEFINED	148				
175 LEFT		INTEGER			REFS	144	DEFINED	143				
2 LINES		INTEGER		CLIST	REFS	81	143	144				
10 LINESG		INTEGER		CLIST	REFS	81						
3 LINEST		INTEGER		CLIST	REFS	81						
163 LTEXT		INTEGER			REFS	111	112	147	148	DEFINED	108	109
1 LTSH		INTEGER		CTSH	REFS	84						
0 LTSHD		INTEGER	*UNUSED	F.P.	DEFINED	75						
161 MINUE		INTEGER			REFS	118	133	150	DEFINED	103	132	
173 MINUI		INTEGER			REFS	137	151	DEFINED	136			
166 MINUO	*	INTEGER			DEFINED	118						
0 NCHAR		INTEGER		F.P.	REFS	108	109	DEFINED	75			
1 NCHARW		INTEGER		COMPUT	REFS	83	108					
6 NPAGE		INTEGER		CLIST	REFS	81						
162 NWORDS		INTEGER			REFS	111	DEFINED	104				
171 SECOE		REAL			REFS	150	DEFINED	134				
172 SECOI		REAL			REFS	136	138	151	DEFINED	135	138	
167 SECOO		REAL			REFS	135	DEFINED	119				
0 TEXT		REAL	ARRAY	F.P.	REFS	78	148	DEFINED	75			
157 TIME		REAL			REFS	103	119	132	134	135		
					DEFINED	102	129					
170 TIMES		REAL			REFS	134	DEFINED	133				
2 TSH		REAL	ARRAY	CTSH	REFS	78	84					
0 TSHD		REAL	*UNUSED	F.P.	DEFINED	75						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
PLB		3	146	
SECOND	REAL	1	102	129
TITLES		1	145	

STATEMENT LABELS			DEF LINE	REFERENCES
0	100	INACTIVE	88	
20	150		107	89
0	200	INACTIVE	117	
0	300	INACTIVE	142	
75	320		149	147
131	1000	FMT	159	148
133	1100	FMT	162	150
143	1200	FMT	164	151

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)
		9 KOUNTH (1)	10 KOUNTI (1)	
COMPUT	2	0 KOMPUT (1)	1 NCHARW (1)	
CTSH	3	0 KTSH (1)	1 LTSH (1)	2 TSH (1)

STATISTICS

PROGRAM LENGTH	2028	130
CM LABELED COMMON LENGTH	238	19

52000B CM USED

```
                C45700. SUB. PROGN. (PROGRAM NAME CONSISTING OF TWO WORDS)          PROGN       2
                C                                                                   PROGN       3
                      SUBROUTINE PROGN (LT,T,WORD1,WORD2)                           PROGN       4
                C                                                                   PROGN       5
                C                                                                   PROGN       6
                      DIMENSION TSH(1)                                              PROGN       7
                C                                                                   PROGN       8
                      COMMON /CTSH  / KTSH  ,LTSH  ,TSH                             PROGN       9
                C                                                                   PROGN      10
                      L1     =  LTSH - 1                                            PROGN      11
                      L2     =  LTSH                                                PROGN      12
                      TSH(L1)=  WORD1                                               PROGN      13
                      TSH(L2)=  WORD2                                               PROGN      14
                C                                                                   PROGN      15
                      RETURN                                                        PROGN      16
                      END                                                           PROGN      17
```

SYMBOLIC REFERENCE MAP (R=3)

```
ENTRY POINTS      DEF LINE      REFERENCES
    3  PROGN             3        15

VARIABLES      SN  TYPE            RELOCATION
    0  KTSH        INTEGER              CTSH          REFS          8
    0  LT          INTEGER    *UNUSED    F.P.       DEFINED          3
    1  LTSH        INTEGER              CTSH          REFS          8        10          11
   14  L1          INTEGER                            REFS         12   DEFINED          10
   15  L2          INTEGER                            REFS         13   DEFINED          11
    0  T           REAL       *UNUSED    F.P.       DEFINED          3
    2  TSH         REAL        ARRAY     CTSH          REFS          6         8   DEFINED          12          13
    0  WORD1       REAL                   F.P.          REFS         12   DEFINED           3
    0  WORD2       REAL                   F.P.          REFS         13   DEFINED           3

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
      CTSH            3              0 KTSH   (1)              1 LTSH   (1)              2 TSH    (1)

STATISTICS
  PROGRAM LENGTH                  168       14
  CM LABELED COMMON LENGTH         3B        3
        52000B CM USED
```

```
      C45700, SUB. HEAD (ARRANGE HEADING OF LISTED RESULTS)                    HEAD     2
      C                                                                        HEAD     3
            SUBROUTINE HEAD (LTSHD,TSHD,IROWS,JCOLS)                           HEAD     4
      C                                                                        HEAD     5
            DIMENSION TSH(1)                                                   HEAD     6
      C                                                                        HEAD     7
            COMMON /CLIST / KOUNT ,KPAGE ,LINES ,LINEST,KLABEL,KTPAGE,NPAGE    HEAD     8
           1               ,KBPAGE,LINESG,KOUNTH,KOUNTI                        HEAD     9
            COMMON /COMRWP/ ITAPER,ITAPEW,ITAPEP                               HEAD    10
            COMMON /CHEAD / KHEAD ,KRETUR,KOLUMN,IR    ,JCL   ,JCU   ,LSUB     HEAD    11
           1               ,LSKIP                                              HEAD    12
      C                                                                        HEAD    13
      C                                                                        HEAD    14
      C FUNCTION DEFINITION                                                    HEAD    15
      C                                                                        HEAD    16
            MINOF(I,J)    =  MINO(I,J)                                         HEAD    17
      C                                                                        HEAD    18
            IF (KRETUR .EQ. 1 .OR. KRETUR .EQ. 2) GO TO 50                     HEAD    19
            IF (KRETUR .GE. -2) GO TO 20                                       HEAD    20
            IRSAVE =  IR                                                       HEAD    21
            JCSAVE =  JCU                                                      HEAD    22
            KRETUR = -2                                                        HEAD    23
         20 CONTINUE                                                           HEAD    24
            IF (KOUNT .GT. (LINES-LSUB)) KOUNT = LINES                         HEAD    25
            KOUNTS =  KOUNT                                                    HEAD    26
            IF (KRETUR .EQ. 3) GO TO 45                                        HEAD    27
            IF (KRETUR .LT. 0) GO TO 30                                        HEAD    28
            IR     =  0                                                        HEAD    29
            JCU    =  0                                                        HEAD    30
            IRSAVE =  IR                                                       HEAD    31
            JCSAVE =  JCU                                                      HEAD    32
            GO TO 45                                                           HEAD    33
         30 IF (KRETUR .LT. -1) GO TO 45                                       HEAD    34
            IR     = -1                                                        HEAD    35
            JCU    =  0                                                        HEAD    36
            IRSAVE =  IR                                                       HEAD    37
            JCSAVE =  JCU                                                      HEAD    38
         45 IRINIT =  IRSAVE                                                   HEAD    39
            JCINIT = JCSAVE                                                    HEAD    40
            JCU    =  JCINIT                                                   HEAD    41
            IF (IR .LE. -1) IROWS = IR                                         HEAD    42
            KRETUR =  1                                                        HEAD    43
            LINESC =  0                                                        HEAD    44
         50 CONTINUE                                                           HEAD    45
      C                                                                        HEAD    46
            GO TO (100, 200, 900), KRETUR                                      HEAD    47
        100 CONTINUE                                                           HEAD    48
      C                                                                        HEAD    49
            IR     =  IRINIT                                                   HEAD    50
            JCL    =  JCU + 1                                                  HEAD    51
            JCU    =  JCU + KOLUMN                                             HEAD    52
            JCU    = MINOF (JCU,JCOLS)                                         HEAD    53
      C                                                                        HEAD    54
        200 CONTINUE                                                           HEAD    55
      C                                                                        HEAD    56
            IF (IR .GE. 0) IR = IR + 1                                         HEAD    57
      C                                                                        HEAD    58
```

```
                CALL TITLES (2)                                                 HEAD       59
                IF (KOUNT .EQ. KOUNTS) GO TO 250                                HEAD       60
60              IF (KOUNT .EQ. 5      ) GO TO 260                               HEAD       61
                IF (IR   .NE. -1         .AND.                                  HEAD       62
               1    IR .EQ. (IRINIT+1) .AND.                                    HEAD       63
               2    JCL .GT. (JCINIT+1)     ) GO TO 300                         HEAD       64
                IF (KOUNT .GT. KOUNTH) GO TO 350                                HEAD       65
65            250 CALL PLB (1,LSKIP,ITAPEW)                                     HEAD       66
                KOUNTS =  LINES                                                 HEAD       67
                KOUNT  =  KOUNT + LSKIP                                         HEAD       68
              C                                                                 HEAD       69
              C NOTE THAT THE COMMENTS BETWEEN PSN(255) TO PSN(380)PROVIDE      HEAD       70
70            C DOCUMENTATION AS TO THE USE OF PROGRAM HEAD                     HEAD       71
              C                                                                 HEAD       72
              255 CONTINUE                                                      HEAD       73
              C                                                                 HEAD       74
              C IN THE CALLING PROGRAM ALL OR SOME OF THE VARIABLES MUST BE     HEAD       75
75            C INITIALIZED BEFORE THIS ROUTINE IS CALLED.  AN EXAMPLE OF THE   HEAD       76
              C INITIALIZED VALUES ARE.                                         HEAD       77
              C                                                                 HEAD       78
              C     LSKIP  =  1                                                 HEAD       79
              C     KRETUR =  0                                                 HEAD       80
80            C     KOLUMN =  8                                                 HEAD       81
              C     LSUB   =  4                                                 HEAD       82
              C     IROWS  =  NUROWS                                            HEAD       83
              C     JCOLS  =  NUCOLS                                            HEAD       84
              C                                                                 HEAD       85
85            C AFTER THE VALUES ARE INITIALIZED THE FOLLOWING CALL TO PROGRAM HEAD HEAD    86
              C IS NEEDED.                                                      HEAD       87
              C                                                                 HEAD       88
              C XXX CALL HEAD (LTSH,TSH,IROWS,JCOLS)                            HEAD       89
              C                                                                 HEAD       90
90            C WHERE XXX IS A STATEMENT NUMBER USED IN THE LOGICAL FORTRAN     HEAD       91
              C INSTRUCTION APPEARING ABOVE PSN(370).                           HEAD       92
              C                                                                 HEAD       93
              C     IN THE CALLING PROGRAM THE FOLLOWING STATEMENT WILL BE NEEDED HEAD      94
              C     TO DIRECT THE PROGRAM TO ONE OF THREE STATEMENTS            HEAD       95
95            C                                                                 HEAD       96
              C     GO TO (270, 310, 360), KHEAD                                HEAD       97
              C                                                                 HEAD       98
              260 KHEAD  =  1                                                   HEAD       99
              270 CONTINUE                                                      HEAD      100
100           C                                                                 HEAD      101
              C     IN THE CALLING PROGRAM A TITLE WOULD BE WRITTEN HERE        HEAD      102
              C     WRITE (ITAPEW,1000)                                         HEAD      103
              C                                                                 HEAD      104
                    LINESC =  0                                                 HEAD      105
105                 GO TO 310                                                   HEAD      106
              300 KHEAD  =  2                                                   HEAD      107
              310 KOUNT  =  KOUNT + LSUB - 1                                    HEAD      108
              C                                                                 HEAD      109
              C     IN THE CALLING PROGRAM  A LINE WILL BE SKIPPED AND ANOTHER   HEAD      110
110           C     LINE IDENTIFYING THE COLUMNS MAY OR MAY NOT BE WRITTEN      HEAD      111
              C     CALL PLB (1,1,ITAPEW)                                       HEAD      112
              C     WRITE (ITAPEW,1001) (JC, JC=JCL,JCU)                        HEAD      113
              C                                                                 HEAD      114
                    GO TO 360                                                   HEAD      115
```

```
                      350 KHEAD  =  3                                                  HEAD      116
                      360 KOUNT  =  KOUNT + 1                                          HEAD      117
                          LINESC =  LINESC + 1                                         HEAD      118
                          IF (LINESC .LE. LINESG) GO TO 365                            HEAD      119
                          KOUNT  =  KOUNT + 1                                          HEAD      120
                          CALL PLB (1,1,ITAPEW)                                        HEAD      121
                          LINESC =  1                                                  HEAD      122
                      365 CONTINUE                                                     HEAD      123
                    C                                                                  HEAD      124
                    C     IN THE CALLING PROGRAM THE ACTUAL VARIABLES (COLUMNS) WOULD BE HEAD      125
                    C     WRITTEN HERE IN ONE OF SEVERAL WAYS.                         HEAD      126
                    C     WRITE (ITAPEW,1002) IR, (VAR(IR,JC), JC=JCL,JCU)             HEAD      127
                    C     WRITE (ITAPEW,1002) JC, (VAR(JC), JC=JCL,JCU)                HEAD      128
                    C     WRITE (ITAPEW,1002) IR, VAR1(IR), VAR2(IR), VAR3(IR)         HEAD      129
                    C     AFTER THE WRITE STATEMENT IN THE CALLING PROGRAM THE FOLLOWING HEAD      130
                    C     STATEMENT WILL BE NEEDED                                     HEAD      131
                    C                                                                  HEAD      132
                    C     IF (KRETUR .LT. 3) GO TO XXX                                 HEAD      133
                    C                                                                  HEAD      134
                      370 CONTINUE                                                     HEAD      135
                    C                                                                  HEAD      136
                    C     WHERE XXX REPRESENTS A STATEMENT NUMBER IDENTIFYING A CALL TO HEAD      137
                    C     SUBROUTINE HEAD                                              HEAD      138
                    C                                                                  HEAD      139
                      380 CONTINUE                                                     HEAD      140
                    C                                                                  HEAD      141
                    C                                                                  HEAD      142
                          IF (IR .EQ. IROWS .AND. JCU .LT. JCOLS) KRETUR = 1           HEAD      143
                          IF (IR .LT. IROWS                     ) KRETUR = 2           HEAD      144
                          IF (IR .EQ. IROWS .AND. JCU .EQ. JCOLS) KRETUR = 3           HEAD      145
                          IF (KRETUR .LT. 3) GO TO 400                                 HEAD      146
                          IRSAVE =  IRINIT                                             HEAD      147
                          JCSAVE =  JCINIT                                             HEAD      148
                      400 CONTINUE                                                     HEAD      149
                    C                                                                  HEAD      150
                      900 CONTINUE                                                     HEAD      151
                    C                                                                  HEAD      152
                    C                                                                  HEAD      153
                    C FORMATS (REPRESENTATIVE OF WHAT IS NEEDED IN CALLING PROGRAM)    HEAD      154
                    C                                                                  HEAD      155
                    C1000 FORMAT ( 10X,48HAPPROPRIATE TITLE ASSOCIATED WITH LISTED COLUMNS) HEAD      156
                    C1001 FORMAT (10X,1X,4HMODE,2X,5HMODE=,1(  1I3,1X, 3(1H-))       HEAD      157
                    C     1                                ,7(  1I4,1X, 9(1H-)))     HEAD      158
                    C1002 FORMAT ( 10X, I5, 1P8E14.6)                                  HEAD      159
                    C                                                                  HEAD      160
                          RETURN                                                       HEAD      161
                          END                                                          HEAD      162
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

46 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	HEAD	3	160

VARIABLES	SN	TYPE	RELOCATION							
3	IR	INTEGER	CHEAD	REFS	10	20	30	36	2*41	2*56	2*61
					142	143	144	DEFINED	28	34	49	56
176	IRINIT	INTEGER		REFS	49	61	146	DEFINED	38			
0	IROWS	INTEGER	F.P.	REFS	142	143	144	DEFINED	3	41		
173	IRSAVE	INTEGER		REFS	38	DEFINED	20	30	36	146		
2	ITAPEP	INTEGER	COMRWP	REFS	9							
0	ITAPER	INTEGER	COMRWP	REFS	9							
1	ITAPEW	INTEGER	COMRWP	REFS	9	65	120					
177	JCINIT	INTEGER		REFS	40	61	147	DEFINED	39			
4	JCL	INTEGER	CHEAD	REFS	10	61	DEFINED	50				
0	JCOLS	INTEGER	F.P.	REFS	52	142	144	DEFINED	3			
174	JCSAVE	INTEGER		REFS	39	DEFINED	21	31	37	147		
5	JCU	INTEGER	CHEAD	REFS	10	21	31	37	50	51	52	
					142	144	DEFINED	29	35	40	51	52
7	KBPAGE	INTEGER	CLIST	REFS	7							
0	KHEAD	INTEGER	CHEAD	REFS	10	DEFINED	98	106	115			
4	KLABEL	INTEGER	CLIST	REFS	7							
2	KOLUMN	INTEGER	CHEAD	REFS	10	51						
0	KOUNT	INTEGER	CLIST	REFS	7	24	25	59	60	64	67	
					107	116	119	DEFINED	24	67	107	116
					119							
11	KOUNTH	INTEGER	CLIST	REFS	7	64						
12	KOUNTI	INTEGER	CLIST	REFS	7							
175	KOUNTS	INTEGER		REFS	59	DEFINED	25	66				
1	KPAGE	INTEGER	CLIST	REFS	7							
1	KRETUR	INTEGER	CHEAD	REFS	10	2*18	19	26	27	33	46	
					145	DEFINED	22	42	142	143	144	
5	KTPAGE	INTEGER	CLIST	REFS	7							
2	LINES	INTEGER	CLIST	REFS	7	2*24	66					
200	LINESC	INTEGER		REFS	117	118	DEFINED	43	104	117	121	
10	LINESG	INTEGER	CLIST	REFS	7	118						
3	LINEST	INTEGER	CLIST	REFS	7							
7	LSKIP	INTEGER	CHEAD	REFS	10	65	67					
6	LSUB	INTEGER	CHEAD	REFS	10	24	107					
0	LTSHD	INTEGER	*UNUSED F.P.	DEFINED	3							
6	NPAGE	INTEGER	CLIST	REFS	7							
201	TSH	REAL	*UNDEF	REFS	5							
0	TSHD	REAL	*UNUSED F.P.	DEFINED	3							

EXTERNALS	TYPE	ARGS	REFERENCES	
PLB		3	65	120
TITLES		1	58	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
MINO	INTEGER	0	INTRIN		52
MINOF	INTEGER	2	SF	16	52

STATEMENT LABELS		DEF LINE	REFERENCES
16	20	23	19
31	30	33	27

STATEMENT LABELS			DEF LINE	REFERENCES		
35	45		38	26	32	33
45	50		44	18		
55	100		47	46		
63	200		54	46		
104	250		65	59		
0	255	INACTIVE	72			
111	260		98	60		
0	270	INACTIVE	99			
114	300		106	61		
115	310		107	105		
120	350		115	64		
121	360		116	114		
130	365		122	118		
0	370	INACTIVE	134			
0	380	INACTIVE	139			
156	400		148	145		
156	900		150	46		

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
CLIST	11	0 KOUNT (1)	1 KPAGE (1)	2 LINES (1)
		3 LINEST (1)	4 KLABEL (1)	5 KTPAGE (1)
		6 NPAGE (1)	7 KBPAGE (1)	8 LINESG (1)
		9 KOUNTH (1)	10 KOUNTI (1)	
COMRWP	3	0 ITAPER (1)	1 ITAPEW (1)	2 ITAPEP (1)
CHEAD	8	0 KHEAD (1)	1 KRETUR (1)	2 KOLUMN (1)
		3 IR (1)	4 JCL (1)	5 JCU (1)
		6 LSUB (1)	7 LSKIP (1)	

STATISTICS

PROGRAM LENGTH	202B	130
CM LABELED COMMON LENGTH	26B	22

520000B CM USED

```
      C45700, SUB. DOPEN (INITIALIZES DATA SETS ASSOCIATED WITH DSIO)          DOPEN      2
      C                                                                        DOPEN      3
      C************************************************************************ DOPEN      4
      C                                                                      * DOPEN      5
      C***  SUBROUTINE DOPEN  (UNIT  ,FIL) ************************************ DOPEN      6
      C                                                                      * DOPEN      7
      C***  COMPUTER VERSION  ************************************************ DOPEN      8
      C     ----------------                                                 * DOPEN      9
      C     CDC VERSION ONLY.                                                * DOPEN     10
      C                                                                      * DOPEN     11
      C***  OBJECTIVE  ******************************************************** DOPEN     12
      C     ---------                                                        * DOPEN     13
      C     INITIALIZES THE DATA SETS ASSOCIATED WITH DSIO (DISK ORIENTED    * DOPEN     14
      C     SEQUENTIAL INPUT/OUTPUT SYSTEM)                                  * DOPEN     15
      C                                                                      * DOPEN     16
      C***  INPUT/OUTPUT  ***************************************************** DOPEN     17
      C     ------------                                                     * DOPEN     18
      C     INPUT CONSISTS OF THE DATA SET AND FILE NUMBERS.  OUTPUT IS THE  * DOPEN     19
      C     INITIALIZATION OF THE DATA SETS.                                 * DOPEN     20
      C                                                                      * DOPEN     21
      C***  SUMMARY OF SYMBOLS  *********************************************** DOPEN     22
      C     ------------------                                               * DOPEN     23
      C.... FIL ......... INPUT                                             * DOPEN     24
      C     FILE NUMBER ASSOCIATED WITH DATA SET UNIT.                       * DOPEN     25
      C                                                                      * DOPEN     26
      C.... UNIT ........ INPUT                                             * DOPEN     27
      C     INPUT/OUTPUT DATA SET REFERENCE NUMBER.                          * DOPEN     28
      C                                                                      * DOPEN     29
      C***  ERROR MESSAGES  *************************************************** DOPEN     30
      C     --------------                                                   * DOPEN     31
      C     NONE.                                                            * DOPEN     32
      C                                                                      * DOPEN     33
      C************************************************************************ DOPEN     34
      C                                                                        DOPEN     35
            SUBROUTINE DOPEN(UNIT,FIL)                                         DOPEN     36
      C                                                                        DOPEN     37
            INTEGER FIL,UNIT                                                   DOPEN     38
            INTEGER OWNCODE                                                    DOPEN     39
            INTEGER FILE,FET,BUFFER,BUFSZ,OLDU,OLDOP                           DOPEN     40
            LOGICAL OPEN                                                       DOPEN     41
      C                                                                        DOPEN     42
            DIMENSION BUFFER(513,1),BUFSZ(1)                                   DOPEN     43
            DIMENSION FET(54,1)                                                DOPEN     44
      C                                                                        DOPEN     45
            COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDU,OLDOP,BUFSZ                   DOPEN     46
            COMMON /DCOM2 / FET                                                DOPEN     47
            COMMON /DCOM3 / BUFFER                                             DOPEN     48
      C                                                                        DOPEN     49
      C                                                                        DOPEN     50
      C FUNCTION DEFINITION                                                    DOPEN     51
            FILE(I)=FET(14,I).AND.77B                                          DOPEN     52
            OPEN(I)=(FET(14,I).AND.100B).EQ.100B                               DOPEN     53
            NAME(I,J)=FET(J+14,I).AND..NOT.777777B                             DOPEN     54
      C                                                                        DOPEN     55
      C                                                                        DOPEN     56
            CALL UCHECK(UNIT)                                                  DOPEN     57
            FET(1,UNIT)=NAME(UNIT,FIL).OR.3                                    DOPEN     58
```

```
                      FET(2,UNIT)=SHIFT(8,18).OR.LOCF(BUFFER(1,UNIT))                DOPEN    59
                      CALL FCHECK(FIL)                                               DOPEN    60
      60              IF (.NOT.OPEN(UNIT)) GO TO 10                                  DOPEN    61
                      IF (FILE(UNIT).EQ.FIL) RETURN                                  DOPEN    62
                      CALL DCLOSE(UNIT)                                              DOPEN    63
                   10 FET(14,UNIT)=100B.OR.FIL                                       DOPEN    64
                      FET(3,UNIT)=LOCF(BUFFER(1,UNIT))                               DOPEN    65
      65              FET(4,UNIT)=LOCF(BUFFER(1,UNIT))                               DOPEN    66
                      FET(5,UNIT)=LOCF(BUFFER(1,UNIT))+BUFSZ(UNIT)                   DOPEN    67
                      CALL MOPEN(FET(1,UNIT))                                        DOPEN    68
                      OLDU=0                                                         DOPEN    69
                      OLDOP=0                                                        DOPEN    70
      70              FET(1,UNIT)=NAME(UNIT,FIL).OR.3                                DOPEN    71
                      END                                                            DOPEN    72
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	DOPEN	35	61 71

VARIABLES

	SN		TYPE		RELOCATION							
0		BUFFER	INTEGER	ARRAY	DCOM3	REFS	39	42	47	58	64	65	66
4		BUFSZ	INTEGER	ARRAY	DCOM1	REFS	39	42	45	66			
0		FET	INTEGER	ARRAY	DCOM2	REFS	39	43	46	57	60	61	67
						70	DEFINED	57	58	63	64	65	66
						70							
0		FIL	INTEGER		F.P.	REFS	37	57	59	61	63	70	
						DEFINED	35						
1		MAXFILS	INTEGER		DCOM1	REFS	45						
0		MAXUNTS	INTEGER		DCOM1	REFS	45						
3		OLDOP	INTEGER		DCOM1	REFS	39	45	DEFINED	69			
2		OLDU	INTEGER		DCOM1	REFS	39	45	DEFINED	68			
64	*	OWNCODE	INTEGER	*UNDEF		REFS	38						
0		UNIT	INTEGER		F.P.	REFS	37	56	2*57	2*58	60	61	62
						63	2*64	2*65	3*66	67	2*70		
						DEFINED	35						

EXTERNALS

	TYPE	ARGS	REFERENCES
DCLOSE		1	62
FCHECK		1	59
MOPEN		1	67
UCHECK		1	56

INLINE FUNCTIONS

	TYPE	ARGS		DEF LINE	REFERENCES			
FILE	INTEGER	1	SF	51	39	61		
LOCF	INTEGER	1	INTRIN		58	64	65	66
NAME	INTEGER	2	SF	53	57	70		
OPEN	LOGICAL	1	SF	52	40	60		
SHIFT	NO TYPE	2	INTRIN		58			

STATEMENT LABELS

		DEF LINE	REFERENCES
34	10	63	60

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
DCOM1	5	0 MAXUNTS(1)	1 MAXFILS(1)	2 OLDU (1)
		3 OLDOP (1)	4 BUFSZ (1)	
DCOM2	54	0 FET (54)		
DCOM3	513	0 BUFFER (513)		

STATISTICS

PROGRAM LENGTH	658	53
CM LABELED COMMON LENGTH	10748	572

520000B CM USED

```
      END                                                    DCLOSE      59


      SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE      REFERENCES
    3  DCLOSE          34          58

VARIABLES      SN  TYPE           RELOCATION
    0  BUFFER      INTEGER    ARRAY     DCOM3          REFS      37        39        44
    4  BUFSZ       INTEGER    ARRAY     DCOM1          REFS      37        39        42
    0  FET         INTEGER    ARRAY     DCOM2          REFS      37        40        43        2*52      2*53      54        55
                                                      DEFINED     55
   43  I         * INTEGER                            DEFINED     52
    1  MAXFILS     INTEGER               DCOM1          REFS      42
    0  MAXUNTS     INTEGER               DCOM1          REFS      42
    3  OLDOP       INTEGER               DCOM1          REFS      37        42      DEFINED     57
    2  OLDU        INTEGER               DCOM1          REFS      37        42      DEFINED     56
    0  UNIT        INTEGER                F.P.          REFS      36        51        2*52      2*53      54        2*55
                                                      DEFINED     34

EXTERNALS           TYPE    ARGS        REFERENCES
       MCLOSE                 1             54
       MEND                   1             53
       UCHECK                 1             51

INLINE FUNCTIONS    TYPE    ARGS          DEF LINE  REFERENCES
       FILE       INTEGER    1    SF         48         37        52        55
       LASTOP     INTEGER    1    SF         49         53
       SHIFT      NO TYPE    2  INTRIN                  53

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       DCOM1        5                 0 MAXUNTS(1)          1 MAXFILS(1)          2 OLDU    (1)
                                      3 OLDOP  (1)          4 BUFSZ  (1)
       DCOM2       54                 0 FET    (54)
       DCOM3      513                 0 BUFFER (513)

STATISTICS
  PROGRAM LENGTH                 448       36
  CM LABELED COMMON LENGTH      1074B      572
          520000B CM USED
```

```
      C457008  DCLOSE (CLOSES A DATA SET SET REFERENCED BY UNIT)                DCLOSE      2
      C                                                                         DCLOSE      3
      C*************************************************************************DCLOSE      4
      C                                                                       *  DCLOSE      5
      C***  SUBROUTINE DCLOSE (UNIT) ******************************************  DCLOSE      6
      C                                                                       *  DCLOSE      7
      C***  COMPUTER VERSION  *************************************************  DCLOSE      8
      C     ----------------                                                  *  DCLOSE      9
      C     CDC VERSION ONLY.                                                 *  DCLOSE     10
      C                                                                       *  DCLOSE     11
      C***  OBJECTIVE  ********************************************************  DCLOSE     12
      C     ---------                                                         *  DCLOSE     13
      C     CLOSES A DATA SET REFERENCED BY UNIT.  AN INPUT DATA SET IS       *  DCLOSE     14
      C     CLOSED WITHOUT REPOSITIONING AND THE BUFFERS ARE RELEASED.  FOR   *  DCLOSE     15
      C     AN OUTPUT DATA SET CLOSING, IT IS EQUIVALENT TO AN END OF FILE    *  DCLOSE     16
      C     STATEMENT.                                                        *  DCLOSE     17
      C                                                                       *  DCLOSE     18
      C***  INPUT/OUTPUT  *****************************************************  DCLOSE     19
      C     ------------                                                      *  DCLOSE     20
      C     INPUT CONSISTS OF THE DATA SET UNIT WHICH IS CLUSED AS DESCRIBED  *  DCLOSE     21
      C     IN THE OBJECTIVE.                                                 *  DCLOSE     22
      C                                                                       *  DCLOSE     23
      C***  SUMMARY OF SYMBOLS  ***********************************************  DCLOSE     24
      C     ------------------                                                *  DCLOSE     25
      C.... UNIT ......... INPUT                                             *  DCLOSE     26
      C     INPUT/OUTPUT DATA SET REFERENCE NUMBER.                           *  DCLOSE     27
      C                                                                       *  DCLOSE     28
      C***  ERROR MESSAGES  ***************************************************  DCLOSE     29
      C     --------------                                                    *  DCLOSE     30
      C     NONE.                                                             *  DCLOSE     31
      C                                                                       *  DCLOSE     32
      C*************************************************************************DCLOSE     33
      C                                                                         DCLOSE     34
            SUBROUTINE DCLOSE(UNIT)                                             DCLOSE     35
      C                                                                         DCLOSE     36
            INTEGER UNIT                                                        DCLOSE     37
            INTEGER FILE,FET,BUFFER,BUFSZ,OLDU,OLDOP                            DCLOSE     38
      C                                                                         DCLOSE     39
            DIMENSION BUFFER(513,1),BUFSZ(1)                                    DCLOSE     40
            DIMENSION FET(54,1)                                                 DCLOSE     41
      C                                                                         DCLOSE     42
            COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDU,OLDOP,BUFSZ                    DCLOSE     43
            COMMON /DCOM2 / FET                                                 DCLOSE     44
            COMMON /DCOM3 / BUFFER                                              DCLOSE     45
      C                                                                         DCLOSE     46
      C                                                                         DCLOSE     47
      C FUNCTION DEFINITION                                                     DCLOSE     48
            FILE(I)=FET(14,I).AND.77B                                           DCLOSE     49
            LASTOP(I)=SHIFT(FET(14,I),-7).AND.3                                 DCLOSE     50
      C                                                                         DCLOSE     51
            CALL UCHECK(UNIT)                                                   DCLOSE     52
            I=FET(14+FILE(UNIT),UNIT).AND.777777B                               DCLOSE     53
            IF (LASTOP(UNIT).EQ.1) CALL MEND(FET(1,UNIT))                       DCLOSE     54
            CALL MCLOSE(FET(1,UNIT))                                            DCLOSE     55
            FET(14,UNIT)=(FILE(UNIT)+1).OR.1600B                                DCLOSE     56
            OLDU=0                                                              DCLOSE     57
            OLDOP=0                                                             DCLOSE     58
```

```
      END                                                    DFIND      59


      SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS      DEF LINE      REFERENCES
    3  DFIND          34         57

VARIABLES     SN  TYPE           RELOCATION
    0  BUFFER     INTEGER    ARRAY    DCOM3        REFS      36       39       44
    4  BUFSZ      INTEGER    ARRAY    DCOM1        REFS      36       39       42
    0  FET        INTEGER    ARRAY    DCOM2        REFS      36       40       43       54
    0  FIL        INTEGER             F.P.         REFS      36       53       55     DEFINED       34
    1  MAXFILS    INTEGER             DCOM1        REFS      42
    0  MAXUNTS    INTEGER             DCOM1        REFS      42
    3  OLDOP      INTEGER             DCOM1        REFS      36       42
    2  OLDU       INTEGER             DCOM1        REFS      36       42
    0  UNIT       INTEGER             F.P.         REFS      36       52     2*54      55     DEFINED       34
   33  WRITTEN *  INTEGER    *UNDEF                 REFS      36

EXTERNALS           TYPE    ARGS       REFERENCES
       DCLOSE                  1            54
       DOPEN                   2            55
       FCHECK                  1            53
       UCHECK                  1            52

INLINE FUNCTIONS    TYPE    ARGS          DEF LINE  REFERENCES
       OPEN       LOGICAL     1    SF        49         37         54

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       DCOM1          5                 0 MAXUNTS(1)          1 MAXFILS(1)          2 OLDU    (1)
                                        3 OLDOP  (1)          4 BUFSZ  (1)
       DCOM2         54                 0 FET    (54)
       DCOM3        513                 0 BUFFER (513)

STATISTICS
  PROGRAM LENGTH                  34B       28
  CM LABELED COMMON LENGTH      1074B      572
          52000B CM USED
```

```
      C457008  DFIND (LOCATES SPECIFIED FILES ON AN I/O UNIT)                  DFIND       2
      C                                                                        DFIND       3
      C************************************************************************ DFIND       4
      C                                                                       * DFIND       5
      C***  SUBROUTINE DFIND  (UNIT  ,FIL) ************************************ DFIND       6
      C                                                                       * DFIND       7
      C***  COMPUTER VERSION  ************************************************ DFIND       8
      C     ----------------                                                  * DFIND       9
      C     CDC VERSION ONLY.                                                 * DFIND      10
      C                                                                       * DFIND      11
      C***  OBJECTIVE  ******************************************************** DFIND      12
      C     ---------                                                         * DFIND      13
      C     LOCATES SPECIFIED FILES ON AN INPUT/OUTPUT UNIT.                  * DFIND      14
      C                                                                       * DFIND      15
      C***  INPUT/OUTPUT  ***************************************************** DFIND      16
      C     ------------                                                      * DFIND      17
      C     INPUT CONSISTS OF THE DATA SET AND FILE NUMBERS.  OUTPUT          * DFIND      18
      C     CONSISTS OF LOCATING THE SPECIFIED FILES.                         * DFIND      19
      C                                                                       * DFIND      20
      C***  SUMMARY OF SYMBOLS  *********************************************** DFIND      21
      C     ------------------                                                * DFIND      22
      C.... FIL ........... INPUT                                             * DFIND      23
      C     FILE NUMBER ASSOCIATED WITH DATA SET UNIT.                        * DFIND      24
      C                                                                       * DFIND      25
      C.... UNIT ......... INPUT                                             * DFIND      26
      C     INPUT/OUTPUT DATA SET REFERENCE NUMBER.                           * DFIND      27
      C                                                                       * DFIND      28
      C***  ERROR MESSAGES  *************************************************** DFIND      29
      C     --------------                                                    * DFIND      30
      C     NONE.                                                             * DFIND      31
      C                                                                       * DFIND      32
      C************************************************************************ DFIND      33
      C                                                                        DFIND      34
            SUBROUTINE DFIND(UNIT,FIL)                                         DFIND      35
      C                                                                        DFIND      36
            INTEGER BUFFER,BUFSZ,FET,FIL,OLDOP,OLDU,UNIT,WRITTEN               DFIND      37
            LOGICAL OPEN                                                       DFIND      38
      C                                                                        DFIND      39
            DIMENSION BUFFER(513,1),BUFSZ(1)                                   DFIND      40
            DIMENSION FET(54,1)                                                DFIND      41
      C                                                                        DFIND      42
            COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDU,OLDOP,BUFSZ                   DFIND      43
            COMMON /DCOM2 / FET                                                DFIND      44
            COMMON /DCOM3 / BUFFER                                             DFIND      45
      C                                                                        DFIND      46
      C                                                                        DFIND      47
      C                                                                        DFIND      48
      C FUNCTION DEFINITION                                                    DFIND      49
            OPEN(I)=(FET(14,I).AND.100B).EQ.100B                               DFIND      50
      C                                                                        DFIND      51
      C                                                                        DFIND      52
            CALL UCHECK(UNIT)                                                  DFIND      53
            CALL FCHECK(FIL)                                                   DFIND      54
            IF (OPEN(UNIT)) CALL DCLOSE(UNIT)                                  DFIND      55
            CALL DOPEN(UNIT,FIL)                                               DFIND      56
      C                                                                        DFIND      57
            RETURN                                                             DFIND      58
```

```
VARIABLES      SN  TYPE           RELOCATION
  157  LIMIT      INTEGER                        REFS      53      110      116      122    DEFINED      79
    1  MAXFILS    INTEGER             DCOM1      REFS      60
    0  MAXUNTS    INTEGER             DCOM1      REFS      60
    3  OLDOP      INTEGER             DCOM1      REFS      54       60       73    DEFINED      82
    2  OLDU       INTEGER             DCOM1      REFS      54       60       73    DEFINED      81
  155  OUT        INTEGER                        REFS      53       96       97      105      110      116      119
                                                  121     122      124    DEFINED       80      121      122
    0  UNIT       INTEGER               F.P.     REFS      52       73       75     3*76       77       78       79
                                                   80       81     2*92       95      100      124    2*129      140
                                         DEFINED   49

EXTERNALS            TYPE    ARGS        REFERENCES
        DOPEN                   2             76
        MERR2                   1             92
        MMOVE                   3            119
        MREAD                   1            100       129
        SCHECK                  2             89
        UCHECK                  1             75

INLINE FUNCTIONS     TYPE    ARGS          DEF LINE  REFERENCES
        FILE       INTEGER      1    SF        67        54       76       77
        LASTOP     INTEGER      1    SF        69        92
        LOCF       INTEGER      1  INTRIN                86
        MINO       INTEGER      0  INTRIN                116
        MINOF      INTEGER      3    SF        66        116
        OPEN       LOGICAL      1    SF        68        55       76
        SHIFT      NO TYPE      2  INTRIN                92

STATEMENT LABELS                 DEF LINE    REFERENCES
   36  10                           83          73
   52  100                          94         101       139
   63  110                         104          96
   66  120                         109          97
   72  200                         112         106

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
        DCOM1         5                0 MAXUNTS(1)          1 MAXFILS(1)          2 OLDU    (1)
                                       3 OLDOP  (1)          4 BUFSZ  (1)
        DCOM2        54                0 FET    (54)
        DCOM3       513                0 BUFFER (513)

STATISTICS
  PROGRAM LENGTH                  1608B      112
  CM LABELED COMMON LENGTH        1074B      572
        520000B CM USED
```

```
115           C     REQUESTED (COUNT) OR LIMIT-OUT                                    DREAD     116
                    AMTDATA=MINOF(COUNT,DATA,LIMIT-OUT)                               DREAD     117
              C     MOVE THE DATA TO THE BUFFER. WSA IS(DEST) AND THE BUFFER LOCATION  DREAD     118
              C     IS (OUT).                                                         DREAD     119
                    CALL MMOVE(OUT,DEST,AMTDATA)                                      DREAD     120
120           C     UPDATE THE OUT POINTER TO REFLECT THE AMOUNT OF DATA MOVED         DREAD     121
                    OUT=OUT+AMTDATA                                                   DREAD     122
                    IF(OUT.GE.LIMIT)OUT=FIRST                                         DREAD     123
              C     PLACE NEW VALUE OF (OUT) INTO THE FET                             DREAD     124
                    FET(4,UNIT)=OUT                                                   DREAD     125
125           C     DETERMINE AVAILABLE DATA LEFT IN THE BUFFER                       DREAD     126
                    DATA=DATA-AMTDATA                                                 DREAD     127
              C     IF DATA AVAILABLE IS LESS THEN 1/4 OF THE BUFFER SIZE THEN        DREAD     128
              C     DO A PHYSICAL READ                                                DREAD     129
                    IF(DATA.LT.BUFSZ(UNIT)/4) CALL MREAD(FET(1,UNIT))                 DREAD     130
130           C     DETERMINE THE REQUESTED DATA LEFT (COUNT) BY THE AMOUNT OF DATA   DREAD     131
              C     TRANSFERED FROM THE BUFFER                                        DREAD     132
                    COUNT=COUNT-AMTDATA                                               DREAD     133
              C     INCREMENT THE POINTER TO THE WSA (DEST) BY THE AMOUNT             DREAD     134
              C     OF DATA MOVED                                                     DREAD     135
135                 DEST=DEST + AMTDATA                                               DREAD     136
              C     IF THERE IS NO MORE DATA AVAILABLE, UPDATE THE UNIT STATUS WORD   DREAD     137
              C     (WORD 14) AND RETURN                                              DREAD     138
              C     ELSE IF                                                           DREAD     139
                    IF(COUNT.GT.0) GO TO 100                                          DREAD     140
140                 FET(14,UNIT)=500B.OR.FILENO                                       DREAD     141
                    RETURN                                                            DREAD     142
                    END                                                               DREAD     143
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	DREAD	49	
3	PREAD	72	141

VARIABLES

	SN	TYPE		RELOCATION								
150	AMTDATA	INTEGER			REFS	51	119	121	126	132	135	
					DEFINED	116						
0	BUFFER	INTEGER	ARRAY	DCOM3	REFS	54	57	62				
4	BUFSZ	INTEGER	ARRAY	DCOM1	REFS	54	57	60	129			
0	BYTES	INTEGER		F.P.	REFS	52	85	DEFINED	49			
0	CORE	INTEGER		F.P.	REFS	52	86	DEFINED	49			
153	COUNT	INTEGER			REFS	53	89	116	132	139		
					DEFINED	85	132					
151	DATA	INTEGER			REFS	51	116	126	129	DEFINED	105	110
					126							
152	DEST	INTEGER			REFS	53	89	119	135	DEFINED	86	135
0	FET	INTEGER	ARRAY	DCOM2	REFS	54	58	61	2*76	77	78	79
					80	92	95	100	129	DEFINED	124	140
147	FILENO	INTEGER			REFS	51	140	DEFINED	77			
156	FIRST	INTEGER			REFS	53	110	122	DEFINED	78		
154	IN	INTEGER			REFS	53	96	97	105	110		
					DEFINED	95						

```
                      DIMENSION FET(54,1)                                          DREAD     59
                C                                                                  DREAD     60
60                    COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDU,OLDOP,BUFSZ             DREAD     61
                      COMMON /DCOM2 / FET                                          DREAD     62
                      COMMON /DCOM3 / BUFFER                                       DREAD     63
                C                                                                  DREAD     64
                C                                                                  DREAD     65
65              C FUNCTION DEFINITION                                              DREAD     66
                      MINOF(I1,I2,I3)  =  MINO(I1,I2,I3)                           DREAD     67
                      FILE(I)=FET(14,I).AND.77B                                    DREAD     68
                      OPEN(I)=(FET(14,I).AND.100B).EQ.100B                         DREAD     69
                      LASTOP(I)=SHIFT(FET(14,I),-7).AND.3                          DREAD     70
70              C                                                                  DREAD     71
                C                                                                  DREAD     72
                      ENTRY PREAD                                                  DREAD     73
                      IF (UNIT.EQ.OLDU .AND. OLDOP.EQ.2) GO TO 10                  DREAD     74
                C     ELSE                                                         DREAD     75
75                    CALL UCHECK(UNIT)                                            DREAD     76
                      IF(.NOT.OPEN(UNIT)) CALL DOPEN(UNIT,FILE(UNIT))              DREAD     77
                      FILENO=FILE(UNIT)                                            DREAD     78
                      FIRST=FET(2,UNIT) .AND. 777777B                              DREAD     79
                      LIMIT=FET(5,UNIT) .AND. 777777B                              DREAD     80
80                    OUT=FET(4,UNIT)                                              DREAD     81
                      OLDU=UNIT                                                    DREAD     82
                      OLDOP=2                                                      DREAD     83
                   10 CONTINUE                                                     DREAD     84
                C     CALCULATE NUMBER OF CDC WORDS TO BE READ FROM THE FILE       DREAD     85
85                    COUNT=BYTES/4                                                DREAD     86
                      DEST=LOCF(CORE)                                              DREAD     87
                C     CHECK IF WSA (DEST) IS A VALID ADDRESS                       DREAD     88
                C     IF INVALID ADDRESS, THEN SUB SCHECK WILL TERMINATE THE PROGRAM DREAD    89
                      CALL SCHECK(DEST,COUNT)                                      DREAD     90
90              C     IF LAST OPERATION WAS A WRITE, MERR2 WILL TERMINATE THE PROGRAM DREAD   91
                C     SINCE A READ FOLLOWING A WRITE IS ILLEGAL                    DREAD     92
                      IF(LASTOP(UNIT).EQ.1) CALL MERR2(UNIT)                       DREAD     93
                C     DETERMINE AMOUNT OF DATA IN THE CIRCULAR BUFFER              DREAD     94
                  100 CONTINUE                                                     DREAD     95
95                    IN=FET(3,UNIT)                                               DREAD     96
                      IF(IN.GT.OUT) GO TO 110                                      DREAD     97
                      IF(OUT.GT.IN) GO TO 120                                      DREAD     98
                C     ELSE BUFFER IS EMPTY                                         DREAD     99
                C     READ IN MORE DATA                                            DREAD    100
100                   CALL MREAD(FET(1,UNIT))                                      DREAD    101
                      GO TO 100                                                    DREAD    102
                C     ELSE IN >OUT                                                 DREAD    103
                C     AVAILABLE DATA IS                                            DREAD    104
                  110 CONTINUE                                                     DREAD    105
105                   DATA=IN-OUT                                                  DREAD    106
                      GO TO 200                                                    DREAD    107
                C     ELSE OUT > IN                                                DREAD    108
                C     AVAILABLE BUFFER DATA IS                                     DREAD    109
                  120 CONTINUE                                                     DREAD    110
110                   DATA=LIMIT-OUT+IN-FIRST                                      DREAD    111
                C                                                                  DREAD    112
                  200 CONTINUE                                                     DREAD    113
                C     AMOUNT OF DATA TO BE TRANSFERRED FROM THE BUFFER MUST BE THE DREAD    114
                C     SMALLER OF DATA AVAILABLE  (DATA) IN THE BUFFER OR THE DATA  DREAD    115
```

```
      C457008. DREAD (UNFORMATTED FORTRAN READ OF A COMPLETE LIST)                DREAD      2
      C                                                                           DREAD      3
      C*************************************************************************  DREAD      4
      C                                                                        *  DREAD      5
      C***  SUBROUTINE DREAD  (UNIT  ,CORE  ,BYTES)*****************************  DREAD      6
      C                                                                        *  DREAD      7
      C***  COMPUTER VERSION  *************************************************  DREAD      8
      C     ----------------                                                   *  DREAD      9
      C     CDC VERSION ONLY.                                                  *  DREAD     10
      C                                                                        *  DREAD     11
      C***  OBJECTIVE  ********************************************************  DREAD     12
      C     ---------                                                          *  DREAD     13
      C     CORRESPONDS TO AN UNFORMATTED FORTRAN READ STATEMENT OF A          *  DREAD     14
      C     COMPLETE LIST.  THE COMPLETE LIST OF DATA IS MOVED INTO A          *  DREAD     15
      C     CONTINUOUS AREA OF STORAGE WITH THE REMAINDER OF THE LOGICAL       *  DREAD     16
      C     RECORD, IF ANY, SKIPPED.                                           *  DREAD     17
      C     ENTRY POINT PREAD CORRESPONDS TO AN UNFORMATTED FORTRAN READ       *  DREAD     18
      C     STATEMENT OF A PARTIAL LIST.  THE PARTIAL LIST OF DATA IS MOVED    *  DREAD     19
      C     INTO A CONTINUOUS AREA OF STORAGE WITH THE REMAINDER OF THE        *  DREAD     20
      C     LOGICAL RECORD, IF ANY, HELD IN THE BUFFER TO SATISFY FURTHER      *  DREAD     21
      C     CALLS TO PREAD.  COMPLETION OF THE LOGICAL RECORD IS INDICATED     *  DREAD     22
      C     BY A CALL TO REND.                                                 *  DREAD     23
      C                                                                        *  DREAD     24
      C***  INPUT/OUTPUT  *****************************************************  DREAD     25
      C     ------------                                                       *  DREAD     26
      C     INPUT CONSISTS OF THE DATA SET NUMBER AND NUMBER OF BYTES WHICH    *  DREAD     27
      C     ARE TO BE READ FROM THE DATA SET UNIT.  OUTPUT CONSISTS OF         *  DREAD     28
      C     STORING THE DATA INTO THE VARIABLE CORE.                           *  DREAD     29
      C                                                                        *  DREAD     30
      C***  SUMMARY OF SYMBOLS  ***********************************************  DREAD     31
      C     -------------------                                                *  DREAD     32
      C.... CORE ......... OUTPUT                                             *  DREAD     33
      C     VARIABLE (STORAGE AREA) INTO WHICH DATA, THAT HAS BEEN READ FROM   *  DREAD     34
      C     DATA SET UNIT, ARE TO BE STORED.                                   *  DREAD     35
      C                                                                        *  DREAD     36
      C.... BYTES ........ INPUT                                                 DREAD     37
      C     NUMBER OF BYTES TO BE READ FROM DATA SET UNIT AND STORED INTO      *  DREAD     38
      C     THE VARIABLE CORE.                                                 *  DREAD     39
      C                                                                        *  DREAD     40
      C.... UNIT ......... INPUT                                              *  DREAD     41
      C     INPUT/OUTPUT DATA SET REFERENCE NUMBER.                            *  DREAD     42
      C                                                                        *  DREAD     43
      C***  ERROR MESSAGES  ***************************************************  DREAD     44
      C     --------------                                                     *  DREAD     45
      C     NONE.                                                              *  DREAD     46
      C                                                                        *  DREAD     47
      C*************************************************************************  DREAD     48
      C                                                                           DREAD     49
            SUBROUTINE DREAD(UNIT,CORE,BYTES)                                     DREAD     50
      C                                                                           DREAD     51
            INTEGER FILENO,AMTDATA,DATA                                           DREAD     52
            INTEGER UNIT,CORE,BYTES                                               DREAD     53
            INTEGER DEST,COUNT,IN,OUT,FIRST,LIMIT                                 DREAD     54
            INTEGER FILE,FET,BUFFER,BUFSZ,OLDU,OLDOP                              DREAD     55
            LOGICAL OPEN                                                          DREAD     56
      C                                                                           DREAD     57
            DIMENSION BUFFER(513,1),BUFSZ(1)                                      DREAD     58
```

VARIABLES SN TYPE RELOCATION

				DEFINED	90						
143	SOURCE	INTEGER		REFS	50	87	114	130	DEFINED	84	130
151	SPACE	INTEGER		REFS	50	111	121	124	DEFINED	94	100
				105	121						
0	UNIT	INTEGER	F.P.	REFS	49	71	73	3*74	75	76	77
				78	79	90	119	2*124	135	2*136	
				DEFINED	47						

EXTERNALS TYPE ARGS REFERENCES

DOPEN		2	74
MMOVE		3	114
MWRITE		1	124
SCHECK		2	87
UCHECK		1	73

INLINE FUNCTIONS TYPE ARGS DEF LINE REFERENCES

FILE	INTEGER	1	SF	65	52	74	75
LOCF	INTEGER	1	INTRIN		84		
MINO	INTEGER	0	INTRIN		111		
MINOF	INTEGER	3	SF	64	111		
NAME	INTEGER	2	SF	67	136		
OPEN	LOGICAL	1	SF	66	53	74	

STATEMENT LABELS DEF LINE REFERENCES

36	10	81	71	
43	100	89	134	
54	110	99	91	
61	120	104	92	
64	200	107	96	101

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

DCOM1	5	0 MAXUNTS(1)	1 MAXFILS(1)	2 OLDU (1)	
		3 OLDOP (1)	4 BUFSZ (1)		
DCOM2	54	0 FET (54)			
DCOM3	513	0 BUFFER (513)			

STATISTICS

PROGRAM LENGTH	154B	108
CM LABELED COMMON LENGTH	1074B.	572
520000B CM USED		

```
                C     UPDATE THE IN POINTER TO REFLECT THE AMOUNT OF DATA MOVED          DWRITE   116
                      IN=IN+AMTDATA                                                      DWRITE   117
                      IF(IN.GE.LIMIT)IN=FIRST                                            DWRITE   118
                C     PLACE NEW VALUE OF (IN) INTO THE FET                               DWRITE   119
                      FET(3,UNIT)=IN                                                     DWRITE   120
                C     DETERMINE AVAILABLE SPACE LEFT IN THE BUFFER                       DWRITE   121
                      SPACE=SPACE-AMTDATA                                                DWRITE   122
                C     IF SPACE AVAILABLE IS LESS THEN 1/4 OF THE BUFFER SIZE THEN        DWRITE   123
                C     DO A PHYSICAL WRITE                                                DWRITE   124
                      IF(SPACE.LT.BUFSZ(UNIT)/4) CALL MWRITE(FET(1,UNIT))                DWRITE   125
                C     DETERMINE THE AVAILABLE DATA LEFT (COUNT) BY THE AMOUNT OF DATA    DWRITE   126
                C     TRANSFERRED TO THE BUFFER                                          DWRITE   127
                      COUNT=COUNT-AMTDATA                                                DWRITE   128
                C     INCREMENT THE POINTER TO THE WSA (SOURCE) BY THE AMOUNT            DWRITE   129
                C     OF DATA MOVED                                                      DWRITE   130
                      SOURCE=SOURCE + AMTDATA                                            DWRITE   131
                C     IF THERE IS NO MORE DATA AVAILABLE, UPDATE THE UNIT STATUS WORD    DWRITE   132
                C     (WORD 14) AND RETURN                                               DWRITE   133
                C     ELSE IF                                                            DWRITE   134
                      IF(COUNT.GT.0) GO TO 100                                           DWRITE   135
                      FET(14,UNIT)=300B.OR.FILENO                                        DWRITE   136
                      FET(14+FILENO,UNIT)=NAME(UNIT,FILENO)                              DWRITE   137
                      RETURN                                                             DWRITE   138
                      END                                                                DWRITE   139
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	DWRITE	47	
3	PRITE	70	137

VARIABLES

	SN	TYPE			RELOCATION							
153	AMTDATA	INTEGER			REFS	51	114	116	121	127	130	
					DEFINED	111						
0	BUFFER	INTEGER	ARRAY	DCOM3	REFS	52	55	60				
4	BUFSZ	INTEGER	ARRAY	DCOM1	REFS	52	55	58	124			
0	BYTES	INTEGER		F.P.	REFS	49	83	DEFINED	47			
0	CORE	INTEGER		F.P.	REFS	49	84	DEFINED	47			
144	COUNT	INTEGER			REFS	50	87	111	127	134		
					DEFINED	83	127					
0	FET	INTEGER	ARRAY	DCOM2	REFS	52	56	59	2*74	75	76	77
						78	90	124	136	DEFINED	119	135	136
152	FILENO	INTEGER			REFS	51	135	2*136	DEFINED	75		
147	FIRST	INTEGER			REFS	50	94	100	117	DEFINED	76	
145	IN	INTEGER			REFS	50	91	92	100	105	111	114
						116	117	119	DEFINED	78	116	117	
150	LIMIT	INTEGER			REFS	50	94	100	111	117		
					DEFINED	77						
1	MAXFILS	INTEGER		DCOM1	REFS	58						
0	MAXUNTS	INTEGER		DCOM1	REFS	58						
3	OLDOP	INTEGER		DCOM1	REFS	52	58	71	DEFINED	80		
2	OLDU	INTEGER		DCOM1	REFS	52	58	71	DEFINED	79		
146	OUT	INTEGER			REFS	50	91	92	100	105		

```
                      COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDU,OLDOP,BUFSZ                DWRITE     59
                      COMMON /DCOM2 / FET                                             DWRITE     60
60                    COMMON /DCOM3 / BUFFER                                          DWRITE     61
                C                                                                     DWRITE     62
                C                                                                     DWRITE     63
                C FUNCTION DEFINITION                                                 DWRITE     64
                      MINOF(I1,I2,I3)  =  MINO(I1,I2,I3)                              DWRITE     65
65                    FILE(I)=FET(14,I).AND.77B                                       DWRITE     66
                      OPEN(I)=(FET(14,I).AND.100B).EQ.100B                            DWRITE     67
                      NAME(I,J)=FET(J+14,I).AND..NOT.777777B                          DWRITE     68
                C                                                                     DWRITE     69
                C                                                                     DWRITE     70
70                    ENTRY PRITE                                                     DWRITE     71
                      IF (UNIT.EQ.OLDU .AND. OLDOP.EQ.1) GO TO 10                     DWRITE     72
                C     ELSE                                                            DWRITE     73
                      CALL UCHECK(UNIT)                                               DWRITE     74
                      IF(.NOT.OPEN(UNIT)) CALL DOPEN(UNIT,FILE(UNIT))                 DWRITE     75
75                    FILENO=FILE(UNIT)                                               DWRITE     76
                      FIRST=FET(2,UNIT) .AND. 777777B                                 DWRITE     77
                      LIMIT=FET(5,UNIT) .AND. 777777B                                 DWRITE     78
                      IN=FET(3,UNIT)                                                  DWRITE     79
                      OLDU=UNIT                                                       DWRITE     80
80                    OLDOP=1                                                         DWRITE     81
                   10 CONTINUE                                                        DWRITE     82
                C     CALCULATE NUMBER OF CDC WORDS TO BE WRITTEN TO THE FILE         DWRITE     83
                      COUNT=BYTES/4                                                   DWRITE     84
                      SOURCE=LOCF(CORE)                                               DWRITE     85
85              C     CHECK IF WSA (SOURCE) IS A VALID ADDRESS                        DWRITE     86
                C     IF INVALID ADDRESS, THEN SUB SCHECK WILL TERMINATE THE PROGRAM  DWRITE     87
                      CALL SCHECK(SOURCE,COUNT)                                       DWRITE     88
                C     DETERMINE FREE SPACE IN THE CIRCULAR BUFFER                     DWRITE     89
                  100 CONTINUE                                                        DWRITE     90
90                    OUT=FET(4,UNIT)                                                 DWRITE     91
                      IF(IN.GT.OUT) GO TO 110                                         DWRITE     92
                      IF(OUT.GT.IN) GO TO 120                                         DWRITE     93
                C     CALCULATE AVAILABLE BUFFER SPACE                                DWRITE     94
                      SPACE=LIMIT-FIRST-1                                             DWRITE     95
95              C                                                                     DWRITE     96
                      GO TO 200                                                       DWRITE     97
                C     ELSE IN> OUT                                                    DWRITE     98
                C     AVAILABLE SPACE IS                                              DWRITE     99
                  110 CONTINUE                                                        DWRITE    100
100                   SPACE=(LIMIT-IN)+(OUT-FIRST)-1                                  DWRITE    101
                      GO TO 200                                                       DWRITE    102
                C     ELSE OUT > IN                                                   DWRITE    103
                C     AVAILABLE BUFFER SPACE IS                                       DWRITE    104
                  120 CONTINUE                                                        DWRITE    105
105                   SPACE=OUT-IN-1                                                  DWRITE    106
                C                                                                     DWRITE    107
                  200 CONTINUE                                                        DWRITE    108
                C     AMOUNT OF DATA TO BE TRANSFERRED TO THE BUFFER MUST BE THE SMALLER DWRITE  109
                C     OF DATA AVAILABLE (COUNT) OR THE BUFFER SPACE AVAILABLE (SPACE)  DWRITE    110
110             C     OR LIMIT-IN                                                     DWRITE    111
                      AMTDATA=MINOF(COUNT,SPACE,LIMIT-IN)                             DWRITE    112
                C     MOVE THE DATA TO THE BUFFER. WSA IS(SOURCE) AND THE BUFFER LOCATIO DWRITE  113
                C     IS (IN).                                                        DWRITE    114
                      CALL MMOVE(SOURCE,IN,AMTDATA)                                   DWRITE    115
```

```
      C45700, SUB. DWRITE (UNFORMATTED FORTRAN WRITE OF A COMPLETE LIST)        DWRITE      2
      C                                                                         DWRITE      3
      C*************************************************************************DWRITE      4
      C                                                                        * DWRITE      5
      C***  SUBROUTINE DWRITE (UNIT  ,CORE  ,BYTES)*************************** DWRITE      6
      C                                                                        * DWRITE      7
      C***  COMPUTER VERSION  *************************************************** DWRITE      8
      C     ----------------                                                   * DWRITE      9
      C     CDC VERSION ONLY.                                                  * DWRITE     10
      C                                                                        * DWRITE     11
      C***  OBJECTIVE  *********************************************************** DWRITE     12
      C     ---------                                                          * DWRITE     13
      C     CORRESPONDS TO AN UNFORMATTED FORTRAN WRITE STATEMENT OF A         * DWRITE     14
      C     COMPLETE LIST.  THE COMPLETE LIST OF DATA IS WRITTEN FROM A        * DWRITE     15
      C     CONTINUOUS AREA OF STORAGE AND IS EQUAL TO THE LOGICAL RECORD.     * DWRITE     16
      C     ENTRY POINT PRITE CORRESPONDS TO AN UNFORMATTED FORTRAN WRITE      * DWRITE     17
      C     STATEMENT OF A PARTIAL LIST.  THE PARTIAL LIST OF DATA IS          * DWRITE     18
      C     WRITTEN FROM A CONTINUOUS AREA OF STORAGE AND IS EQUAL TO OR       * DWRITE     19
      C     LESS THAN THE LOGICAL RECORD.  COMPLETION OF THE LOGICAL RECORD    * DWRITE     20
      C     IS INDICATED BY A CALL TO WEND.                                    * DWRITE     21
      C                                                                        * DWRITE     22
      C***  INPUT/OUTPUT  ******************************************************** DWRITE     23
      C     ------------                                                       * DWRITE     24
      C     INPUT CONSISTS OF THE DATA SET NUMBER AND THE NUMBER OF BYTES      * DWRITE     25
      C     WHICH ARE STORED IN THE VARIABLE CORE.  OUTPUT CONSISTS OF         * DWRITE     26
      C     STORING THE DATA IN THE VARIABLE CORE ON TO THE DATA SET UNIT.     * DWRITE     27
      C                                                                        * DWRITE     28
      C***  SUMMARY OF SYMBOLS  ************************************************** DWRITE     29
      C     ------------------                                                 * DWRITE     30
      C.... BYTES ........ INPUT                                              * DWRITE     31
      C     NUMBER OF BYTES TO BE MOVED FROM THE VARIABLE CORE AND STORED      * DWRITE     32
      C     ON THE DATA SET UNIT.                                              * DWRITE     33
      C                                                                        * DWRITE     34
      C.... CORE ......... INPUT                                              * DWRITE     35
      C     VARIABLE (STORAGE ADDRESS) FROM WHICH DATA IS TO BE TAKEN AND      * DWRITE     36
      C     STORED ON THE DATA SET UNIT.                                       * DWRITE     37
      C                                                                        * DWRITE     38
      C.... UNIT ......... INPUT                                              * DWRITE     39
      C     INPUT/OUTPUT DATA SET REFERENCE NUMBER.                            * DWRITE     40
      C                                                                        * DWRITE     41
      C***  ERROR MESSAGES  ****************************************************** DWRITE     42
      C     --------------                                                     * DWRITE     43
      C     NONE.                                                              * DWRITE     44
      C                                                                        * DWRITE     45
      C*************************************************************************DWRITE     46
      C                                                                         DWRITE     47
            SUBROUTINE DWRITE(UNIT,CORE,BYTES)                                  DWRITE     48
      C                                                                         DWRITE     49
            INTEGER UNIT,CORE,BYTES                                             DWRITE     50
            INTEGER SOURCE,COUNT,IN,OUT,FIRST,LIMIT,SPACE                       DWRITE     51
            INTEGER FILENO,AMTDATA                                              DWRITE     52
            INTEGER FILE,FET,BUFFER,BUFSZ,OLDU,OLDOP                            DWRITE     53
            LOGICAL OPEN                                                        DWRITE     54
      C                                                                         DWRITE     55
            DIMENSION BUFFER(513,1),BUFSZ(1)                                    DWRITE     56
            DIMENSION FET(54,1)                                                 DWRITE     57
      C                                                                         DWRITE     58
```

VARIABLES	SN	TYPE	RELOCATION									
161	A	REAL			REFS	33	DEFINED	13				
0	FET	INTEGER	ARRAY	F.P.	REFS	9	11	28	31	32	33	
					DEFINED	1	21	24	27			
166	LF	INTEGER			REFS	32	DEFINED	30				
163	LOC	INTEGER			REFS	21	24	26	27	28	31	32
					33	DEFINED	20	23	25			
165	LU	INTEGER			REFS	31	DEFINED	29				
0	MAXLOCS	INTEGER		F.P.	REFS	11	25	DEFINED	1			
0	MAXUNTS	INTEGER		F.P.	REFS	11	19	DEFINED	1			
164	NF	INTEGER			REFS	30	DEFINED	26				
167	NOS	INTEGER	ARRAY		REFS	11	14	15	16	17	31	32
162	NU	INTEGER			REFS	21	24	27	28	29	31	32
					33	DEFINED	19					

EXTERNALS	TYPE	ARGS	REFERENCES			
MOVE		5	28	31	32	33
WORDS		3	14	15	16	17

STATEMENT LABELS			DEF LINE	REFERENCES
0	100		22	20
0	200		34	25
0	1000		35	19
146	2000	FMT NO REFS	43	
150	3000	FMT NO REFS	44	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
22	1000	NU	19 35	52B		EXT REFS	NOT INNER
27	100	LOC	20 22	2B	INSTACK		
35	200	LOC	25 34	35B		EXT REFS	

STATISTICS

PROGRAM LENGTH 247B 167

520000B CM USED

```
      SUBROUTINE FETS (FET, MAXLOCS, MAXUNTS)                                  FETS       2
C                                                                              FETS       3
C***                                                                           FETS       4
C                                                                              FETS       5
C     CDC VERSION ONLY                                                         FETS       6
C                                                                              FETS       7
C***                                                                           FETS       8
C                                                                              FETS       9
      INTEGER FET                                                              FETS      10
C                                                                              FETS      11
      DIMENSION FET(MAXLOCS,MAXUNTS),NOS(16)                                   FETS      12
C                                                                              FETS      13
      A=1HA                                                                    FETS      14
      CALL WORDS (NOS(1), 4,4OH0102030405060708091011121314151617181920)       FETS      15
      CALL WORDS (NOS(5), 4,4OH2122232425262728293031323334353637383940)       FETS      16
      CALL WORDS (NOS(9), 4,4OH4142434445464748495051525354555657585960)       FETS      17
      CALL WORDS(NOS(13), 4,4OH6162636465666768697071727374757677787980)       FETS      18
C                                                                              FETS      19
      DO 1000 NU=1,MAXUNTS                                                     FETS      20
      DO 100 LOC=1,13                                                          FETS      21
      FET(LOC,NU) =  0                                                         FETS      22
  100 CONTINUE                                                                 FETS      23
      LOC    =  14                                                             FETS      24
      FET(LOC,NU) =  1                                                         FETS      25
      DO 200 LOC=15,MAXLOCS                                                    FETS      26
      NF     =  LOC - 14                                                       FETS      27
      FET(LOC,NU) =  0                                                         FETS      28
      CALL MOVE (2, 2HFL, 1, FET(LOC,NU), 1)                                   FETS      29
      LU     =  2*NU - 1                                                       FETS      30
      LF     =  2*NF - 1                                                       FETS      31
      CALL MOVE (2, NOS ,LU, FET(LOC,NU), 3)                                   FETS      32
      CALL MOVE (2, NOS ,LF, FET(LOC,NU), 5)                                   FETS      33
      CALL MOVE(1,A,1,FET(LOC,NU),7)                                           FETS      34
  200 CONTINUE                                                                 FETS      35
 1000 CONTINUE                                                                 FETS      36
C     WRITE (6,2000) ((FET(LOC,NU), LOC=1,14), NU=1,MAXUNTS)                   FETS      37
C     DO 1500 NU=1,MAXUNTS                                                     FETS      38
C     WRITE (6,3000)  (FET(LOC,NU), LOC=15,MAXLOCS)                            FETS      39
C1500 CONTINUE                                                                 FETS      40
C                                                                              FETS      41
      RETURN                                                                   FETS      42
C                                                                              FETS      43
 2000 FORMAT (10X, 14I2)                                                       FETS      44
 3000 FORMAT (10X, 10A10)                                                      FETS      45
C                                                                              FETS      46
      END                                                                      FETS      47
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 FETS	1	41

```
      C457000B. UCHECK (CHECK I/O OPERATIONS AND PRINT ERROR MESSAGE)          UCHECK      2
      C                                                                        UCHECK      3
      C*************************************************************************UCHECK      4
      C                                                                       * UCHECK      5
      C***  SUBROUTINE UCHECK (UNIT  ,L) ***************************************UCHECK      6
      C                                                                       * UCHECK      7
      C***  COMPUTER VERSION  **************************************************UCHECK      8
      C     ----------------                                                  * UCHECK      9
      C     CDC VERSION ONLY.                                                 * UCHECK     10
      C                                                                       * UCHECK     11
      C***  OBJECTIVE  *********************************************************UCHECK     12
      C     ---------                                                         * UCHECK     13
      C     DOES VARIOUS CHECKS ON THE DATA SET UNIT (SEE ERROR MESSAGES      * UCHECK     14
      C     BELOW).  IF ERRORS OCCUR, CALCULATIONS ARE TERMINATED.            * UCHECK     15
      C                                                                       * UCHECK     16
      C***  INPUT/OUTPUT  ******************************************************UCHECK     17
      C     ------------                                                      * UCHECK     18
      C     BASED UPON THE VALUE OF THE DATA SET UNIT, VARIOUS ERROR MESSAGES* UCHECK     19
      C     MAY BE WRITTEN.                                                   * UCHECK     20
      C                                                                       * UCHECK     21
      C***  SUMMARY OF SYMBOLS  ************************************************UCHECK     22
      C     ------------------                                                * UCHECK     23
      C.... L ............. INPUT                                            * UCHECK     24
      C     FOR THE VARIOUS MEANINGS OF THIS VARIABLE, SEE THE CALLS          * UCHECK     25
      C     TO THE ENTRY POINTS OF SUBROUTINE UCHECK.                         * UCHECK     26
      C                                                                       * UCHECK     27
      C.... UNIT ......... INPUT                                             * UCHECK     28
      C     INPUT/OUTPUT DATA SET REFERENCE NUMBER.                           * UCHECK     29
      C     FOR ADDITIONAL MEANINGS OF THIS VARIABLE, SEE THE CALLS           * UCHECK     30
      C     TO THE ENTRY POINTS OF SUBROUTINE UCHECK.                         * UCHECK     31
      C                                                                       * UCHECK     32
      C***  ERROR MESSAGES  ****************************************************UCHECK     33
      C     --------------                                                    * UCHECK     34
      C     --- IS A BAD UNIT NUMBER.                                         * UCHECK     35
      C     --- IS A BAD FILE NUMBER.                                         * UCHECK     36
      C     ATTEMPT TO READ OR WRITE FROM LOCATIONS ------ THRU ------ NO     * UCHECK     37
      C     GOOD.                                                             * UCHECK     38
      C     BUFFER TOO SMALL FOR FILE -------                                 * UCHECK     39
      C     ATTEMPT TO READ AFTER WRITE FILE -------.                         * UCHECK     40
      C     END OF INFORMATION FILE -------.                                  * UCHECK     41
      C     ERROR, FILE ------- ,CODE AND STATUS= ------.                     * UCHECK     42
      C                                                                       * UCHECK     43
      C*************************************************************************UCHECK     44
      C                                                                        UCHECK     45
            SUBROUTINE UCHECK(UNIT,L)                                          UCHECK     46
      C                                                                        UCHECK     47
            INTEGER BUFFER,BUFSZ,CM,FET,FL,OLDOP,OLDU,UNIT                     UCHECK     48
      C                                                                        UCHECK     49
            DIMENSION BUFFER(513,1),BUFSZ(1)                                   UCHECK     50
            DIMENSION FET(54,1)                                                UCHECK     51
            DIMENSION ITAPES(1)                                                UCHECK     52
            DIMENSION MSG(13)                                                  UCHECK     53
      C                                                                        UCHECK     54
            COMMON /CTAPES/ ITAPES                                             UCHECK     55
            COMMON /DCOM1 / MAXUNTS,MAXFILS,OLDU,OLDOP,BUFSZ                   UCHECK     56
            COMMON /DCOM2 / FET                                                UCHECK     57
            COMMON /DCOM3 / BUFFER                                             UCHECK     58
```

```
      C                                                                 UCHECK     59
      C                                                                 UCHECK     60
60    C INITIAL CONDITIONS                                              UCHECK     61
            DATA MSG/13*0/                                              UCHECK     62
            DATA CM/4000000B/                                           UCHECK     63
            ITAPEW = ITAPES(6)                                          UCHECK     64
      C                                                                 UCHECK     65
65          IF (UNIT.GT.0.AND.UNIT.LE.MAXUNTS) RETURN                   UCHECK     66
            ENCODE(120,10,MSG) UNIT                                     UCHECK     67
            GO TO 1000                                                  UCHECK     68
      C                                                                 UCHECK     69
            ENTRY FCHECK                                                UCHECK     70
70          IF (UNIT.GT.0.AND.UNIT.LE.MAXFILS) RETURN                   UCHECK     71
            ENCODE(120,20,MSG) UNIT                                     UCHECK     72
            GO TO 1000                                                  UCHECK     73
      C                                                                 UCHECK     74
            ENTRY SCHECK                                                UCHECK     75
75          L1=UNIT                                                     UCHECK     76
            L2=L1+L                                                     UCHECK     77
            LL=LOCF(L2)                                                 UCHECK     78
      C     IF(CM.EQ.0) CM=FL(0)                                        UCHECK     79
            IF (L1.LE.L2.AND.(L1.GT.LL.OR.L2.LT.LL).AND.L2.LE.CM) RETURN UCHECK    80
80          ENCODE(120,30,MSG) L1,L2                                    UCHECK     81
            GO TO 1000                                                  UCHECK     82
      C                                                                 UCHECK     83
            ENTRY MERR1                                                 UCHECK     84
            ENCODE (120,40,MSG) FET(1,UNIT)                             UCHECK     85
85          GO TO 1000                                                  UCHECK     86
      C                                                                 UCHECK     87
            ENTRY MERR2                                                 UCHECK     88
            ENCODE(120,50,MSG) FET(1,UNIT)                              UCHECK     89
            GO TO 1000                                                  UCHECK     90
90    C                                                                 UCHECK     91
            ENTRY MERR3                                                 UCHECK     92
            ENCODE(120,60,MSG) UNIT                                     UCHECK     93
            GO TO 1000                                                  UCHECK     94
      C                                                                 UCHECK     95
95          ENTRY MERR4                                                 UCHECK     96
            ENCODE(120,70,MSG) UNIT,UNIT                                UCHECK     97
     1000 WRITE (ITAPEW,1001) (FET(I,UNIT), I=1,18)                     UCHECK     98
            CALL SYSTEM(200,MSG)                                        UCHECK     99
      C                                                                 UCHECK    100
100   C                                                                 UCHECK    101
      C FORMATS                                                         UCHECK    102
        10 FORMAT (I20, 21H IS A BAD UNIT NUMBER )                      UCHECK    103
        20 FORMAT (I20, 21H IS A BAD FILE NUMBER )                      UCHECK    104
        30 FORMAT (44H ATTEMPT TO READ TO OR WRITE FROM LOCATIONS , 06, UCHECK    105
105       16H THRU , 06,  9H, NO GOOD )                                 UCHECK    106
        40 FORMAT (27H BUFFER TOO SMALL FOR FILE ,A7)                   UCHECK    107
        50 FORMAT (35H ATTEMPT TO READ AFTER WRITE, FILE ,A7)           UCHECK    108
        60 FORMAT (26H END OF INFORMATION, FILE ,A7)                    UCHECK    109
        70 FORMAT (13H ERROR, FILE ,A7,18H, CODE AND STATUS= ,06)       UCHECK    110
110   1001 FORMAT (1X,020)                                              UCHECK    111
      C                                                                 UCHECK    112
            STOP 200                                                    UCHECK    113
            END                                                         UCHECK    114
```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

63 I ITAPES ARRAY REFERENCE OUTSIDE DIMENSION BOUNDS.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
15	FCHECK	69	70
62	MERR1	83	
103	MERR2	87	
124	MERR3	91	
141	MERR4	95	
35	SCHECK	74	79
3	UCHECK	45	65

VARIABLES	SN	TYPE		RELOCATION								
0	BUFFER	INTEGER	ARRAY	DCOM3	REFS	47	49	57				
4	BUFSZ	INTEGER	ARRAY	DCOM1	REFS	47	49	55				
172	CM	INTEGER			REFS	47	79	DEFINED	62			
0	FET	INTEGER	ARRAY	DCOM2	REFS	47	50	56	84	88	97	
320	FL	* INTEGER	*UNDEF		REFS	47						
325	I	INTEGER			REFS	97	DEFINED	97				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	51	54	63				
321	ITAPEW	INTEGER			DEFINED	63	I/O REFS	97				
0	L	INTEGER		F.P.	REFS	76	DEFINED	45				
324	LL	INTEGER			REFS	2*79	DEFINED	77				
322	L1	INTEGER			REFS	76	2*79	80	DEFINED	75		
323	L2	INTEGER			REFS	77	3*79	80	DEFINED	76		
1	MAXFILS	INTEGER		DCOM1	REFS	55	70					
0	MAXUNTS	INTEGER		DCOM1	REFS	55	65					
326	MSG	INTEGER	ARRAY		REFS	52	98	DEFINED	61	66	71	80
					84	88	92	96				
3	OLDOP	INTEGER		DCOM1	REFS	47	55					
2	OLDU	INTEGER		DCOM1	REFS	47	55					
0	UNIT	INTEGER		F.P.	REFS	47	2*65	66	2*70	71	75	84
					88	92	2*96	97	DEFINED	45		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
SYSTEM		2	98

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
LOCF	INTEGER	1	INTRIN		77

STATEMENT LABELS			DEF LINE	REFERENCES					
245	10	FMT	102	66					
251	20	FMT	103	71					
255	30	FMT	104	80					
266	40	FMT	106	84					
273	50	FMT	107	88					
301	60	FMT	108	92					
306	70	FMT	109	96					
155	1000		97	67	72	81	85	89	93

```
STATEMENT LABELS                DEF LINE    REFERENCES
  314   1001     FMT               110          97

COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
       CTAPES         1                 0 ITAPES (1)
       DCOM1          5                 0 MAXUNTS(1)          1 MAXFILS(1)          2 OLDU   (1)
                                        3 OLDOP  (1)          4 BUFSZ  (1)
       DCOM2         54                 0 FET    (54)
       DCOM3        513                 0 BUFFER (513)

STATISTICS
  PROGRAM LENGTH                 345B      229
  CM LABELED COMMON LENGTH      1075B      573
          52000B CM USED
```

```
      C PROGRAM MYIO                                                    MYIO       2
      C*                                                                MYIO       3
      C*****************************************************************MYIO       4
      C*                                                               *MYIO       5
      C***  SUBROUTINE MYIO    ********************************************MYIO       6
      C*                                                               *MYIO       7
      C***  COMPUTER VERSION   ********************************************MYIO       8
      C*    ----------------                                           *MYIO       9
      C*    CDC ONLY.                                                  *MYIO      10
      C*                                                               *MYIO      11
      C***  OBJECTIVE  *****************************************************MYIO      12
      C*    ---------                                                  *MYIO      13
      C*    ENTRY POINT REND TERMINATES PROCESSING OF THE LOGICAL RECORD FOR *MYIO      14
      C*    AN UNFORMATTED FORTRAN READ OF A PARTIAL LIST /USED WITH PREAD).  *MYIO      15
      C*    ENTRY POINT WEND TERMINATES PROCESSING OF THE LOGICAL RECORD FOR *MYIO      16
      C*    AN UNFORMATTED FORTRAN WRITE OF A PARTIAL LIST (USED WITH PRITE).*MYIO      17
      C*                                                               *MYIO      18
      C***  INPUT/OUTPUT  ***************************************************MYIO      19
      C*    ------------                                               *MYIO      20
      C*                                                               *MYIO      21
      C**** SUMMARY OF SYMBOLS  *********************************************MYIO      22
      C*    ------------------                                         *MYIO      23
      C*                                                               *MYIO      24
      C***  ERROR MESSAGES  *************************************************MYIO      25
      C*    --------------                                             *MYIO      26
      C*    NONE.                                                      *MYIO      27
      C*                                                               *MYIO      28
      C*****************************************************************MYIO      29
      C*                                                                MYIO      30
      CIBM                                                              MYIO      31
      C     SUBROUTINE MYIO                                             MYIO      32
      CIBM                                                              MYIO      33
```

MYIO
STORAGE ALLOCATION.

ADDRESS	LENGTH
0	64
64	

BINARY CONTROL CARDS.

```
IDENT   MYIO
END
```

ENTRY POINTS.

MOPEN	0+	MSKIP	20+	MRECALL	40+
MCLOSE	4+	MREWIND	24+	REND	44+
MEVICT	10+	MREAD	30+	WEND	44+
MEND	14+	MWRITE	34+	OWNCODE	46+

EXTERNAL SYMBOLS.

CPC	MERR3	MERR4

```
                                                                    MYIO    34
                        IDENT   MYIO                               MYIO    35
                        LIST    M                                   MYIO    36
                        EXT     CPC                                 MYIO    37
                        MACRO   M,NAME,CODE                         MYIO    38
                        ENTRY   NAME                                MYIO    39
NAME                    BSS     1                                   MYIO    40
                        SA1     X1                                  MYIO    41
                        RJ      CPC                                 MYIO    42
                +       VFD     18D/3,2/1,40D/CODE                  MYIO    43
                        JP      *-3                                 MYIO    44
                        ENDM                                        MYIO    45
                        BASE    D_0                                 MYIO    46
0               MOPEN   M       160                               M       1
                        ENTRY   MOPEN                             M       1
0                       BSS     1       MOPEN                     M       1
1  53110                SA1     X1                                M       1
        0100000000 X    RJ      CPC                               M       1
2  000003200000000000160+       VFD     18D/3,2/1,40D/160         M       1
3  0200000000 +         JP      *-3                               M       1
                        ENDM                                        MYIO    47
                MCLOSE  M       150                               M       1
                        ENTRY   MCLOSE                            M       1
4                       BSS     1       MCLOSE                    M       1
5  53110                SA1     X1                                M       1
        0100000000 X    RJ      CPC                               M       1
6  000003200000000000150+       VFD     18D/3,2/1,40D/150         M       1
7  0200000004 +         JP      *-3                               M       1
                        ENDM                                        MYIO    48
                MEVICT  M       114                               M       1
                        ENTRY   MEVICT                            M       1
10                      BSS     1       MEVICT                    M       1
11 53110                SA1     X1                                M       1
        0100000000 X    RJ      CPC                               M       1
12 000003200000000000114+       VFD     18D/3,2/1,40D/114         M       1
13 0200000010 +         JP      *-3                               M       1
                        ENDM
```

```
                                MEND    M       34                              MYIO    49
                                        ENTRY   MEND                            M       .1
 14                         1   MEND    BSS     1                               M       .1
 15  53110                          SA1     X1                                  M       .1
           0100000000 X                 RJ      CPC                             M       .1
 16  0000032000000000034        +        VFD     18D/3,2/1,40D/34                M       .1
 17  0200000014 +                        JP      *-3                             M       .1
                                        ENDM                                    M       .1
                                MSKIP   M       240                             MYIO    50
                                        ENTRY   MSKIP                           M       .1
 20                         1   MSKIP    BSS     1                              M       .1
 21  53110                          SA1     X1                                  M       .1
           0100000000 X                 RJ      CPC                             M       .1
 22  0000032000000000240        +        VFD     18D/3,2/1,40D/240               M       .1
 23  0200000020 +                        JP      *-3                             M       .1
                                        ENDM                                    M       .1
                                MREWIND M       50                              MYIO    51
                                        ENTRY   MREWIND                         M       .1
 24                         1   MREWIND     BSS     1                          M       .1
 25  53110                          SA1     X1                                  M       .1
           0100000000 X                 RJ      CPC                             M       .1
 26  0000032000000000050        +        VFD     18D/3,2/1,40D/50                M       .1
 27  0200000024 +                        JP      *-3                             M       .1
                                        ENDM                                    M       .1
                                        ENTRY   MREAD,MWRITE                    MYIO    52
 30                         1   MREAD   BSS     1                               MYIO    53
 31  53110                          SA1     X1                                  MYIO    54
           0100000000 X         -       RJ      CPC                             MYIO    55
 32  0000022000000000010                VFD     18D/2,2/1,40D/108               MYIO    56
 33  0200000030 +                       JP      MREAD                           MYIO    57
 34                         1   MWRITE  BSS     1                               MYIO    58
 35  53110                          SA1     X1                                  MYIO    59
           0100000000 X         -       RJ      CPC                             MYIO    60
 36  0000022000000000014                VFD     18D/2,2/1,40D/148               MYIO    61
 37  0200000034 +                       JP      MWRITE                          MYIO    62
                                        ENTRY   MRECALL                         MYIO    63
 40                         1   MRECALL BSS     1                               MYIO    64
 41  53110                          SA1     X1                                  MYIO    65
           0100000000 X         -       RJ      CPC                             MYIO    66
 42  0000012000000777777        +        VFD     18D/1,2/1,40D/777777B           MYIO    67
 43  0200000040 +                       JP      MRECALL                         MYIO    68
                                        ENTRY   REND,WEND                       MYIO    69
 44                             WEND    BSS     0                               MYIO    70
 44                         1   REND    BSS     1                               MYIO    71
 45  0200000044 +                       JP      *-1                             MYIO    72
                                        ENTRY   OWNCODE                         MYIO    73
 46                         1   OWNCODE BSS     1                               MYIO    74
 47  5110000051 +                       SA1     ADDRS                           MYIO    75
                10611                   BX6     X1                              MYIO    76
 50  0200000046 +                       JP      OWNCODE                         MYIO    77
 51  0000000052 +               ADDRS   VFD     30D/EOI,30D/ERR                 MYIO    78
                0000000060 +
                                        EXT     MERR3,MERR4                     MYIO    79
 52                         1   EOI     BSS     1                               MYIO    80
 53  10611                          BX6     X1                                  MYIO    81
           5160000056 +                 SA6     WORD                            MYIO    82
 54  5110000057 +                       SA1     WDADDR                          MYIO    83
```

```
                0100000000 X            RJ      MERR3                                   MYIO    84
    55  0200000052 +                    JP      EOI                                     MYIO    85
    56                    1     WORD    BSS     1                                       MYIO    86
    57  00000000000000000056 +  WDADDR  VFD     60D/WORD                                MYIO    87
    60                    1     ERR     BSS     1                                       MYIO    88
    61  10611                           BX6     X1                                      MYIO    89
          5160000056 +                  SA6     WORD                                    MYIO    90
    62  5110000057 +                    SA1     WDADDR                                  MYIO    91
                0100000000 X            RJ      MERR4                                   MYIO    92
    63  0200000060 +                    JP      ERR                                     MYIO    93
    64                                  END                                             MYIO    94

                463008 CM  STORAGE USED          103 STATEMENTS      20 SYMBOLS
                  PARALLEL CPU ASSEMBLY        0.261 SECONDS         57 REFERENCES
```

SYMBOLIC REFERENCE TABLE.

ADDRS	51	PROGRAM*	2/48		2/51	L			
CPC	0	EXTERNAL*	1/24	X	1/46		2/05	2/21	2/33
			1/38		1/54		2/13	2/28	2/39
EOI	52	PROGRAM*	2/51		2/54	L	3/02		
ERR	60	PROGRAM*	2/51		3/05	L	3/10		
MCLOSE	4	PROGRAM*	1/43	E	1/44	L			
MEND	14	PROGRAM*	2/02	E	2/03	L			
MERR3	0	EXTERNAL*	2/53	X	3/01				
MERR4	0	EXTERNAL*	2/53	X	3/09				
MEVICT	10	PROGRAM*	1/51	E	1/52	L			
MOPEN	0	PROGRAM*	1/35	E	1/36	L			
MREAD	30	PROGRAM*	2/25	E	2/26	L	2/30		
MRECALL	40	PROGRAM*	2/36	E	2/37	L	2/41		
MREWIND	24	PROGRAM*	2/18	E	2/19	L			
MSKIP	20	PROGRAM*	2/10	E	2/11	L			
MWRITE	34	PROGRAM*	2/25	E	2/31	L	2/35		
OWNCODE	46	PROGRAM*	2/46	E	2/47	L	2/50		
REND	44	PROGRAM*	2/42	E	2/44	L			
WDADDR	57	PROGRAM*	2/57		3/04	L	3/08		
WEND	44	PROGRAM*	2/42	E	2/43	L			
WORD	56	PROGRAM*	2/56	S	3/03	L	3/04	3/07	S

```
      C PROGRAM MMOVE                                                    MMOVE      2
      C*                                                                 MMOVE      3
      C******************************************************************MMOVE      4
      C*                                                                *MMOVE      5
      C***  SUBROUTINE MMOVE   ********************************************MMOVE      6
      C*                                                                *MMOVE      7
      C***  COMPUTER VERSION  *********************************************MMOVE      8
      C*    ----------------                                            *MMOVE      9
      C*    CDC ONLY.                                                   *MMOVE     10
      C*                                                                *MMOVE     11
      C***  OBJECTIVE  ****************************************************MMOVE     12
      C*    ---------                                                   *MMOVE     13
      C*                                                                *MMOVE     14
      C***  INPUT/OUTPUT  *************************************************MMOVE     15
      C*    ------------                                                *MMOVE     16
      C*                                                                *MMOVE     17
      C***  SUMMARY OF SYMBOLS  *******************************************MMOVE     18
      C*    ------------------                                          *MMOVE     19
      C*                                                                *MMOVE     20
      C***  ERROR MESSAGES  ***********************************************MMOVE     21
      C*    --------------                                              *MMOVE     22
      C*    NONE.                                                       *MMOVE     23
      C*                                                                *MMOVE     24
      C******************************************************************MMOVE     25
      C*                                                                 MMOVE     26
      CIBM                                                               MMOVE     27
      C     SUBROUTINE MMOVE                                             MMOVE     28
      CIBM                                                               MMOVE     29
```

STORAGE ALLOCATION

ADDRESS	LENGTH	BINARY CONTROL CARDS.
0	15	IDENT MMOVE
15		END

ENTRY POINTS.

MMOVE 0+

```
                                    IDENT   MMOVE                                   MMOVE   30
                                    ENTRY   MMOVE                                   MMOVE   31
 0                        1 MMOVE   BSS     1                                      MMOVE   32
 1  53210                          SA2     X1                                     MMOVE   33
       63120                       SB1     X2                                     MMOVE   34
            5011000001             SA1     A1+1                                   MMOVE   35
 2  53210                          SA2     X1                                     MMOVE   36
       63320                       SB3     X2                                     MMOVE   37
            5011000001             SA1     A1+1                                   MMOVE   38
 3  53210                          SA2     X1                                     MMOVE   39
       0302000000 +                ZR      X2,MMOVE                               MMOVE   40
 4  0332000000 +                   NG      X2,MMOVE                               MMOVE   41
            63221                  SB2     X2+B1                                  MMOVE   42
 5  6122777776                     SB2     B2-1                                   MMOVE   43
            63423                  SB4     X2+B3                                  MMOVE   44
 6  6144777776                     SB4     B4-1                                   MMOVE   45
            6252777776             SB5     X2-1                                   MMOVE   46
 7  76250                          SX2     B5                                     MMOVE   47
       21201                       AX2     1                                      MMOVE   48
            63521                  SB5     X2+B1                                  MMOVE   49
                 56110             SA1     B1                                     MMOVE   50
10  10611                          BX6     X1                                     MMOVE   51
       56630                       SA6     B3                                     MMOVE   52
            0412000000 +           EQ      B1,B2,MMOVE                            MMOVE   53
11  56220                LOOP      SA2     B2                                     MMOVE   54
       5011000001                  SA1     A1+1                                   MMOVE   55
                 10722             BX7     X2                                     MMOVE   56
12  6122777776                     SB2     B2-1                                   MMOVE   57
            56740                  SA7     B4                                     MMOVE   58
                 10611             BX6     X1                                     MMOVE   59
13  6144777776                     SB4     B4-1                                   MMOVE   60
            5066000001             SA6     A6+1                                   MMOVE   61
14  0552000011 +                   NE      B5,B2,LOOP                             MMOVE   62
            0200000000 +           JP      MMOVE                                  MMOVE   63
15                                 END                                            MMOVE   64
```

463008 CM STORAGE USED — 35 STATEMENTS — 2 SYMBOLS
PARALLEL CPU ASSEMBLY — 0.105 SECONDS — 8 REFERENCES

SYMBOLIC REFERENCE TABLE.

LOOP	11	PROGRAM*	1/38 L	1/46

SYMBOLIC REFERENCE TABLE

MMOVE	0	PROGRAM*	1/15 E	1/16 L	1/24	1/25	1/37	1/47

```
      C45700, SUB. DVOLNO (VOLUME SERIAL NUMBER FOR DSIO)                DVOLNO     2
            SUBROUTINE DVOLNO (ITAPE,REELNO)                             DVOLNO     3
      C                                                                  DVOLNO     4
            DATA  REELN / 10H          /                                 DVOLNO     5
      5     REELNO = REELN                                               DVOLNO     6
      C                                                                  DVOLNO     7
            RETURN                                                       DVOLNO     8
            END                                                          DVOLNO     9
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	DVOLNO	2	7

VARIABLES	SN	TYPE	RELOCATION					
0	ITAPE	INTEGER	*UNUSED	F.P.	DEFINED	2		
7	REELN	REAL			REFS	5	DEFINED	4
0	REELNO	REAL		F.P.	DEFINED	2	5	

STATISTICS

PROGRAM LENGTH 108 8

52000B CM USED

```
1           C45700, SUB. ABDUMP (ABEND DUMP)                    ABDUMP      2
                  SUBROUTINE ABDUMP                             ABDUMP      3
            C                                                   ABDUMP      4
                  ZERO = 0.0                                    ABDUMP      5
5                 DUMP = 1.0/ZERO                               ABDUMP      6
            C                                                   ABDUMP      7
                  RETURN                                        ABDUMP      8
                  END                                           ABDUMP      9
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
1	ABDUMP	2	7

VARIABLES	SN	TYPE	RELOCATION				
7 DUMP	*	REAL		DEFINED	5		
6 ZERO		REAL		REFS	5	DEFINED	4

STATISTICS

PROGRAM LENGTH 108 8

520008 CM USED

```
      SUBROUTINE STRDES                                                 STRDES     2
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    STRDES     3
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)          STRDES     4
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)               STRDES     5
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)               STRDES     6
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                       STRDES     7
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                          STRDES     8
     F      ,STRFDO(5,6),STRFDN(5,6)                                   STRDES     9
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD      STRDES    10
      COMMON/POWELL/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)    STRDES    11
     1              ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICONV,ICN  STRDES    12
      COMMON/CTAPES/ ITAPES                                             STRDES    13
      COMMON /MAX/ MAXDIM                                               STRDES    14
      COMMON/ VSAVE / VNSAVE, VOSAVE                                    STRDES    15
      COMMON/NEWCON/JNEW(50),NEWDIM                                     STRDES    16
      COMMON /JGL/ JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50),         STRDES    17
     1             MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,            STRDES    18
     2             NOTACT(50),NDIM                                    STRDES    19
C                                                                       STRDES    20
CCDC                                                                    STRDES    21
      COMMON /INCCOM/ GECS(35,50),BCOECS(50),NPMECS,MSTRECS             STRDES    22
      COMMON /STRCOM/ JSETECS(50),JDIMECS,LMKECS(50,50),NOTJECS(50),    STRDES    23
     1        NTDMECS,LNDECS(50),LDMECS,NOTTECS(50),ICNECS,NDIMECS,      STRDES    24
     2        XOECS(35),XNECS(35),DELXECS(35),GROECS(35),GRNECS(35),     STRDES    25
     3        DELGECS(35),ZECS(35),HOECS(35,35),HNECS(35,35),HGRECS(35), STRDES    26
     4        ICNVECS                                                    STRDES    27
      COMMON /KLUES/ IDUM1(16),NCYC,IDUM2(7)                            STRDES    28
CCDC                                                                    STRDES    29
C                                                                       STRDES    30
      DIMENSION VAR(4)                                                  STRDES    31
      DIMENSION A(35),B(35),IPERM(35),ITAPES(50)                        STRDES    32
      DIMENSION TYPE(14)                                                STRDES    33
      DIMENSION XNEW(13),GNEW(13)                                       STRDES    34
C                                                                       STRDES    35
CCDC                                                                    STRDES    36
      LEVEL 3, JSETECS,JDIMECS,GECS,LMKECS,BCOECS,MSTRECS,NOTJECS,      STRDES    37
     1         NTDMECS,LNDECS,LDMECS,NOTTECS,NDIMECS,XOECS,XNECS,       STRDES    38
     2         DELXECS,GROECS,GRNECS,DELGECS,ZECS,HOECS,HNECS,HGRECS,   STRDES    39
     3         NPMECS,ICNVECS,ICNECS                                    STRDES    40
CCDC                                                                    STRDES    41
C                                                                       STRDES    42
      DATA VAR /4HW   ,4HIXX ,4HIYY ,4HIZZ /                            STRDES    43
      DATA TYPE /4HPARA,4H   W,4H  IX,4H  IY,4H  IZ,                    STRDES    44
     A           4H  RX,4H  RY,4H  RZ,4H  FX,4H  FY,4H  FZ,             STRDES    45
     B           4H FXX,4H FYY,4H FZZ /                                 STRDES    46
C                                                                       STRDES    47
      ITAPEW = ITAPES(6)                                                STRDES    48
      ITAPEN = ITAPES(40)                                               STRDES    49
C                                                                       STRDES    50
CIBM                                                                    STRDES    51
C     ITAPJP = 60                                                       STRDES    52
CIBM                                                                    STRDES    53
C                                                                       STRDES    54
      MAXDIM = 35                                                       STRDES    55
      CALL MESAGE(1,6,6HSTRDES)                                         STRDES    56
      ISTEP2 = IABS(ISTEP)                                              STRDES    57
      WRITE(ITAPEW,390)  ISTEP2                                         STRDES    58
```

```
                C                                                                RILL      116
                C      DO 9 J= 1,NPARM                                           RILL      117
                C    9 XO(J)= XJ(J,NDS)                                          RILL      118
                C      GO TO 5                                                   RILL      119
                C    7 CONTINUE                                                  RILL      120
                C                                                                RILL      121
                C SINCE NEW PT IS NOT A REPEAT,                                  RILL      122
                C MAKE MOVE                                                      RILL      123
                C                                                                RILL      124
                C      WRITE(ITAPEW,420) JJ,GRO(JJ)                              RILL      125
                C      WRITE(ITAPEN,420) JJ, GRO(JJ)                             RILL      126
                C      VNEW= VOLD                                                RILL      127
                C      RETURN 1                                                  RILL      128
                C                                                                RILL      129
                C NO NON-REPEATED DIRECT SEARCH POSSIBLE                         RILL      130
                C                                                                RILL      131
                C   10 CONTINUE                                                  RILL      132
                C      WRITE(ITAPEW,440)                                         RILL      133
                C      WRITE(ITAPEN,440)                                         RILL      134
                C      ICYCLE= -1                                                RILL      135
                C      RETURN 1                                                  RILL      136
                  400 FORMAT(1HO,15X,33HA LOCAL MINIMUM HAS BEEN DETECTED)       RILL      137
                  401 FORMAT(1HO,15X,24HNORM OF PREVIOUS MOVE = ,1PE20.8)        RILL      138
                C 410 FORMAT(1HO,15X,33HA POSSIBLE RILL HAS BEEN DETECTED)       RILL      139
                C 420 FORMAT(1HO,15X,36HMAXIMUM SCALED DERIVATIVE OCCURS FOR,    RILL      140
                C     1 13H VARIABLE NO .I2,8H AND IS ,1PE14.5,///)              RILL      141
                C 440 FORMAT(1HO,10X,25HNO NEW SIDE-STEP POSSIBLE)               RILL      142
                C  ******************************************************        RILL      143
                C  *       END OF CODE THAT HAS BEEN COMMENTED OUT.     *        RILL      144
                C  ******************************************************        RILL      145
                      END                                                        RILL      146
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
1	RILL	1	

VARIABLES

		SN	TYPE	RELOCATION								
166	B		REAL	*UNDEF		REFS	26					
0	CON		REAL	ARRAY	CONS	REFS	24					
257	DELG		REAL	ARRAY	POWELL	REFS	17					
106	DELX		REAL	ARRAY	POWELL	REFS	17					
117	EPS	*	REAL			DEFINED	30					
122	G		REAL			REFS	40	46	47	DEFINED	39	40
214	GRN		REAL	ARRAY	POWELL	REFS	17					
151	GRO		REAL	ARRAY	POWELL	REFS	17					
5207	HGR		REAL	ARRAY	POWELL	REFS	17					
2676	HN		REAL	ARRAY	POWELL	REFS	17					
365	HO		REAL	ARRAY	POWELL	REFS	17					
120	I		INTEGER			REFS	3*32	DEFINED	31			
5254	ICN		INTEGER		POWELL	REFS	17					
5253	ICONV		INTEGER		POWELL	REFS	17					
0	ICYCLE		INTEGER		STRCLU	REFS	16					

```
      C (STORE JUMP-OFF POINT)                                          RILL       59
      C                                                                 RILL       60
   60 C   2 CONTINUE                                                   RILL       61
      C     NDS= NDS + 1                                                RILL       62
      C     M4 = 0                                                      RILL       63
      C     M3 = M3 + 1                                                 RILL       64
      C     WRITE(ITAPEW,410)                                           RILL       65
   65 C     WRITE(ITAPEN,410)                                           RILL       66
      C     DO 3 I= 1,NPARM                                             RILL       67
      C   3 XJ(I,NDS)= XO(I)                                           RILL       68
      C                                                                 RILL       69
      C ORDER COMPONENTS OF GRADIENT                                    RILL       70
   70 C TO GIVE LARGEST ABS VALUE FIRST                                 RILL       71
      C                                                                 RILL       72
      C     DO 4 I= 1,NPARM                                             RILL       73
      C   4 B(I)= ABS(GRN(I))                                           RILL       74
      C     N= -NPARM                                                   RILL       75
   75 C     CALL AORDER(B,N,IPERM,1)                                    RILL       76
      C     II= 0                                                       RILL       77
      C                                                                 RILL       78
      C DETERMINE NEXT LARGEST                                          RILL       79
      C UNCONSTRAINED COMPONENT                                         RILL       80
   80 C                                                                 RILL       81
      C   5 II= II+1                                                   RILL       82
      C     JJ= IPERM(II)                                               RILL       83
      C     IF(II .GT. NPARM) GO TO 10                                  RILL       84
      C     IF(CON(JJ,4) .LT. 0.0) GO TO 5                              RILL       85
   85 C                                                                 RILL       86
      C DELETE THIS COMPONENT AND THE CONSTRAINED COMPONENTS            RILL       87
      C FROM THE GRADIENT TO FORM THE DIRECT SEARCH DIRECTION           RILL       88
      C                                                                 RILL       89
      C     DO 6 I= 1,NPARM                                             RILL       90
   90 C     DELX(I)= 0.                                                 RILL       91
      C     IF(I .EQ. JJ) GO TO 6                                       RILL       92
      C     IF(CON(I,4) .LT. 0.0) GO TO 6                               RILL       93
      C     DELX(I)= -GRO(I)                                            RILL       94
      C   6 CONTINUE                                                   RILL       95
   95 C                                                                 RILL       96
      C MAKE A DIRECT SEARCH STEP                                       RILL       97
      C                                                                 RILL       98
      C     STEP= 1.0                                                   RILL       99
      C     CALL USTEP(STEP)                                            RILL      100
  100 C     INDEX= 1                                                    RILL      101
      C     CALL CONSTR(INDEX)                                          RILL      102
      C                                                                 RILL      103
      C IS NEW POINT A REPEAT OF                                        RILL      104
      C ANY PREVIOUS JUMP-OFF POINT                                     RILL      105
  105 C                                                                 RILL      106
      C     NN= NDS-1                                                   RILL      107
      C     DO 7 I= 1,NN                                                RILL      108
      C     DO 8 J= 1,NPARM                                             RILL      109
      C     X= XJ(J,I)                                                  RILL      110
  110 C     Y= XJ(I,NDS)                                                RILL      111
      C     IF(X .NE. Y) GO TO 7                                        RILL      112
      C   8 CONTINUE                                                   RILL      113
      C                                                                 RILL      114
      C RESTORE X AND GO BACK FOR ANOTHER DIRECTION                     RILL      115
```

```
      SUBROUTINE RILL                                                   RILL       2
C  ******************************************************             RILL       3
C  *       THE CALL TO RILL IN STRDES WITH THE          *             RILL       4
C  *       ARGUMENTS IN THE FOLLOWING STATEMENT         *             RILL       5
C  *       IS NOT VALID IN THE CURRENT VERSION          *             RILL       6
C  *       OF ESP.                                      *             RILL       7
C  ******************************************************             RILL       8
C     SUBROUTINE RILL (STEP,*,*)                                      RILL       9
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)  RILL      10
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)         RILL      11
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)              RILL      12
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)              RILL      13
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                      RILL      14
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                         RILL      15
     F      ,STRFDO(5,6),STRFDN(5,6)                                  RILL      16
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD    RILL      17
      COMMON/POWELL/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)  RILL      18
     1              ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICONV,ICN RILL      19
      DIMENSION XDEL(35)                                              RILL      20
CIBM                                                                  RILL      21
C     REAL*8 SUM                                                      RILL      22
CIBM                                                                  RILL      23
      COMMON/DIRECT/NDS,XJ(20,15)                                     RILL      24
      COMMON/CONS/CON(20,4)                                           RILL      25
      COMMON/CTAPES/ ITAPES                                           RILL      26
      DIMENSION B(20),IPERM(20),ITAPES(50)                            RILL      27
      ITAPEW = ITAPES(6)                                              RILL      28
      ITAPEN = ITAPES(40)                                             RILL      29
      CALL MESAGE(1,4,4HRILL)                                         RILL      30
      EPS = 1.0E-3                                                    RILL      31
      DO 1 I = 1, NPARM                                               RILL      32
    1 XDEL(I) = XN(I) - XO(I)                                         RILL      33
CCDC                                                                  RILL      34
      SUM = 0.0                                                       RILL      35
CCDC                                                                  RILL      36
CIBM                                                                  RILL      37
C     SUM = 0.D0                                                      RILL      38
CIBM                                                                  RILL      39
      G = SOSCAP(XDEL,XDEL,SUM,NPARM,1,1,1,1)                         RILL      40
      G = SQRT(G)                                                     RILL      41
C                                                                     RILL      42
C NEAR LOCAL MINIMUM                                                  RILL      43
C                                                                     RILL      44
      WRITE(ITAPEW,400)                                               RILL      45
      WRITE(ITAPEN,400)                                               RILL      46
      WRITE(ITAPEW,401) G                                             RILL      47
      WRITE(ITAPEN,401) G                                             RILL      48
      CALL MESAGE(2,4,4HRILL)                                         RILL      49
      STOP                                                            RILL      50
C  ******************************************************             RILL      51
C  *       THE FOLLOWING LINES OF CODE HAVE BEEN        *             RILL      52
C  *       COMMENTED OUT BECAUSE THEY CANNOT BE         *             RILL      53
C  *       REACHED IN THE CURRENT VERSION OF ESP.       *             RILL      54
C  ******************************************************             RILL      55
C     RETURN 2                                                        RILL      56
C                                                                     RILL      57
C DIRECT SEARCH TO BE TRIED                                           RILL      58
```

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
		210 Z (35)	245 HO (1225)	1470 HN (1225)			
		2695 HGR (35)	2730 NPARM (1)	2731 ICONV (1)			
		2732 ICN (1)					
CTAPES	50	0 ITAPES (50)					
MAX	1	0 MAXDIM (1)					
VSAVE	2	0 VNSAVE (1)	1 VOSAVE (1)				
NEWCON	51	0 JNEW (50)	50 NEWDIM (1)				
JGL	4505	0 JSET (50)	50 JDIM (1)	51 G (1750)			
		1801 LMK (2500)	4301 BCOEF (50)	4351 MSTAR (1)			
		4352 NOTJ (50)	4402 NOTDIM (1)	4403 LINDEP (50)			
		4453 LDDIM (1)	4454 NOTACT (50)	4504 NDIM (1)			
INCCOM	1802 ECS	0 GECS (1750)	1750 BCOECS (50)	1800 NPMECS (1)			
		1801 MSTRECS(1)					
STRCOM	5436 ECS	0 JSETECS(50)	50 JDIMECS(1)	51 LMKECS (2500)			
		2551 NOTJECS(50)	2601 NTDMECS(1)	2602 LNDECS (50)			
		2652 LDMECS (1)	2653 NOTTECS(50)	2703 ICNECS (1)			
		2704 NDIMECS(1)	2705 XOECS (35)	2740 XNECS (35)			
		2775 DELXECS(35)	2810 GROECS (35)	2845 GRNECS (35)			
		2880 DELGECS(35)	2915 ZECS (35)	2950 HOECS (1225)			
		4175 HNECS (1225)	5400 HGRECS (35)	5435 ICNVECS(1)			
KLUES	24	0 IDUM1 (16)	16 NCYC (1)	17 IDUM2 (7)			

STATISTICS

PROGRAM LENGTH	2204B	1156
CM LABELED COMMON LENGTH	17231B	7833
ECS LABELED COMMON LENGTH	16106B	7238

520008 CM USED

STATEMENT LABELS				DEF LINE	REFERENCES						
113	25			101	75						
342	75			196	129						
224	80			154	143	148	150				
352	100			204	160						
0	101		INACTIVE	208							
144	105			134	126	127					
1465	300	FMT	NO REFS	332							
1474	301	FMT		333	203						
1500	390	FMT		334	57	58					
1507	391	FMT		335	118	119					
1517	392	FMT		337	137	138					
1533	393	FMT		339	197	198					
1542	394	FMT	NO REFS	340							
1553	395	FMT		342	158	159	181	183	185	258	
1556	400	FMT		343	156	157	180				
1563	401	FMT		344	259						
1571	402	FMT		345	260						
1621	403	FMT	NO REFS	351							
1627	404	FMT	NO REFS	352							
1643	405	FMT		354	284	285					
1656	406	FMT		356	293	294					
1660	407	FMT		357	167	168					
1575	409	FMT		346	261						
1577	410	FMT		347	262	263	264	265	266	267	268
					271	272	273	274			
1602	411	FMT		348	182						
1607	412	FMT		349	184						
1614	413	FMT		350	257						
1670	9000	FMT		359	144	145					
1676	9001	FMT		360	146	147	152	153			

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
154	80	I	143 154	55B	EXT REFS NOT INNER
201	80	J	148 154	26B	EXT REFS
336	3	I	194 195	3B	INSTACK
356	11	I	213 248	116B	EXT REFS NOT INNER
400	13	J	220 228	13B	OPT
426	14	J	229 236	10B	OPT
451	15	J	237 244	10B	OPT
515		I	260 260	4B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)
		397 STRFDO (30)	427 STRFDN (30)	
STRCLU	10	0 ICYCLE (1)	1 ISTEP (1)	2 M1 (1)
		3 M2 (1)	4 M3 (1)	5 M4 (1)
		6 VS (1)	7 VOLD (1)	8 VNEW (1)
		9 STPOLD (1)		
POWELL	2733	0 XO (35)	35 XN (35)	70 DELX (35)
		105 GRO (35)	140 GRN (35)	175 DELG (35)

VARIABLES	SN	TYPE		RELOCATION								
					DEFINED	42						
10	VNEW	REAL		STRCLU	REFS	9	59					
1725	VNOW	REAL			REFS	246	DEFINED	60				
0	VNSAVE	REAL		VSAVE	REFS	14	60	113				
7	VOLD	REAL		STRCLU	REFS	9						
1	VOSAVE	REAL		VSAVE	REFS	14	113					
6	VS	REAL		STRCLU	REFS	9						
1724	VX	REAL			REFS	284	285	DEFINED	59			
43	XN	REAL	ARRAY	POWELL	REFS	10	89	185	195	258	317	
5264	XNECS	REAL	ARRAY	STRCOM	REFS	22	36	89	317			
2143	XNEW	REAL	ARRAY		REFS	33	246	DEFINED	219	227	235	243
0	XO	REAL	ARRAY	POWELL	REFS	10	88	183	316	DEFINED	195	
5221	XOECS	REAL	ARRAY	STRCOM	REFS	22	36	88	316			
322	Z	REAL	ARRAY	POWELL	REFS	10	94	322				
5543	ZECS	REAL	ARRAY	STRCOM	REFS	22	36	94	322			

FILE NAMES	MODE		
TAPE39	FMT	WRITES	246

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES							
CONSTR		2	202							
LINESR		1	136							
MESAGE		3	55	287						
MURT		1	174							
NRM2		3	155	175						
READEC		3	71	72	73	74	76	77	78	79	80
			81	82	83	84	85	86	87	88	89
			90	91	92	93	94	95	96	97	98
			99	100							
RILL		0	125							
TIMEB		2	286							
USTEP		1	205							
VSCALE		2	108	250						
WRITEC		3	304	305	306	307	308	309	310	311	312
			313	314	315	316	317	318	319	320	321
			322	323	324	325	326	327	328		

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
ABS	REAL	1	INTRIN	165
IABS	INTEGER	1	INTRIN	56

STATEMENT LABELS			DEF LINE	REFERENCES		
0	1	INACTIVE	113			
252	2		165	114		
0	3		195	194		
501	4		256	278		
633	5		279	275		
300	6		179	189		
333	7		190	186		
471	11		248	213	245	
365	12		220	215		
410	13		228	220	222	223
433	14		236	229	231	
456	15		244	237	239	
1701	16	FMT	361	246		
31	20		76	70		

VARIABLES	SN	TYPE		RELOCATION								
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	16	84	312				
3411	LMK	INTEGER	ARRAY	JGL	REFS	16	79	307				
63	LMKECS	INTEGER	ARRAY	STRCOM	REFS	22	36	79	307			
5052	LNDECS	INTEGER	ARRAY	STRCOM	REFS	22	36	84	312			
1737	LOOP	INTEGER			REFS	186	275	DEFINED	178	187	255	276
0	MAXDIM	INTEGER		MAX	REFS	13	DEFINED	54				
10377	MSTAR	INTEGER		JGL	REFS	16	73	81	309			
3411	MSTRECS	INTEGER		INCCOM	REFS	21	36	73	81	309		
2	M1	INTEGER		STRCLU	REFS	9	115	117	126	DEFINED	115	170
3	M2	INTEGER		STRCLU	REFS	9	117	125	DEFINED	117	172	
4	M3	INTEGER		STRCLU	REFS	9	DEFINED	173				
5	M4	INTEGER		STRCLU	REFS	9	171	172	173	DEFINED	116	171
20	NCYC	INTEGER		KLUES	REFS	27	70					
10630	NDIM	INTEGER		JGL	REFS	16	87	315				
5220	NDIMECS	INTEGER		STRCOM	REFS	22	36	87	315			
62	NEWDIM	INTEGER		NEWCON	REFS	15	DEFINED	135				
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	16	86	314				
10462	NOTDIM	INTEGER		JGL	REFS	16	83	311				
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	16	82	310				
4767	NOTJECS	INTEGER	ARRAY	STRCOM	REFS	22	36	82	310			
5135	NOTTECS	INTEGER	ARRAY	STRCOM	REFS	22	36	86	314			
5252	NPARM	INTEGER		POWELL	REFS	10	74	98	155	158	159	175
						181	183	185	194	258	326	
3410	NPMECS	INTEGER		INCCOM	REFS	21	36	74	98	326		
5051	NTDMECS	INTEGER		STRCOM	REFS	22	36	83	311			
0	NUMSTR	INTEGER		STORES	REFS	2	143	213	260	262	263	264
						265	266	267	268	269	270	271	272
						273	274					
362	SCALE	REAL	ARRAY	STORES	REFS	2	215	222	231	239		
1726	STEP	REAL			REFS	108	128	136	174	202	205	250
						284	285	288	DEFINED	106	128	169
11	STPOLD	REAL		STRCLU	REFS	9	106	DEFINED	288			
653	STRFDN	REAL	ARRAY	STORES	REFS	2						
615	STRFDO	REAL	ARRAY	STORES	REFS	2						
463	STRFI	REAL	ARRAY	STORES	REFS	2						
557	STRFN	REAL	ARRAY	STORES	REFS	2	243	269	270	271	272	273
						274						
521	STRFO	REAL	ARRAY	STORES	REFS	2						
305	STRIDN	REAL	ARRAY	STORES	REFS	2						
266	STRIDO	REAL	ARRAY	STORES	REFS	2	152	153				
122	STRII	REAL	ARRAY	STORES	REFS	2						
160	STRIN	REAL	ARRAY	STORES	REFS	2	227	263	264	265		
141	STRIO	REAL	ARRAY	STORES	REFS	2						
343	STRRDN	REAL	ARRAY	STORES	REFS	2						
324	STRRDO	REAL	ARRAY	STORES	REFS	2						
177	STRRI	REAL	ARRAY	STORES	REFS	2						
235	STRRN	REAL	ARRAY	STORES	REFS	2	235	266	267	268		
216	STRRO	REAL	ARRAY	STORES	REFS	2						
261	STRWDN	REAL	ARRAY	STORES	REFS	2						
254	STRWDO	REAL	ARRAY	STORES	REFS	2	146	147				
103	STRWI	REAL	ARRAY	STORES	REFS	2						
115	STRWN	REAL	ARRAY	STORES	REFS	2	219	262				
110	STRWO	REAL	ARRAY	STORES	REFS	2						
2125	TYPE	REAL	ARRAY		REFS	32	260	262	263	264	265	266
						267	268	269	270	271	272	273	274
					DEFINED	43						
1750	VAR	REAL	ARRAY		REFS	30	146	147	152	153		

VARIABLES	SN	TYPE		RELOCATION								
						158	159	181	183	185	2*195	215	219
						222	227	231	235	239	243	258	260
						262	263	264	265	266	267	268	269
						270	271	272	273	274	DEFINED	143	158
						159	181	183	185	194	213	258	260
						262	263	264	265	266	267	268	269
						270	271	272	273	274			
5254	ICN	INTEGER		POWELL	REFS	10	100	328	DEFINED	166			
5217	ICNECS	INTEGER		STRCOM	REFS	22	36	100	328				
12473	ICNVECS	INTEGER		STRCOM	REFS	22	36	99	327				
5253	ICONV	INTEGER		POWELL	REFS	10	99	127	327				
0	ICYCLE	INTEGER		STRCLU	REFS	9							
76	IDSTR	INTEGER	ARRAY	STORES	REFS	2	144	145					
0	IDUM1	INTEGER	ARRAY	KLUES	REFS	27							
21	IDUM2	INTEGER	ARRAY	KLUES	REFS	27							
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	2	150						
1727	INDEX	INTEGER			REFS	108	250	DEFINED	107	249			
2062	IPERM	INTEGER	*UNDEF		REFS	31							
1747	ISAVE *	INTEGER	*UNDEF		REFS	292							
1746	ISIZE *	INTEGER			DEFINED	292							
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	2							
1	ISTEP	INTEGER		STRCLU	REFS	9	56	202	246	289	290		
					DEFINED	289	290						
1723	ISTEP2	INTEGER			REFS	57	58	DEFINED	56				
1736	ITAP	INTEGER			DEFINED	177	188	254	277	I/O REFS	180	181	
						182	183	184	185	257	258	259	260
						261	262	263	264	265	266	267	268
						269	270	271	272	273	274		
1722	ITAPEN	INTEGER			REFS	188	277	DEFINED	48	I/O REFS	58	119	
						138	145	147	153	157	158	168	198
						285	294						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	12	31	47	48				
1721	ITAPEW	INTEGER			REFS	177	254	DEFINED	47	I/O REFS	57	118	
						137	144	146	152	156	159	167	197
						203	284	293					
1745	ITESTN *	INTEGER	*UNDEF		REFS	291							
1744	ITESTO *	INTEGER			DEFINED	291							
1732	J	INTEGER			REFS	149	151	152	153	221	223	227	
						230	235	238	243	246	DEFINED	148	220
						229	237	246					
62	JDIM	INTEGER		JGL	REFS	16	77	246	305				
62	JDIMECS	INTEGER		STRCOM	REFS	22	36	77	305				
1741	JJ	INTEGER			REFS	222	231	239	DEFINED	221	230	238	
0	JNEW	INTEGER	ARRAY	NEWCON	REFS	15							
0	JSET	INTEGER	ARRAY	JGL	REFS	16	76	246	304				
0	JSETECS	INTEGER	ARRAY	STRCOM	REFS	22	36	76	304				
1733	K	INTEGER			REFS	150	152	153	216	218	224	226	
						232	234	240	242	DEFINED	149	151	212
						216	224	232	240				
1	KCONST	INTEGER		STORES	REFS	2	223						
1740	KK	INTEGER			REFS	217	218	219	[illegible]	226	227	233	
						234	235	241	242	[illegible]	245		
					DEFINED	214	217	225	233	241			
1742	K1	INTEGER			REFS	246	DEFINED	246					
1743	K2	INTEGER			REFS	246	DEFINED	246					
10545	LDDIM	INTEGER		JGL	REFS	16	85	313					
5134	LDMECS	INTEGER		STRCOM	REFS	22	36	85	313				

```
                400 FORMAT(1HO,5X,22HSCALED DERIVATIVES ARE)                          STRDES   344
                401 FORMAT(////,6X,32H***** NEW STORE PARAMETERS *****,/)             STRDES   345
    345         402 FORMAT(2X,A4,5(10H STORE NO.,I2,1X))                              STRDES   346
                409 FORMAT(1HO)                                                       STRDES   347
                410 FORMAT(2X,A4,5(1PE12.5,1X))                                       STRDES   348
                411 FORMAT(1HO,5X,29HPREVIOUS SCALED VARIABLES ARE )                  STRDES   349
                412 FORMAT(1HO,5X,28HPRESENT SCALED VARIABLES ARE  )                  STRDES   350
    350         413 FORMAT(1H1,5X,24HNEW SCALED VARIABLES ARE      )                  STRDES   351
                403 FORMAT(1H ,//3X,I4,5X,1PE12.5,2X,E12.5,2X,E12.5,2X,E12.5)         STRDES   352
                404 FORMAT(1H ,13X,38HA CONSTRAINED MINIMUM HAS BEEN REACHED,         STRDES   353
                   1//11X,43HTHE FINAL STORE PARAMETERS ARE LISTED BELOW,///)         STRDES   354
                405 FORMAT(1H ,//10X,25H CURRENT STEP SIZE =      ,0P1F10.3,         STRDES   355
    355            1//10X,25H CURRENT FLUTTER SPEED = ,0P1F10.3,8H   KNOTS)          STRDES   356
                406 FORMAT(1H1)                                                       STRDES   357
                407 FORMAT(1HO,10X,40HTHE FLUTTER SPEED HAS BEEN DECREASED BY ,F10.4, STRDES   358
                   17H KNOTS.)                                                        STRDES   359
               9000 FORMAT(///,10X, 28HDERIVATIVES FOR STORE NUMBER,I4)               STRDES   360
    360        9001 FORMAT(/,10X,A4,2X,1PE15.5)                                       STRDES   361
                 16 FORMAT(1X,I2,F6.1,1P6E10.3,5I2)                                   STRDES   362
                    END                                                               STRDES   363
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
1	STRDES	1	331

VARIABLES	SN	TYPE	RELOCATION									
1754	A	REAL	*UNDEF		REFS	31						
2017	B	REAL	*UNDEF		REFS	31						
3326	BCOECS	REAL	ARRAY	INCCOM	REFS	21	36	72	80	308		
10315	BCOEF	REAL	ARRAY	JGL	REFS	16	72	80	308			
257	DELG	REAL	ARRAY	POWELL	REFS	10	93	321				
5500	DELGECS	REAL	ARRAY	STRCOM	REFS	22	36	93	321			
1730	DELTAV	REAL			REFS	114	118	119	165	DEFINED	113	
1735	DELV	REAL			REFS	167	168	DEFINED	165			
106	DELX	REAL	ARRAY	POWELL	REFS	10	90	318				
5327	DELXECS	REAL	ARRAY	STRCOM	REFS	22	36	90	318			
63	G	REAL	ARRAY	JGL	REFS	16	71	78	306			
0	GECS	REAL	ARRAY	INCCOM	REFS	21	36	71	78	306		
2160	GNEW	REAL	ARRAY		REFS	33	DEFINED	218	226	234	242	
1734	GR	REAL			REFS	155	175	197	198			
214	GRN	REAL	ARRAY	POWELL	REFS	10	92	175	181	218	226	234
						242	246	320				
5435	GRNECS	REAL	ARRAY	STRCOM	REFS	22	36	92	320			
151	GRO	REAL	ARRAY	POWELL	REFS	10	91	155	158	159	319	
5372	GROECS	REAL	ARRAY	STRCOM	REFS	22	36	91	319			
5207	HGR	REAL	ARRAY	POWELL	REFS	10	97	325				
12430	HGRECS	REAL	ARRAY	STRCOM	REFS	22	36	97	325			
2676	HN	REAL	ARRAY	POWELL	REFS	10	96	324				
10117	HNECS	REAL	ARRAY	STRCOM	REFS	22	36	96	324			
365	HO	REAL	ARRAY	POWELL	REFS	10	95	323				
5606	HOECS	REAL	ARRAY	STRCOM	REFS	22	36	95	323			
1731	I	INTEGER			REFS	144	145	146	147	150	152	153

```
                CALL TIMEB(10,11HFROM STRDES)                                   STRDES   287
                CALL MESAGE(2,6,6HSTRDES)                                       STRDES   288
                STPOLD= STEP                                                    STRDES   289
                IF(ISTEP EQ 0) ISTEP=1                                          STRDES   290
290             ISTEP = ISTEP + 1                                               STRDES   291
                ITESTO = ITESTN                                                 STRDES   292
                ISIZE = ISAVE                                                   STRDES   293
                WRITE(ITAPEW,406)                                               STRDES   294
                WRITE(ITAPEN,406)                                               STRDES   295
295         C                                                                   STRDES   296
            CIBM                                                                STRDES   297
            C       WRITE (ITAPJP) JSET,JDIM,G,LMK,BCOEF,MSTAR,NOTJ,NOTDIM,LINDEP,  STRDES   298
            C      1               LDDIM,NOTACT,NDIM,XO,XN,DELX,GRO,GRN,DELG,Z,HO,  STRDES   299
            C      2               HN,HGR,NPARM,ICONV,ICN                       STRDES   300
300         C       REWIND ITAPJP                                               STRDES   301
            CIBM                                                                STRDES   302
            C                                                                   STRDES   303
            CCDC                                                                STRDES   304
                CALL WRITEC(JSET(1),JSETECS(1),50)                              STRDES   305
305             CALL WRITEC(JDIM,JDIMECS,1)                                     STRDES   306
                CALL WRITEC(G(1,1),GECS(1,1),1750)                              STRDES   307
                CALL WRITEC(LMK(1,1),LMKECS(1,1),2500)                          STRDES   308
                CALL WRITEC(BCOEF(1),BCOECS(1),50)                              STRDES   309
                CALL WRITEC(MSTAR,MSTRECS,1)                                    STRDES   310
310             CALL WRITEC(NOTJ(1),NOTJECS(1),50)                              STRDES   311
                CALL WRITEC(NOTDIM,NTDMECS,1)                                   STRDES   312
                CALL WRITEC(LINDEP(1),LNDECS(1),50)                             STRDES   313
                CALL WRITEC(LDDIM,LDMECS,1)                                     STRDES   314
                CALL WRITEC(NOTACT(1),NOTTECS(1),50)                            STRDES   315
315             CALL WRITEC(NDIM,NDIMECS,1)                                     STRDES   316
                CALL WRITEC(XO(1),XOECS(1),35)                                  STRDES   317
                CALL WRITEC(XN(1),XNECS(1),35)                                  STRDES   318
                CALL WRITEC(DELX(1),DELXECS(1),35)                              STRDES   319
                CALL WRITEC(GRO(1),GROECS(1),35)                                STRDES   320
320             CALL WRITEC(GRN(1),GRNECS(1),35)                                STRDES   321
                CALL WRITEC(DELG(1),DELGECS(1),35)                              STRDES   322
                CALL WRITEC(Z(1),ZECS(1),35)                                    STRDES   323
                CALL WRITEC(HO(1,1),HOECS(1,1),1225)                            STRDES   324
                CALL WRITEC(HN(1,1),HNECS(1,1),1225)                            STRDES   325
325             CALL WRITEC(HGR(1),HGRECS(1),35)                                STRDES   326
                CALL WRITEC(NPARM,NPMECS,1)                                     STRDES   327
                CALL WRITEC(ICONV,ICNVECS,1)                                    STRDES   328
                CALL WRITEC(ICN,ICNECS,1)                                       STRDES   329
            CCDC                                                                STRDES   330
330         C                                                                   STRDES   331
                RETURN                                                          STRDES   332
              300 FORMAT(1HO,10X,43HEXPECTED DELV GT ZERO.  GRAD MOVE ATTEMPTED )  STRDES   333
              301 FORMAT(1HO,10X,14HLEAVING CONSTR)                             STRDES   334
              390 FORMAT(1H1,//11X,39HSTORE PARAMETERS FOR REDESIGN CYCLE NO.,I4)  STRDES   335
335           391 FORMAT(1HO,10X,40HTHE FLUTTER SPEED HAS BEEN INCREASED BY ,F10.4,  STRDES   336
                 17H KNOTS.)                                                    STRDES   337
              392 FORMAT(1HO,10X,33HTHE PREVIOUS STEP SIZE IS REDUCED,          STRDES   338
                 1//10X,53HAND THE PREVIOUS DERIVATIVES ARE USED FOR THIS CYCLE )  STRDES   339
              393 FORMAT(1HO,10X,33HNORM OF SCALED GRADIENT VECTOR = ,1P1E15.4)  STRDES   340
340           394 FORMAT(1HO,10X,52HNORM OF SCALED INCREMENTAL STORE PARAMETER VECTO  STRDES   341
                 1R = ,1P1E15.4)                                                STRDES   342
              395 FORMAT (5(2X,1PE12.5))                                        STRDES   343
```

```
                  DO 14 J= 1,3                                                  STRDES   230
230               JJ=J+4                                                        STRDES   231
                  IF(SCALE(I,JJ)  EQ. 0.) GO TO 14                              STRDES   232
                  K=K+1                                                         STRDES   233
                  KK=KK+1                                                       STRDES   234
                  GNEW(KK)= GRN(K)                                              STRDES   235
235               XNEW(KK)= STRRN(I,J)                                          STRDES   236
                14 CONTINUE                                                     STRDES   237
                  DO 15 J=1,6                                                   STRDES   238
                  JJ=J+7                                                        STRDES   239
                  IF(SCALE(I,JJ)  EQ  0 ) GO TO 15                              STRDES   240
240               K=K+1                                                         STRDES   241
                  KK=KK+1                                                       STRDES   242
                  GNEW(KK)= GRN(K)                                              STRDES   243
                  XNEW(KK)= STRFN(I,J)                                          STRDES   244
                15 CONTINUE                                                     STRDES   245
245               IF(KK EQ 0) GO TO 11                                          STRDES   246
                  WRITE(39,16) ISTEP,VNOW,(XNEW(J),J=1,3),(GRN(K1),K1=1,3)      STRDES   247
                 1             ,(JSET(K2),K2=1,JDIM)                          STRDES   248
                11 CONTINUE                                                     STRDES   249
                  INDEX= 2                                                      STRDES   250
250               CALL VSCALE(INDEX,STEP)                                       STRDES   251
          C                                                                     STRDES   252
          C LIST NEW STORE PARAMETERS                                           STRDES   253
          C                                                                     STRDES   254
                ITAP=ITAPEW                                                     STRDES   255
255             LOOP=1                                                          STRDES   256
                4 CONTINUE                                                      STRDES   257
                  WRITE(ITAP,413)                                               STRDES   258
                  WRITE(ITAP,395) (XN(I), I=1,NPARM)                            STRDES   259
                  WRITE(ITAP,401)                                               STRDES   260
260               WRITE(ITAP,402) TYPE(1), (I          , I=1,NUMSTR)            STRDES   261
                  WRITE(ITAP,409)                                               STRDES   262
                  WRITE(ITAP,410) TYPE(2), (STRWN(I)   , I=1,NUMSTR)            STRDES   263
                  WRITE(ITAP,410) TYPE(3), (STRIN(I,1), I=1,NUMSTR)             STRDES   264
                  WRITE(ITAP,410) TYPE(4), (STRIN(I,2), I=1,NUMSTR)             STRDES   265
265               WRITE(ITAP,410) TYPE(5), (STRIN(I,3), I=1,NUMSTR)             STRDES   266
                  WRITE(ITAP,410) TYPE(6), (STRRN(I,1), I=1,NUMSTR)             STRDES   267
                  WRITE(ITAP,410) TYPE(7), (STRRN(I,2), I=1,NUMSTR)             STRDES   268
                  WRITE(ITAP,410) TYPE(8), (STRRN(I,3), I=1,NUMSTR)             STRDES   269
                  WRITE(ITAP,410) TYPE(9), (STRFN(I,1), I=1,NUMSTR)             STRDES   270
270               WRITE(ITAP,410) TYPE(10), (STRFN(I,2), I=1,NUMSTR)            STRDES   271
                  WRITE(ITAP,410) TYPE(11), (STRFN(I,3), I=1,NUMSTR)            STRDES   272
                  WRITE(ITAP,410) TYPE(12), (STRFN(I,4), I=1,NUMSTR)            STRDES   273
                  WRITE(ITAP,410) TYPE(13), (STRFN(I,5), I=1,NUMSTR)            STRDES   274
                  WRITE(ITAP,410) TYPE(14), (STRFN(I,6), I=1,NUMSTR)            STRDES   275
275               IF(LOOP  GT  1) GO TO 5                                       STRDES   276
                  LOOP=2                                                        STRDES   277
                  ITAP=ITAPEN                                                   STRDES   278
                  GO TO 4                                                       STRDES   279
                5 CONTINUE                                                      STRDES   280
280       C                                                                     STRDES   281
          C                                                                     STRDES   282
          C     SET ICYCLE TO NEGATIVE VALUE TO EXIT FROM AVAM-AFAM-AFOM LOOP.  STRDES   283
          C                                                                     STRDES   284
                WRITE(ITAPEW,405) STEP,VX                                       STRDES   285
285             WRITE(ITAPEN,405) STEP,VX                                       STRDES   286
```

```
                IF(M4.GE.2) M2= 0                                       STRDES   173
                IF(M4.GE.2) M3= 0                                       STRDES   174
                CALL MURT(STEP)                                         STRDES   175
175             CALL NRM2(GRN,GR,NPARM)                                 STRDES   176
              C                                                         STRDES   177
                ITAP=ITAPEW                                             STRDES   178
                LOOP=1                                                  STRDES   179
              6 CONTINUE                                                STRDES   180
180             WRITE(ITAP,400)                                         STRDES   181
                WRITE(ITAP,395) (GRN(I),I=1,NPARM)                      STRDES   182
                WRITE(ITAP,411)                                         STRDES   183
                WRITE(ITAP,395) (XO(I), I=1,NPARM)                      STRDES   184
                WRITE(ITAP,412)                                         STRDES   185
185             WRITE(ITAP,395) (XN(I), I=1,NPARM)                      STRDES   186
                IF(LOOP.GT.1) GO TO 7                                   STRDES   187
                LOOP=2                                                  STRDES   188
                ITAP=ITAPEN                                             STRDES   189
                GO TO 6                                                 STRDES   190
190           7 CONTINUE                                                STRDES   191
              C                                                         STRDES   192
              C RESET XOLD BEFORE TAKING STEP                           STRDES   193
              C                                                         STRDES   194
                DO 3 I= 1,NPARM                                         STRDES   195
195           3 XO(I)= XN(I)                                            STRDES   196
              75 CONTINUE                                               STRDES   197
                WRITE(ITAPEW,393) GR                                    STRDES   198
                WRITE(ITAPEN,393) GR                                    STRDES   199
              C                                                         STRDES   200
200           C     CALL CONSTR TO APPLY CONSTRAINTS TO STEP            STRDES   201
              C                                                         STRDES   202
                CALL CONSTR(ISTEP,STEP)                                 STRDES   203
                WRITE(ITAPEW,301)                                       STRDES   204
              100 CONTINUE                                              STRDES   205
205             CALL USTEP(STEP)                                        STRDES   206
              C UNLOAD VECTORS                                          STRDES   207
              C                                                         STRDES   208
              101 CONTINUE                                              STRDES   209
              C                                                         STRDES   210
210           C SET-UP AND PRINT CONDENSED OUTPUT                       STRDES   211
              C                                                         STRDES   212
                K=0                                                     STRDES   213
                DO 11 I= 1,NUMSTR                                       STRDES   214
                KK=0                                                    STRDES   215
215             IF(SCALE(I,1) .EQ. 0.) GO TO 12                         STRDES   216
                K=K+1                                                   STRDES   217
                KK=KK+1                                                 STRDES   218
                GNEW(KK)= GRN(K)                                        STRDES   219
                XNEW(KK)= STRWN(I)                                      STRDES   220
220           12 DO 13 J= 1,3                                           STRDES   221
                JJ=J+1                                                  STRDES   222
                IF(SCALE(I,JJ) .EQ. 0.) GO TO 13                        STRDES   223
                IF(J.EQ.3 .AND. KCONST.EQ.0) GO TO 13                   STRDES   224
                K=K+1                                                   STRDES   225
225             KK=KK+1                                                 STRDES   226
                GNEW(KK)= GRN(K)                                        STRDES   227
                XNEW(KK)= STRIN(I,J)                                    STRDES   228
              13 CONTINUE                                               STRDES   229
```

```
115                M1= M1 + 1                                              STRDES    116
                   M4= 0                                                   STRDES    117
                   IF(M1 GE.3) M2= M2 + 1                                  STRDES    118
                   WRITE(ITAPEW,391) DELTAV                                STRDES    119
                   WRITE(ITAPEN,391) DELTAV                                STRDES    120
120          C  ***************************************************        STRDES    121
             C  *       THE FOLLOWING CALL IS NOT VALID WITH THE      *     STRDES    122
             C  *       CURRENT VERSION OF OF ESP.                    *     STRDES    123
             C  ***************************************************        STRDES    124
             C     IF(M2.GT.0) CALL RILL(STEP,&101,&105)                    STRDES    125
125                IF(M2.GT.0) CALL RILL                                   STRDES    126
                   IF(M1.EQ.1) GO TO 105                                   STRDES    127
                   IF(ICONV.NE.1) GO TO 105                                STRDES    128
                   STEP= STEP/2.                                           STRDES    129
                   GO TO 75                                                STRDES    130
130          C                                                             STRDES    131
             C LINE-SEARCH MUST BE DONE                                    STRDES    132
             C AND NEWDIM MUST BE RESET TO ZERO                            STRDES    133
             C                                                             STRDES    134
               105 CONTINUE                                                STRDES    135
135                NEWDIM = 0                                              STRDES    136
                   CALL LINESR(STEP)                                       STRDES    137
                   WRITE(ITAPEW,392)                                       STRDES    138
                   WRITE(ITAPEN,392)                                       STRDES    139
             C                                                             STRDES    140
140          C LIST OLD DERIVATIVES OF STORE VARIABLES                      STRDES    141
             C WHEN FLUTTER SPEED INCREASES.                               STRDES    142
             C                                                             STRDES    143
                   DO 80 I = 1,NUMSTR                                      STRDES    144
                   WRITE(ITAPEW,9000) IDSTR(I)                             STRDES    145
145                WRITE(ITAPEN,9000) IDSTR(I)                             STRDES    146
                   WRITE(ITAPEW,9001) VAR(1),STRWDO(I)                     STRDES    147
                   WRITE(ITAPEN,9001) VAR(1),STRWDO(I)                     STRDES    148
                   DO 80 J=1,3                                             STRDES    149
                   K=J+3                                                   STRDES    150
150                IF(IDYDOF(I,K).EQ.0) GO TO 80                           STRDES    151
                   K=J+1                                                   STRDES    152
                   WRITE(ITAPEW,9001) VAR(K),STRIDO(I,J)                   STRDES    153
                   WRITE(ITAPEN,9001) VAR(K),STRIDO(I,J)                   STRDES    154
                80 CONTINUE                                                STRDES    155
155                CALL NRM2(GRO,GR,NPARM)                                 STRDES    156
                   WRITE(ITAPEW,400)                                       STRDES    157
                   WRITE(ITAPEN,400)                                       STRDES    158
                   WRITE(ITAPEN,395) (GRO(I),I=1,NPARM)                    STRDES    159
                   WRITE(ITAPEW,395) (GRO(I),I=1,NPARM)                    STRDES    160
160                GO TO 100                                               STRDES    161
             C                                                             STRDES    162
             C DETERMINE NEW HESSIAN                                       STRDES    163
             C AND NEW SEARCH DIRECTION                                    STRDES    164
             C                                                             STRDES    165
165              2 DELV= ABS(DELTAV)                                       STRDES    166
                   ICN= 0                                                  STRDES    167
                   WRITE(ITAPEW,407) DELV                                  STRDES    168
                   WRITE(ITAPEN,407) DELV                                  STRDES    169
                   STEP= 1.0                                               STRDES    170
170                M1= 0                                                   STRDES    171
                   M4= M4 + 1                                              STRDES    172
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                WRITE(ITAPEN,390) ISTEP2                                        STRDES     59
                VX= VNEW                                                        STRDES     60
60              VNOW = VNSAVE                                                   STRDES     61
          C                                                                     STRDES     62
          CIBM                                                                  STRDES     63
          C     READ (ITAPJP) JSET,JDIM,G,LMK,BCOEF,MSTAR,NOTJ,NOTDIM,LINDEP,  STRDES     64
          C    1              LDDIM,NOTACT,NDIM,XO,XN,DELX,GRO,GRN,DELG,Z,HO,   STRDES     65
65        C    2              HN,HGR,NPARM,ICONV,ICN                           STRDES     66
          C     REWIND ITAPJP                                                   STRDES     67
          CIBM                                                                  STRDES     68
          C                                                                     STRDES     69
          CCDC                                                                  STRDES     70
70              IF (NCYC.NE.O)  GO TO 20                                        STRDES     71
                CALL READEC(G(1,1),GECS(1,1),1750)                              STRDES     72
                CALL READEC(BCOEF(1),BCOECS(1),50)                              STRDES     73
                CALL READEC(MSTAR,MSTRECS,1)                                    STRDES     74
                CALL READEC(NPARM,NPMECS,1)                                     STRDES     75
75              GO TO 25                                                        STRDES     76
             20 CALL READEC(JSET(1),JSETECS(1),50)                              STRDES     77
                CALL READEC(JDIM,JDIMECS,1)                                     STRDES     78
                CALL READEC(G(1,1),GECS(1,1),1750)                              STRDES     79
                CALL READEC(LMK(1,1),LMKECS(1,1),2500)                          STRDES     80
80              CALL READEC(BCOEF(1),BCOECS(1),50)                              STRDES     81
                CALL READEC(MSTAR,MSTRECS,1)                                    STRDES     82
                CALL READEC(NOTJ(1),NOTJECS(1),50)                              STRDES     83
                CALL READEC(NOTDIM,NTDMECS,1)                                   STRDES     84
                CALL READEC(LINDEP(1),LNDECS(1),50)                             STRDES     85
85              CALL READEC(LDDIM,LDMECS,1)                                     STRDES     86
                CALL READEC(NOTACT(1),NOTTECS(1),50)                            STRDES     87
                CALL READEC(NDIM,NDIMECS,1)                                     STRDES     88
                CALL READEC(XO(1),XOECS(1),35)                                  STRDES     89
                CALL READEC(XN(1),XNECS(1),35)                                  STRDES     90
90              CALL READEC(DELX(1),DELXECS(1),35)                              STRDES     91
                CALL READEC(GRO(1),GROECS(1),35)                                STRDES     92
                CALL READEC(GRN(1),GRNECS(1),35)                                STRDES     93
                CALL READEC(DELG(1),DELGECS(1),35)                              STRDES     94
                CALL READEC(Z(1),ZECS(1),35)                                    STRDES     95
95              CALL READEC(HO(1,1),HOECS(1,1),1225)                            STRDES     96
                CALL READEC(HN(1,1),HNECS(1,1),1225)                            STRDES     97
                CALL READEC(HGR(1),HGRECS(1),35)                                STRDES     98
                CALL READEC(NPARM,NPMECS,1)                                     STRDES     99
                CALL READEC(ICONV,ICNVECS,1)                                    STRDES    100
100             CALL READEC(ICN,ICNECS,1)                                       STRDES    101
             25 CONTINUE                                                        STRDES    102
          CCDC                                                                  STRDES    103
          C                                                                     STRDES    104
          C DIRECTS STORE SEARCH - MURTAGH / SARGENT METHOD                     STRDES    105
105       C                                                                     STRDES    106
                STEP=STPOLD                                                     STRDES    107
                INDEX= 1                                                        STRDES    108
                CALL VSCALE(INDEX,STEP)                                         STRDES    109
          C                                                                     STRDES    110
110       C TEST FOR OVERSHOOT AND                                              STRDES    111
          C PROXIMITY TO DISCONTINUITIES                                        STRDES    112
          C                                                                     STRDES    113
              1 DELTAV= (VNSAVE - VOSAVE)                                       STRDES    114
                IF(DELTAV.LE.O.O) GO TO 2                                       STRDES    115
```

VARIABLES	SN	TYPE		RELOCATION						
76	IDSTR	INTEGER	ARRAY	STORES	REFS	9				
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	9				
212	IPERM	INTEGER	*UNDEF		REFS	26				
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	9				
1	ISTEP	INTEGER		STRCLU	REFS	16				
116	ITAPEN	INTEGER			DEFINED	28	I/O REFS	45	47	
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	25	26	27	28	
115	ITAPEW	INTEGER			DEFINED	27	I/O REFS	44	46	
1	KCONST	INTEGER		STORES	REFS	9				
2	M1	INTEGER		STRCLU	REFS	16				
3	M2	INTEGER		STRCLU	REFS	16				
4	M3	INTEGER		STRCLU	REFS	16				
5	M4	INTEGER		STRCLU	REFS	16				
0	NDS	INTEGER		DIRECT	REFS	23				
5252	NPARM	INTEGER		POWELL	REFS	17	31	39		
0	NUMSTR	INTEGER		STORES	REFS	9				
362	SCALE	REAL	ARRAY	STORES	REFS	9				
11	STPOLD	REAL		STRCLU	REFS	16				
653	STRFDN	REAL	ARRAY	STORES	REFS	9				
615	STRFDO	REAL	ARRAY	STORES	REFS	9				
463	STRFI	REAL	ARRAY	STORES	REFS	9				
557	STRFN	REAL	ARRAY	STORES	REFS	9				
521	STRFO	REAL	ARRAY	STORES	REFS	9				
305	STRIDN	REAL	ARRAY	STORES	REFS	9				
266	STRIDO	REAL	ARRAY	STORES	REFS	9				
122	STRII	REAL	ARRAY	STORES	REFS	9				
160	STRIN	REAL	ARRAY	STORES	REFS	9				
141	STRIO	REAL	ARRAY	STORES	REFS	9				
343	STRRDN	REAL	ARRAY	STORES	REFS	9				
324	STRRDO	REAL	ARRAY	STORES	REFS	9				
177	STRRI	REAL	ARRAY	STORES	REFS	9				
235	STRRN	REAL	ARRAY	STORES	REFS	9				
216	STRRO	REAL	ARRAY	STORES	REFS	9				
261	STRWDN	REAL	ARRAY	STORES	REFS	9				
254	STRWDO	REAL	ARRAY	STORES	REFS	9				
103	STRWI	REAL	ARRAY	STORES	REFS	9				
115	STRWN	REAL	ARRAY	STORES	REFS	9				
110	STRWO	REAL	ARRAY	STORES	REFS	9				
121	SUM	REAL			REFS	39	DEFINED	34		
10	VNEW	REAL		STRCLU	REFS	16				
7	VOLD	REAL		STRCLU	REFS	16				
6	VS	REAL		STRCLU	REFS	16				
123	XDEL	REAL	ARRAY		REFS	19	2*39	DEFINED	32	
1	XJ	REAL	ARRAY	DIRECT	REFS	23				
43	XN	REAL	ARRAY	POWELL	REFS	17	32			
0	XO	REAL	ARRAY	POWELL	REFS	17	32			
322	Z	REAL	ARRAY	POWELL	REFS	17				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
MESAGE		3	29	48
SOSCAP	REAL	8	39	
SQRT	REAL	1 LIBRARY	40	

STATEMENT LABELS			DEF LINE	REFERENCES	
0	1		32	31	
74	400	FMT	136	44	45

STATEMENT LABELS

			DEF LINE	REFERENCES	
102	401	FMT	137	46	47

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	1	I	31 32	3B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)			
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)			
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)			
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)			
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)			
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)			
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)			
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)			
		397 STRFDO (30)	427 STRFDN (30)				
STRCLU	10	0 ICYCLE (1)	1 ISTEP (1)	2 M1 (1)			
		3 M2 (1)	4 M3 (1)	5 M4 (1)			
		6 VS (1)	7 VOLD (1)	8 VNEW (1)			
		9 STPOLD (1)					
POWELL	2733	0 XO (35)	35 XN (35)	70 DELX (35)			
		105 GRO (35)	140 GRN (35)	175 DELG (35)			
		210 Z (35)	245 HO (1225)	1470 HN (1225)			
		2695 HGR (35)	2730 NPARM (1)	2731 ICONV (1)			
		2732 ICN (1)					
DIRECT	301	0 NDS (1)	1 XJ (300)				
CONS	80	0 CON (80)					
CTAPES	50	0 ITAPES (50)					

STATISTICS

PROGRAM LENGTH	242B	162
CM LABELED COMMON LENGTH	70578	3631
52000B CM USED		

```
      SUBROUTINE VSCALE(INDEX,STEP)                                          VSCALE     2
CIBM                                                                         VSCALE     3
C     REAL*8 SUM                                                             VSCALE     4
CIBM                                                                         VSCALE     5
      COMMON/CTAPES/ ITAPES                                                  VSCALE     6
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)         VSCALE     7
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)                VSCALE     8
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)                     VSCALE     9
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)                     VSCALE    10
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                             VSCALE    11
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                                VSCALE    12
     F      ,STRFDO(5,6),STRFDN(5,6)                                         VSCALE    13
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD           VSCALE    14
      COMMON/POWELL/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)         VSCALE    15
     1               ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICONV,ICN      VSCALE    16
      DIMENSION ITAPES(50)                                                   VSCALE    17
      DIMENSION A(35),B(35),C(35),IPERM(35)                                  VSCALE    18
C                                                                            VSCALE    19
C PUTS VARIABLES AND DERIVATIVES                                             VSCALE    20
C INTO VECTOR FORM AND SCALES THEM                                           VSCALE    21
C                                                                            VSCALE    22
      ITAPER= ITAPES(5)                                                      VSCALE    23
      ITAPEW= ITAPES(6)                                                      VSCALE    24
      ITAPEN = ITAPES( 40 )                                                  VSCALE    25
      ITAPEP = ITAPES(48)                                                    VSCALE    26
C                                                                            VSCALE    27
CCDC                                                                         VSCALE    28
      ITAPEI = ITAPES(47)                                                    VSCALE    29
CCDC                                                                         VSCALE    30
C                                                                            VSCALE    31
      CALL MESAGE(1,6,6HVSCALE)                                              VSCALE    32
      IF(INDEX.GT.1) GO TO 20                                                VSCALE    33
      IF(ISTEP.GT.1) GO TO 10                                                VSCALE    34
C                                                                            VSCALE    35
C INITIAL SET-UP OF VECTORS, CONSTRAINTS AND INVERSE HESSIAN                 VSCALE    36
C                                                                            VSCALE    37
      NDS= 1                                                                 VSCALE    38
      K= 0                                                                   VSCALE    39
      ICN= 0                                                                 VSCALE    40
      DO 1 I= 1,NUMSTR                                                       VSCALE    41
      IF(SCALE(I,1).EQ.0.) GO TO 2                                           VSCALE    42
      K= K + 1                                                               VSCALE    43
      XO(K) = STRWI(I)/SCALE(I,1)                                            VSCALE    44
      XN(K)=  XO(K)                                                          VSCALE    45
      DELX(K)= 0.                                                            VSCALE    46
      GRN(K)= STRWDN(I)*SCALE(I,1)/VS                                        VSCALE    47
      GRO(K)= 0.                                                             VSCALE    48
      DELG(K)= GRN(K)                                                        VSCALE    49
    2 DO 3 J= 1,3                                                            VSCALE    50
      JJ= J + 1                                                              VSCALE    51
      IF(SCALE(I,JJ).EQ.0.) GO TO 3                                          VSCALE    52
      IF(J.EQ.3 .AND. KCONST.EQ.0) GO TO 3                                   VSCALE    53
      K= K + 1                                                               VSCALE    54
      XO(K)= STRII(I,J)/SCALE(I,JJ)                                          VSCALE    55
      XN(K)= XO(K)                                                           VSCALE    56
      DELX(K)= 0.                                                            VSCALE    57
      GRN(K)= STRIDN(I,J)*SCALE(I,JJ)/VS                                     VSCALE    58
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                  GRO(K)= 0.                                                VSCALE     59
                  DELG(K)= GRN(K)                                           VSCALE     60
60              3 CONTINUE                                                  VSCALE     61
                  DO 15 J= 1,3                                              VSCALE     62
                  JJ= J+4                                                   VSCALE     63
                  IF(SCALE(I,JJ) .EQ. 0.) GO TO 15                          VSCALE     64
                  K= K+1                                                    VSCALE     65
65                XO(K) = STRRI(I,J)/SCALE(I,JJ)                            VSCALE     66
                  XN(K) = XO(K)                                             VSCALE     67
                  DELX(K)= 0.                                               VSCALE     68
                  GRN(K)= STRRDN(I,J)*SCALE(I,JJ)/VS                        VSCALE     69
                  GRO(K)= 0.                                                VSCALE     70
70                DELG(K)= GRN(K)                                           VSCALE     71
                15 CONTINUE                                                 VSCALE     72
                  DO 17 J= 1,6                                              VSCALE     73
                  JJ= J + 7                                                 VSCALE     74
                  IF(SCALE(I,JJ) .EQ. 0.) GO TO 17                          VSCALE     75
75                K= K+1                                                    VSCALE     76
                  XO(K)  = STRFN(I,J)/SCALE(I,JJ)                           VSCALE     77
                  XN(K)  = XO(K)                                            VSCALE     78
                  DELX(K)= 0.                                               VSCALE     79
                  GRO(K) = 0.                                               VSCALE     80
80                GRN(K) = STRFDN(I,J)*SCALE(I,JJ)/VS                       VSCALE     81
                  DELG(K)= GRN(K)                                           VSCALE     82
                17 CONTINUE                                                 VSCALE     83
                 1 CONTINUE                                                 VSCALE     84
                  VOLD= VOLD/VS                                             VSCALE     85
85                VNEW= VNEW/VS                                             VSCALE     86
                  NPARM= K                                                  VSCALE     87
                  DO 5 I= 1,NPARM                                           VSCALE     88
                  DO 4 J= 1,NPARM                                           VSCALE     89
                  HN(I,J)= 0.                                               VSCALE     90
90                IF(J.EQ.I) HN(I,J)= 1.                                    VSCALE     91
                 4 CONTINUE                                                 VSCALE     92
                 5 CONTINUE                                                 VSCALE     93
                  IF (ISTEP.GT.0) GO TO 6                                   VSCALE     94
               C                                                            VSCALE     95
95             C A RESTART.  READ OLD VECTORS,                              VSCALE     96
               C GRAD, HESSIAN, AND FUNCTION                                VSCALE     97
               C                                                            VSCALE     98
               CCDC                                                         VSCALE     99
                     READ (ITAPEI,300) (XO(I),I=1,NPARM)                    VSCALE    100
100                  DO 7 I=1,NPARM                                         VSCALE    101
                     READ (ITAPEI,300) (HO(I,J),J=1,NPARM)                  VSCALE    102
                     DO 7 J=1,NPARM                                         VSCALE    103
                   7 HN(I,J) = HO(I,J)                                      VSCALE    104
                     READ (ITAPEI,300) (GRO(I),I=1,NPARM)                   VSCALE    105
105                  READ (ITAPEI,301) STEP                                 VSCALE    106
                     READ (ITAPEI,301) VOLD                                 VSCALE    107
               CCDC                                                         VSCALE    108
               C                                                            VSCALE    109
               CIBM                                                         VSCALE    110
110            C     READ(ITAPER,300) (XO(I), I=1,NPARM)                    VSCALE    111
               C     DO 7 I= 1,NPARM                                        VSCALE    112
               C     READ(ITAPER,300) (HO(I,J), J=1,NPARM)                  VSCALE    113
               C     DO 7 J= 1,NPARM                                        VSCALE    114
               C   7 HN(I,J)= HO(I,J)                                       VSCALE    115
```

```
115          C     READ(ITAPER,300) (GRO(I), I=1,NPARM)                    VSCALE   116
             C     READ(ITAPER,301) STEP                                   VSCALE   117
             C     READ(ITAPER,301) VOLD                                   VSCALE   118
             CIBM                                                          VSCALE   119
             C                                                             VSCALE   120
120                VOLD= VOLD/VS                                           VSCALE   121
                   DO 8 I= 1,NPARM                                         VSCALE   122
                   DELX(I)= XN(I) - XO(I)                                  VSCALE   123
                   DELG(I)= GRN(I)-GRO(I)                                  VSCALE   124
                 8 CONTINUE                                                VSCALE   125
125                DO 9 I= 1,NPARM                                         VSCALE   126
             CCDC                                                          VSCALE   127
                   SUM = 0.0                                               VSCALE   128
             CCDC                                                          VSCALE   129
             CIBM                                                          VSCALE   130
130          C     SUM = 0.D0                                              VSCALE   131
             CIBM                                                          VSCALE   132
                   HGR(I)= SOSCAP(HO,GRO,SUM,NPARM,20,1,I,1)               VSCALE   133
                 9 CONTINUE                                                VSCALE   134
                   INDEX=1                                                 VSCALE   135
135                CALL RECONS(INDEX)                                      VSCALE   136
                 6 CONTINUE                                                VSCALE   137
                   RETURN                                                  VSCALE   138
             C                                                             VSCALE   139
             C LOAD-UP VECTORS, SWITCH HESSIAN                             VSCALE   140
140          C                                                             VSCALE   141
                10 K=0                                                     VSCALE   142
                   DO 11 I= 1,NUMSTR                                       VSCALE   143
                   IF(SCALE(I,1).EQ.0.) GO TO 12                           VSCALE   144
                   K= K + 1                                                VSCALE   145
145                XO(K)= STRWO(I)/SCALE(I,1)                              VSCALE   146
                   XN(K)= STRWN(I)/SCALE(I,1)                              VSCALE   147
                   GRO(K)= STRWDO(I)*SCALE(I,1)/VS                         VSCALE   148
                   GRN(K)= STRWDN(I)*SCALE(I,1)/VS                         VSCALE   149
                12 DO 13 J= 1,3                                            VSCALE   150
150                JJ= J+1                                                 VSCALE   151
                   IF(SCALE(I,JJ).EQ.0.) GO TO 13                          VSCALE   152
                   IF(J.EQ.3 .AND. KCONST.EQ.0) GO TO 13                   VSCALE   153
                   K= K+1                                                  VSCALE   154
                   XO(K)= STRIO(I,J)/SCALE(I,JJ)                           VSCALE   155
155                XN(K)= STRIN(I,J)/SCALE(I,JJ)                           VSCALE   156
                   GRO(K)= STRIDO(I,J)*SCALE(I,JJ)/VS                      VSCALE   157
                   GRN(K)= STRIDN(I,J)*SCALE(I,JJ)/VS                      VSCALE   158
                13 CONTINUE                                                VSCALE   159
                   DO 16 J= 1,3                                            VSCALE   160
160                JJ= J+4                                                 VSCALE   161
                   IF(SCALE(I,JJ) .EQ. 0.) GO TO 16                        VSCALE   162
                   K= K+1                                                  VSCALE   163
                   XO(K) =  STRRO(I,J)/SCALE(I,JJ)                         VSCALE   164
                   XN(K) =  STRRN(I,J)/SCALE(I,JJ)                         VSCALE   165
165                GRO(K)= STRRDO(I,J)*SCALE(I,JJ)/VS                      VSCALE   166
                   GRN(K)= STRRDN(I,J)*SCALE(I,JJ)/VS                      VSCALE   167
                16 CONTINUE                                                VSCALE   168
                   DO 18 J= 1,6                                            VSCALE   169
                   JJ=J+7                                                  VSCALE   170
170                IF(SCALE(I,JJ) .EQ. 0.) GO TO 18                        VSCALE   171
                   K= K+1                                                  VSCALE   172
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                  XO(K)   = STRFO(I,J)/SCALE(I,JJ)                    VSCALE    173
                  XN(K)   = STRFN(I,J)/SCALE(I,JJ)                    VSCALE    174
                  GRO(K) =STRFDO(I,J)*SCALE(I,JJ)/VS                  VSCALE    175
175               GRN(K) =STRFDN(I,J)*SCALE(I,JJ)/VS                  VSCALE    176
               18 CONTINUE                                            VSCALE    177
               11 CONTINUE                                            VSCALE    178
                  DO 14 I=1,K                                         VSCALE    179
                  DO 14 J=1,K                                         VSCALE    180
180               14 HO(I,J)= HN(I,J)                                 VSCALE    181
                  VNEW= VNEW/VS                                       VSCALE    182
            C                                                         VSCALE    183
            C SAVE STORE INFO FOR RESTART                             VSCALE    184
            C                                                         VSCALE    185
185               REWIND ITAPEP                                       VSCALE    186
                  WRITE(ITAPEP,300) (XO(I),I=1,NPARM)                 VSCALE    187
                  DO 25 I= 1,NPARM                                    VSCALE    188
                  WRITE(ITAPEP,300) (HO(I,J),J=1,NPARM)               VSCALE    189
               25 CONTINUE                                            VSCALE    190
190               WRITE(ITAPEP,300) (GRO(I),I=1,NPARM)                VSCALE    191
                  WRITE(ITAPEP,301) STEP                              VSCALE    192
                  WRITE(ITAPEP,301) VOLD                              VSCALE    193
                  INDEX=0                                             VSCALE    194
                  CALL RECONS(INDEX)                                  VSCALE    195
195               VOLD= VOLD/VS                                       VSCALE    196
                  RETURN                                              VSCALE    197
            C                                                         VSCALE    198
            C UNLOAD VECTORS                                          VSCALE    199
            C                                                         VSCALE    200
200            20 K=0                                                 VSCALE    201
                  DO 21 I= 1,NUMSTR                                   VSCALE    202
                  IF(SCALE(I,1).EQ.0.) GO TO 22                       VSCALE    203
                  K= K+1                                              VSCALE    204
                  STRWN(I) = XN(K)*SCALE(I,1)                         VSCALE    205
205               STRWO(I)= XO(K)*SCALE(I,1)                          VSCALE    206
                  STRWDN(I)= GRN(K)*VS/SCALE(I,1)                     VSCALE    207
               22 DO 23 J= 1,3                                        VSCALE    208
                  JJ= J+1                                             VSCALE    209
                  IF(SCALE (I,JJ).EQ.0.) GO TO 23                     VSCALE    210
210               K= K+1                                              VSCALE    211
                  IF(J.EQ.3 .AND. KCONST.EQ.0) K= K-1                 VSCALE    212
                  STRIO(I,J)= XO(K)*SCALE(I,JJ)                       VSCALE    213
                  STRIN(I,J)= XN(K)*SCALE(I,JJ)                       VSCALE    214
                  STRIDN(I,J)= GRN(K)*VS/SCALE(I,JJ)                  VSCALE    215
215               23 CONTINUE                                         VSCALE    216
                  DO 24 J= 1,3                                        VSCALE    217
                  JJ= J+4                                             VSCALE    218
                  IF(SCALE(I,JJ) .EQ. 0.) GO TO 24                    VSCALE    219
                  K= K+1                                              VSCALE    220
220               STRRO(I,J) =  XO(K)*SCALE(I,JJ)                     VSCALE    221
                  STRRN(I,J) =  XN(K)*SCALE(I,JJ)                     VSCALE    222
                  STRRDN(I,J)= GRN(K)*VS/SCALE(I,JJ)                  VSCALE    223
               24 CONTINUE                                            VSCALE    224
                  DO 19 J= 1,6                                        VSCALE    225
225               JJ= J+7                                             VSCALE    226
                  IF(SCALE(I,JJ) .EQ. 0.) GO TO 19                    VSCALE    227
                  K= K+1                                              VSCALE    228
                  STRFO(I,J) = XO(K)*SCALE(I,JJ)                      VSCALE    229
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```
                     STRFN(I,J) = XN(K)*SCALE(I,JJ)                          VSCALE    230
  230                STRFDN(I,J)= GRN(K)*VS/SCALE(I,JJ)                      VSCALE    231
                   19 CONTINUE                                               VSCALE    232
                   21 CONTINUE                                               VSCALE    233
                      VNEW= VNEW*VS                                          VSCALE    234
                      VOLD= VOLD*VS                                          VSCALE    235
  235                 RETURN                                                 VSCALE    236
                 C                                                           VSCALE    237
                  300 FORMAT (5(2X,1PE12.5))                                 VSCALE    238
                  301 FORMAT(35X,F10.3)                                      VSCALE    239
                      END                                                    VSCALE    240
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES

3	VSCALE	1	137	196	235

VARIABLES	SN	TYPE	RELOCATION									
741	A	REAL	*UNDEF		REFS	17						
1004	B	REAL	*UNDEF		REFS	17						
1047	C	REAL	*UNDEF		REFS	17						
257	DELG	REAL	ARRAY	POWELL	REFS	14	DEFINED	48	59	70	81	123
106	DELX	REAL	ARRAY	POWELL	REFS	14	DEFINED	45	56	67	78	122
214	GRN	REAL	ARRAY	POWELL	REFS	14	48	59	70	81	123	206
					214	222	230	DEFINED	46	57	68	80
					148	157	166	175				
151	GRO	REAL	ARRAY	POWELL	REFS	14	123	132	190	DEFINED	47	58
					69	79	104	147	156	165	174	
5207	HGR	REAL	ARRAY	POWELL	REFS	14	DEFINED	132				
2676	HN	REAL	ARRAY	POWELL	REFS	14	180	DEFINED	89	90	103	
365	HO	REAL	ARRAY	POWELL	REFS	14	103	132	188	DEFINED	101	180
735	I	INTEGER			REFS	41	2*43	2*46	51	2*54	2*57	63
					2*65	2*68	74	2*76	2*80	89	2*90	99
					101	2*103	104	3*122	3*123	2*132	143	2*145
					2*146	2*147	2*148	151	2*154	2*155	2*156	2*157
					161	2*163	2*164	2*165	2*166	170	2*172	2*173
					2*174	2*175	2*180	186	188	190	202	2*204
					2*205	2*206	209	2*212	2*213	2*214	218	2*220
					2*221	2*222	226	2*228	2*229	2*230		
					DEFINED	40	87	99	100	104	121	125
					142	178	186	187	190	201		
5254	ICN	INTEGER		POWELL	REFS	14	DEFINED	39				
5253	ICONV	INTEGER		POWELL	REFS	14						
0	ICYCLE	INTEGER		STRCLU	REFS	13						
76	IDSTR	INTEGER	ARRAY	STORES	REFS	6						
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	6						
0	INDEX	INTEGER		F.P.	REFS	32	135	194	DEFINED	1	134	193
1112	IPERM	INTEGER	*UNDEF		REFS	17						
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	6						
1	ISTEP	INTEGER		STRCLU	REFS	13	33	93				
732	ITAPEI	INTEGER			DEFINED	28	I/O REFS	99	101	104	105	106
730	ITAPEN *	INTEGER			DEFINED	24						
731	ITAPEP	INTEGER			DEFINED	25	I/O REFS	185	186	188	190	191

VARIABLES	SN	TYPE		RELOCATION								
					192							
726	ITAPER	* INTEGER			DEFINED	22						
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	5	16	22	23	24	25	28
727	ITAPEW	* INTEGER			DEFINED	23						
736	J	INTEGER			REFS	50	52	54	57	62	65	68
						73	76	80	89	2*90	101	2*103	150
						152	154	155	156	157	160	163	164
						165	166	169	172	173	174	175	2*180
						188	208	211	212	213	214	217	220
						221	222	225	228	229	230		
					DEFINED	49	61	72	88	101	102	149	
						159	168	179	188	207	216	224	
737	JJ	INTEGER			REFS	51	54	57	63	65	68	74
						76	80	151	154	155	156	157	161
						163	164	165	166	170	172	173	174
						175	209	212	213	214	218	220	221
						222	226	228	229	230	DEFINED	50	62
						73	150	160	169	208	217	225	
734	K	INTEGER			REFS	42	43	2*44	45	46	47	2*48
						53	54	2*55	56	57	58	2*59	64
						65	2*66	67	68	69	2*70	75	76
						2*77	78	79	80	2*81	86	144	145
						146	147	148	153	154	155	156	157
						162	163	164	165	166	171	172	173
						174	175	178	179	203	204	205	206
						210	211	212	213	214	219	220	221
						222	227	228	229	230	DEFINED	38	42
						53	64	75	141	144	153	162	171
						200	203	210	211	219	227		
1	KCONST	INTEGER		STORES	REFS	6	52	152	211			
2	M1	INTEGER		STRCLU	REFS	13						
3	M2	INTEGER		STRCLU	REFS	13						
4	M3	INTEGER		STRCLU	REFS	13						
5	M4	INTEGER		STRCLU	REFS	13						
733	NDS	* INTEGER			DEFINED	37						
5252	NPARM	INTEGER		POWELL	REFS	14	87	88	99	100	101	102
						104	121	125	132	186	187	188	190
					DEFINED	86						
0	NUMSTR	INTEGER		STORES	REFS	6	40	142	201			
362	SCALE	REAL	ARRAY	STORES	REFS	6	41	43	46	51	54	57
						63	65	68	74	76	80	143	145
						146	147	148	151	154	155	156	157
						161	163	164	165	166	170	172	173
						174	175	202	204	205	206	209	212
						213	214	218	220	221	222	226	228
						229	230						
0	STEP	REAL		F.P.	REFS	191	DEFINED	1	105			
11	STPOLD	REAL		STRCLU	REFS	13						
653	STRFDN	REAL	ARRAY	STORES	REFS	6	80	175	DEFINED	230		
615	STRFDO	REAL	ARRAY	STORES	REFS	6	174					
463	STRFI	REAL	ARRAY	STORES	REFS	6						
557	STRFN	REAL	ARRAY	STORES	REFS	6	76	173	DEFINED	229		
521	STRFO	REAL	ARRAY	STORES	REFS	6	172	DEFINED	228			
305	STRIDN	REAL	ARRAY	STORES	REFS	6	57	157	DEFINED	214		
266	STRIDO	REAL	ARRAY	STORES	REFS	6	156					
122	STRII	REAL	ARRAY	STORES	REFS	6	54					
160	STRIN	REAL	ARRAY	STORES	REFS	6	155	DEFINED	213			

VARIABLES	SN	TYPE	RELOCATION									
141	STRIO	REAL	ARRAY	STORES	REFS	6	154	DEFINED	212			
343	STRRDN	REAL	ARRAY	STORES	REFS	6	68	166	DEFINED	222		
324	STRRDO	REAL	ARRAY	STORES	REFS	6	165					
177	STRRI	REAL	ARRAY	STORES	REFS	6	65					
235	STRRN	REAL	ARRAY	STORES	REFS	6	164	DEFINED	221			
216	STRRO	REAL	ARRAY	STORES	REFS	6	163	DEFINED	220			
261	STRWDN	REAL	ARRAY	STORES	REFS	6	46	148	DEFINED	206		
254	STRWDO	REAL	ARRAY	STORES	REFS	6	147					
103	STRWI	REAL	ARRAY	STORES	REFS	6	43					
115	STRWN	REAL	ARRAY	STORES	REFS	6	146	DEFINED	204			
110	STRWO	REAL	ARRAY	STORES	REFS	6	145	DEFINED	205			
740	SUM	REAL			REFS	132	DEFINED	127				
10	VNEW	REAL		STRCLU	REFS	13	85	181	233	DEFINED	85	181
					233							
7	VOLD	REAL		STRCLU	REFS	13	84	120	192	195	234	
					DEFINED	84	106	120	195	234		
6	VS	REAL		STRCLU	REFS	13	46	57	68	80	84	85
					120	147	148	156	157	165	166	174
					175	181	195	206	214	222	230	233
					234							
43	XN	REAL	ARRAY	POWELL	REFS	14	122	204	213	221	229	
					DEFINED	44	55	66	77	146	155	164
					173							
0	XO	REAL	ARRAY	POWELL	REFS	14	44	55	66	77	122	186
					205	212	220	228	DEFINED	43	54	65
					76	99	145	154	163	172		
322	Z	REAL	ARRAY	POWELL	REFS	14						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
MESAGE		3	31	
RECONS		1	135	194
SOSCAP	REAL	8	132	

STATEMENT LABELS		DEF LINE	REFERENCES		
0	1	83	40		
35	2	49	41		
63	3	60	49	51	52
0	4	91	88		
0	5	92	87		
265	6	136	93		
0	7	103	100	102	
0	8	124	121		
0	9	133	125		
266	10	141	33		
0	11	177	142		
302	12	149	143		
330	13	158	149	151	152
0	14	180	178	179	
107	15	71	61	63	
354	16	167	159	161	
133	17	82	72	74	
400	18	176	168	170	
602	19	231	224	226	
472	20	200	32		
0	21	232	201		
504	22	207	202		

STATEMENT LABELS			DEF LINE	REFERENCES					
535	23		215	207	209				
557	24		223	216	218				
0	25		189	187					
715	300	FMT	237	99	101	104	186	188	190
720	301	FMT	238	105	106	191	192		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
24	1	I	40 83	115B	NOT INNER
50	3	J	49 60	15B	OPT
77	15	J	61 71	12B	OPT
123	17	J	72 82	12B	OPT
147	5	I	87 92	15B	NOT INNER
154	4	J	88 91	5B	INSTACK
174	7	I	100 103	31B	EXT REFS NOT INNER
177		J	101 101	11B	EXT REFS
216	7	J	102 103	3B	INSTACK
243	8	I	121 124	6B	INSTACK
253	9	I	125 133	7B	EXT REFS
270	11	I	142 177	116B	NOT INNER
315	13	J	149 158	15B	OPT
344	16	J	159 167	12B	OPT
370	18	J	168 176	12B	OPT
407	14	I	178 180	14B	NOT INNER
414	14	J	179 180	3B	INSTACK
434	25	I	187 189	20B	EXT REFS NOT INNER
437		J	188 188	11B	EXT REFS
474	21	I	201 232	114B	NOT INNER
517	23	J	207 215	20B	OPT
550	24	J	216 223	11B	OPT
573	19	J	224 231	11B	OPT

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
CTAPES	50	0 ITAPES (50)					
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)			
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)			
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)			
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)			
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)			
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)			
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)			
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)			
		397 STRFDO (30)	427 STRFDN (30)				
STRCLU	10	0 ICYCLE (1)	1 ISTEP (1)	2 M1 (1)			
		3 M2 (1)	4 M3 (1)	5 M4 (1)			
		6 VS (1)	7 VOLD (1)	8 VNEW (1)			
		9 STPOLD (1)					
POWELL	2733	0 XO (35)	35 XN (35)	70 DELX (35)			
		105 GRO (35)	140 GRN (35)	175 DELG (35)			
		210 Z (35)	245 HO (1225)	1470 HN (1225)			
		2695 HGR (35)	2730 NPARM (1)	2731 ICONV (1)			
		2732 ICN (1)					

STATISTICS

PROGRAM LENGTH	11578	623
CM LABELED COMMON LENGTH	62628	3250

52000B CM USED

```
      SUBROUTINE MURT(STEP)                                                  MURT       2
CIBM                                                                         MURT       3
C     REAL*8 SUM                                                             MURT       4
CIBM                                                                         MURT       5
      COMMON/CTAPES/ ITAPES(50)                                              MURT       6
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW STPOLD           MURT       7
      COMMON/POWELL/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)         MURT       8
     1              ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICONV,ICN      MURT       9
      COMMON /MAX/ MAXDIM                                                    MURT      10
      COMMON /MURTS/   YK(35)                                                MURT      11
      DIMENSION HY(35)                                                       MURT      12
C      CALL MESAGE(1,4,4HMURT)                                               MURT      13
      WRITE(6,400)                                                           MURT      14
  400 FORMAT(1HO,10X,13HENTERING MURT)                                       MURT      15
      ITAPEW = ITAPES(6)                                                     MURT      16
      ITAPEN = ITAPES(40)                                                    MURT      17
      IF(ISTEP.EQ.1) GO TO 8                                                 MURT      18
C                                                                            MURT      19
      DO 1 I= 1,NPARM                                                        MURT      20
      DELX(I)= XN(I) - XO(I)                                                 MURT      21
      DELG(I)= GRN(I) -GRO(I)                                                MURT      22
!     CONTINUE                                                               MURT      23
C                                                                            MURT      24
C FORM Z AND CK                                                              MURT      25
C                                                                            MURT      26
      DO 2 I= 1,NPARM                                                        MURT      27
CCDC                                                                         MURT      28
      SUM = 0.0                                                              MURT      29
CCDC                                                                         MURT      30
CIBM                                                                         MURT      31
C     SUM = 0.D0                                                             MURT      32
CIBM                                                                         MURT      33
    2 HY(I)= SOSCAP(HO,DELG,SUM,NPARM,MAXDIM,1,I,1)                          MURT      34
      DO 3 I= 1,NPARM                                                        MURT      35
    3 Z(I)= DELX(I) - HY(I)                                                  MURT      36
CCDC                                                                         MURT      37
      SUM = 0.0                                                              MURT      38
CCDC                                                                         MURT      39
CIBM                                                                         MURT      40
C     SUM = 0.D0                                                             MURT      41
CIBM                                                                         MURT      42
      CK= SOSCAP(DELG,Z,SUM,NPARM,1,1,1,1)                                   MURT      43
C                                                                            MURT      44
C TEST CK AND NORM OF ZG/CK TO ENSURE                                        MURT      45
C INVERSE HESSIAN IS POSITIVE DEFINITE                                       MURT      46
C                                                                            MURT      47
      CALL NRM2(Z,W,NPARM)                                                   MURT      48
      Z2= W*W                                                                MURT      49
C                                                                            MURT      50
      ITAP=ITAPEW                                                            MURT      51
      LOOP=1                                                                 MURT      52
   20 CONTINUE                                                               MURT      53
      WRITE(ITAP,306)                                                        MURT      54
      WRITE(ITAP,300) (DELX(I), I=1,NPARM)                                   MURT      55
      WRITE(ITAP,307)                                                        MURT      56
      WRITE(ITAP,300) (DELG(I), I=1,NPARM)                                   MURT      57
      WRITE(ITAP,299)                                                        MURT      58
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```
                DO 100 I= 1,NPARM                                    MURT       59
              100 WRITE(ITAP,300) (HO(I,J), J=1,NPARM)               MURT       60
60              WRITE(ITAP,308)                                      MURT       61
                WRITE(ITAP,300) (HY(I), I=1,NPARM)                   MURT       62
                WRITE(ITAP,309)                                      MURT       63
                WRITE(ITAP,300) (Z(I), I=1,NPARM)                    MURT       64
                WRITE(ITAP,301) CK,Z2                                MURT       65
65              IF(LOOP.GT.1) GO TO 21                               MURT       66
                LOOP=2                                               MURT       67
                ITAP=ITAPEN                                          MURT       68
                GO TO 20                                             MURT       69
               21 CONTINUE                                           MURT       70
70              IF(W.GT.1.E-06) GO TO 30                             MURT       71
                WRITE(ITAPEW,305)                                    MURT       72
                WRITE(ITAPEN,305)                                    MURT       73
                DO 25 I=1,NPARM                                      MURT       74
                DO 25 J=1,NPARM                                      MURT       75
75              HN(I,J) = HO(I,J)                                    MURT       76
           25   CONTINUE                                             MURT       77
                GO TO 8                                              MURT       78
           30   CONTINUE                                             MURT       79
                EPS= 1.0E-04                                         MURT       80
80              TEST= EPS*Z2                                         MURT       81
                IF(ABS(CK).LT.TEST) GO TO 4                          MURT       82
           CCDC                                                      MURT       83
                SUM = 0.0                                            MURT       84
           CCDC                                                      MURT       85
85         CIBM                                                      MURT       86
           C       SUM = 0.D0                                        MURT       87
           CIBM                                                      MURT       88
                W= SOSCAP(Z,GRO,SUM,NPARM,1,1,1,1)                   MURT       89
                EPS= -1.0E-08                                        MURT       90
90              W= W/CK                                              MURT       91
                IF(W.LE.EPS) GO TO 6                                 MURT       92
           C                                                         MURT       93
           C RESET INVERSE HESSIAN                                   MURT       94
           C                                                         MURT       95
95             4 CONTINUE                                            MURT       96
                WRITE(ITAPEW,304) W                                  MURT       97
                WRITE(ITAPEN,304) W                                  MURT       98
                DO 5 I= 1,NPARM                                      MURT       99
                DO 5 J= 1,NPARM                                      MURT      100
100             YK(J) = Z(J)/Z2                                      MURT      101
           5    HN(I,J) = Z(I) * YK(J) + HO(I,J)                     MURT      102
                GO TO 8                                              MURT      103
           C                                                         MURT      104
           C FORM NEW INVERSE HESSIAN                                MURT      105
105        C                                                         MURT      106
               6 CONTINUE                                            MURT      107
                DO 7 I= 1,NPARM                                      MURT      108
                DO 7 J= 1,NPARM                                      MURT      109
                YK(J) = Z(J)/CK                                      MURT      110
110        7    HN(I,J) = Z(I) * YK(J) + HO(I,J)                     MURT      111
           C                                                         MURT      112
           C COMPUTE NEW DIRECTIONS                                  MURT      113
           C                                                         MURT      114
               8 CONTINUE                                            MURT      115
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```
      DO 9 I= 1,NPARM                                                    MURT      116
CCDC                                                                     MURT      117
      SUM = 0.0                                                          MURT      118
CCDC                                                                     MURT      119
CIBM                                                                     MURT      120
C     SUM = 0.D0                                                         MURT      121
CIBM                                                                     MURT      122
      HGR(I)= SOSCAP(HN,GRN,SUM,NPARM,MAXDIM,1,I,1)                      MURT      123
    9 DELX(I)= -HGR(I)                                                   MURT      124
C                                                                        MURT      125
C TEST SIZE OF HG/G                                                      MURT      126
C IF TOO SMALL RESCALE H                                                 MURT      127
C                                                                        MURT      128
   10 CONTINUE                                                           MURT      129
      CALL NRM2(DELX,HG,NPARM)                                           MURT      130
      CALL NRM2(GRN,G,NPARM)                                             MURT      131
      EPS= 1.0E-08                                                       MURT      132
      IF(G.LT.1.0E-04) GO TO 15                                          MURT      133
      TEST= HG/G                                                         MURT      134
      IF(TEST.GT.EPS) GO TO 15                                           MURT      135
C                                                                        MURT      136
C RESCALE H AND DELX - VIA ALPHA                                         MURT      137
C                                                                        MURT      138
      WRITE(ITAPEW,302) TEST                                             MURT      139
      WRITE(ITAPEN,302) TEST                                             MURT      140
      F= 10.*EPS/TEST                                                    MURT      141
      DO 11 I= 1,NPARM                                                   MURT      142
      DO 11 J= 1,NPARM                                                   MURT      143
   11 HN(I,J)= F*HN(I,J)                                                 MURT      144
      STEP= F*STEP                                                       MURT      145
   15 CONTINUE                                                           MURT      146
      WRITE(ITAPEW,303)                                                  MURT      147
      WRITE(ITAPEN,303)                                                  MURT      148
      DO 101 I=1,NPARM                                                   MURT      149
      WRITE(ITAPEW,300) (HN(I,J), J=1,NPARM)                             MURT      150
  101 WRITE(ITAPEN,300) (HN(I,J), J=1,NPARM)                             MURT      151
      WRITE(ITAPEW,310)                                                  MURT      152
      WRITE(ITAPEW,300) (HGR(I), I=1,NPARM)                              MURT      153
      WRITE(ITAPEN,300) (HGR(I), I=1,NPARM)                              MURT      154
      RETURN                                                             MURT      155
C                                                                        MURT      156
  299 FORMAT(//5X,19HOLD INVERSE HESSIAN/)                               MURT      157
  300 FORMAT (5(2X,1PE12.5))                                             MURT      158
  301 FORMAT(1HO,5X,12HCK AND Z2 = ,E15.5,2X,E15.5)                      MURT      159
  302 FORMAT(1HO,5X,6HHG/G= ,E15.5,21H.  RESCALE H AND DELX)             MURT      160
  303 FORMAT(//5X,33HNEW INVERSE HESSIAN AND DIRECTION/)                 MURT      161
  304 FORMAT(//5X,4HW = ,E10.3,23H  RESET INVERSE HESSIAN)               MURT      162
  305 FORMAT(1HO,5X,49HZ = 0, SET NEW INVERSE HESSION EQUAL TO OLD VALUE MURT      163
     1)                                                                  MURT      164
  306 FORMAT(1HO,5X,13HPREVIOUS MOVE,//)                                 MURT      165
  307 FORMAT(1HO,5X,10HDELTA GRAD,//)                                    MURT      166
  308 FORMAT(1HO,5X,17HHOLD*(DELTA GRAD) ,//)                            MURT      167
  309 FORMAT(1HO,5X,15HZ= DELTAX-HOLDG,//)                               MURT      168
  310 FORMAT(1HO)                                                        MURT      169
      END                                                                MURT      170
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	MURT	1	154

VARIABLES		SN	TYPE		RELOCATION								
720	CK		REAL			REFS	64	81	90	109	DEFINED	42	
257	DELG		REAL	ARRAY	POWELL	REFS	7	33	42	56	DEFINED	21	
106	DELX		REAL	ARRAY	POWELL	REFS	7	35	54	129	DEFINED	20	123
726	EPS		REAL			REFS	80	91	134	140	DEFINED	79	89
						131							
732	F		REAL			REFS	143	144	DEFINED	140			
731	G		REAL			REFS	130	132	133				
214	GRN		REAL	ARRAY	POWELL	REFS	7	21	122	130			
151	GRO		REAL	ARRAY	POWELL	REFS	7	21	88				
730	HG		REAL			REFS	129	133					
5207	HGR		REAL	ARRAY	POWELL	REFS	7	123	152	153	DEFINED	122	
2676	HN		REAL	ARRAY	POWELL	REFS	7	122	143	149	150		
						DEFINED	75	101	110	143			
365	HO		REAL	ARRAY	POWELL	REFS	7	33	59	75	101	110	
733	HY		REAL	ARRAY		REFS	11	35	61	DEFINED	33		
716	I		INTEGER			REFS	3*20	3*21	2*33	3*35	54	56	59
						61	63	2*75	3*101	3*110	2*122	2*123	2*143
						149	150	152	153	DEFINED	19	26	34
						54	56	58	61	63	73	98	107
						115	141	148	152	153			
5254	ICN		INTEGER		POWELL	REFS	7						
5253	ICONV		INTEGER		POWELL	REFS	7						
0	ICYCLE		INTEGER		STRCLU	REFS	6						
1	ISTEP		INTEGER		STRCLU	REFS	6	17					
723	ITAP		INTEGER			DEFINED	50	67	I/O REFS	53	54	55	56
						57	59	60	61	62	63	64	
715	ITAPEN		INTEGER			REFS	67	DEFINED	16	I/O REFS	72	97	139
						147	150	153					
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	5	15	16				
714	ITAPEW		INTEGER			REFS	50	DEFINED	15	I/O REFS	71	96	138
						146	149	151	152				
725	J		INTEGER			REFS	59	2*75	2*100	3*101	2*109	3*110	2*143
						149	150	DEFINED	59	74	99	108	142
						149	150						
724	LOOP		INTEGER			REFS	65	DEFINED	51	66			
0	MAXDIM		INTEGER		MAX	REFS	9	33	122				
2	M1		INTEGER		STRCLU	REFS	6						
3	M2		INTEGER		STRCLU	REFS	6						
4	M3		INTEGER		STRCLU	REFS	6						
5	M4		INTEGER		STRCLU	REFS	6						
5252	NPARM		INTEGER		POWELL	REFS	7	19	26	33	34	42	47
						54	56	58	59	61	63	73	74
						88	98	99	107	108	115	122	129
						130	141	142	148	149	150	152	153
0	STEP		REAL		F.P.	REFS	144	DEFINED	1	144			
11	STPOLD		REAL		STRCLU	REFS	6						
717	SUM		REAL			REFS	33	42	88	122	DEFINED	28	37
						83	117						
727	TEST		REAL			REFS	81	134	138	139	140		
						DEFINED	80	133					

VARIABLES	SN	TYPE		RELOCATION							
1	ISTEP	INTEGER		STRCLU	REFS	2					
425	ITAPEN	INTEGER			DEFINED	10	I/O REFS	27	39	53	72	82
					88	98	105	109				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	3	9	10				
424	ITAPEW	INTEGER			DEFINED	9	I/O REFS	26	38	52	71	81
					87	97	104	108				
2	M1	INTEGER		STRCLU	REFS	2						
3	M2	INTEGER		STRCLU	REFS	2						
4	M3	INTEGER		STRCLU	REFS	2						
5	M4	INTEGER		STRCLU	REFS	2						
5252	NPARM	INTEGER		POWELL	REFS	4	19	46	61	117		
446	RTMAX	REAL			REFS	2*92	96	DEFINED	89			
447	RTMIN	REAL			REFS	2*91	94	DEFINED	90			
0	STEP	REAL		F.P.	REFS	62	66	68	94	96	106	107
					110	DEFINED	1	50	94	96	110	
11	STPOLD	REAL		STRCLU	REFS	2						
10	VNEW	REAL		STRCLU	REFS	2	68	106	DEFINED	115		
0	VNSAVE	REAL		VSAVE	REFS	7	DEFINED	116				
7	VOLD	REAL		STRCLU	REFS	2	68	106	115			
1	VOSAVE	REAL		VSAVE	REFS	7	116					
6	VS	REAL		STRCLU	REFS	2						
441	W	REAL			REFS	85	86	DEFINED	74			
440	W2	REAL			REFS	70	74	DEFINED	69			
443	X	REAL			REFS	85	86	DEFINED	84			
43	XN	REAL	ARRAY	POWELL	REFS	4	22	47				
0	XO	REAL	ARRAY	POWELL	REFS	4	22	47				
437	Z	REAL			REFS	2*69	78	84	DEFINED	68		
322	ZZ	REAL	ARRAY	POWELL	REFS	4						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
SQRT	REAL	1	LIBRARY	74

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
ABS	REAL	1	INTRIN	23	80
AMAX1	REAL	0	INTRIN	89	
AMIN1	REAL	0	INTRIN	41	90

STATEMENT LABELS			DEF LINE	REFERENCES			
34	1		29	19	21	24	
0	2		42	36			
73	3		49	46	47		
0	4		64	61			
134	5		74	70			
151	6		84	80			
173	7		94	91			
175	8		96	92			
177	9		97	95			
204	10		100	73	83	93	
224	11		111	54	99		
0	12		118	117			
104	20		58	12	30		
344	200	FMT	121	71	72		
351	201	FMT	122	81	82		
356	202	FMT	123	87	88	108	109
364	203	FMT	124	97	98		
370	204	FMT	125	104	105		

```
                      VNEW = VOLD                                                    LINESR   116
                      VNSAVE = VOSAVE                                                LINESR   117
                      DO 12 I= 1,NPARM                                               LINESR   118
                   12 GRN(I)= GRO(I)                                                 LINESR   119
                C                                                                    LINESR   120
                C   STEP - SIZE DECELERATOR.                                         LINESR   121
                  200 FORMAT(1HO,10X,22HW SQUARED IS NEGATIVE.)                      LINESR   122
                  201 FORMAT(1HO,10X,20HDENOMINATOR IS ZERO.)                        LINESR   123
                  202 FORMAT(1HO,10X,5HA1 = ,1P1E10.3,5X,5HA2 = ,1P1E10.3)           LINESR   124
                  203 FORMAT(1HO,10X,18HCUBIC FIT IS USED.)                          LINESR   125
                  204 FORMAT(1HO,10X,22HQUADRATIC FIT IS USED.)                      LINESR   126
                  205 FORMAT(1HO,10X,40HMOVE IS REDUCED TO JUST TOUCH CONSTRAINT,    LINESR   127
                     1       /,10X,11HNEW ALPHA= ,1P1E10.3)                          LINESR   128
                  206 FORMAT(1HO,10X,8HVARIABLE,I4,29HHAS JUST MOVED TO CONSTRAINT ,  LINESR   129
                     1       /,12X,5HDELX=,1P1E10.3)                                 LINESR   130
                      RETURN                                                         LINESR   131
                      END                                                            LINESR   132
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	LINESR	1	130

VARIABLES

		SN	TYPE		RELOCATION							
432	ALPHA		REAL			REFS	41	48	52	53	DEFINED	35	41
434	ALPHA1		REAL			REFS	41	DEFINED	40				
444	A1		REAL			REFS	87	88	89	90	108	109	110
						DEFINED	85	107					
445	A2		REAL			REFS	87	88	89	90	DEFINED	86	
0	CON		REAL	ARRAY	CONS	REFS	6	21					
257	DELG		REAL	ARRAY	POWELL	REFS	4						
106	DELX		REAL	ARRAY	POWELL	REFS	4	38	39	40	62	63	
						DEFINED	48						
442	DEN		REAL			REFS	80	85	86	107	DEFINED	78	106
431	DIF		REAL			REFS	23	24	26	27	DEFINED	22	23
427	EPS		REAL			REFS	24	80	DEFINED	18	79		
435	FD1		REAL			REFS	62	68	69	78	84	106	107
						DEFINED	59	62					
436	FD2		REAL			REFS	63	68	69	78	DEFINED	60	63
214	GRN		REAL	ARRAY	POWELL	REFS	4	63	DEFINED	118			
151	GRO		REAL	ARRAY	POWELL	REFS	4	62	118				
5207	HGR		REAL	ARRAY	POWELL	REFS	4	40	48				
2676	HN		REAL	ARRAY	POWELL	REFS	4						
365	HO		REAL	ARRAY	POWELL	REFS	4						
430	I		INTEGER			REFS	20	21	2*22	26	27	28	37
							2*47	2*48	2*62	2*63	2*118	DEFINED	19	36
							46	61	117				
5254	ICN		INTEGER		POWELL	REFS	4	12	DEFINED	11	51		
5253	ICONV		INTEGER		POWELL	REFS	4						
0	ICYCLE		INTEGER		STRCLU	REFS	2						
433	II		INTEGER			REFS	2*38	2*39	2*40	DEFINED	37		
426	III		INTEGER			REFS	25	28	30	36	DEFINED	17	25
450	IPOINT		INTEGER	ARRAY		REFS	8	37	DEFINED	20	28		

```
                  20 CONTINUE                                                    LINESR     59
                     FD1= 0.                                                     LINESR     60
60                   FD2= 0.                                                     LINESR     61
                     DO 4 I= 1,NPARM                                             LINESR     62
                     FD1= FD1 + GRO(I)*DELX(I)/STEP                              LINESR     63
                     FD2= FD2 + GRN(I)*DELX(I)/STEP                              LINESR     64
                   4 CONTINUE                                                    LINESR     65
65            C                                                                  LINESR     66
              C COMPUTE Z & W                                                    LINESR     67
              C                                                                  LINESR     68
                     Z = ( 3.0 * ( VOLD - VNEW )/STEP ) + FD1 + FD2              LINESR     69
                     W2 = Z * Z - FD1*FD2                                        LINESR     70
70                   IF( W2 .GE. 0.0 ) GO TO 5                                   LINESR     71
                     WRITE(ITAPEW,200)                                           LINESR     72
                     WRITE(ITAPEN,200)                                           LINESR     73
                     GO TO 10                                                    LINESR     74
                   5 W = SQRT( W2 )                                              LINESR     75
75            C                                                                  LINESR     76
              C COMPUTE NEW ALPHA/OLD                                            LINESR     77
              C                                                                  LINESR     78
                     DEN= 2.0*Z + FD1 + FD2                                      LINESR     79
                     EPS= 1.0E-08                                                LINESR     80
80                   IF(ABS(DEN).GT.EPS) GO TO 6                                 LINESR     81
                     WRITE(ITAPEW,201)                                           LINESR     82
                     WRITE(ITAPEN,201)                                           LINESR     83
                     GO TO 10                                                    LINESR     84
                   6 X= Z + FD1                                                  LINESR     85
85                   A1= (X + W)/DEN                                             LINESR     86
                     A2= (X - W)/DEN                                             LINESR     87
                     WRITE(ITAPEW,202) A1,A2                                     LINESR     88
                     WRITE(ITAPEN,202) A1,A2                                     LINESR     89
                     RTMAX = AMAX1( A1,A2 )                                      LINESR     90
90                   RTMIN = AMIN1( A1,A2 )                                      LINESR     91
                     IF( RTMIN .GT. 0.0 .AND. RTMIN .LT. 1.0 ) GO TO 7           LINESR     92
                     IF( RTMAX .GT. 0.0 .AND. RTMAX .LT. 1.0 ) GO TO 8           LINESR     93
                     GO TO 10                                                    LINESR     94
                   7 STEP = STEP * RTMIN                                         LINESR     95
95                   GO TO 9                                                     LINESR     96
                   8 STEP = STEP * RTMAX                                         LINESR     97
                   9 WRITE(ITAPEW,203)                                           LINESR     98
                     WRITE(ITAPEN,203)                                           LINESR     99
                     GO TO 11                                                    LINESR    100
100                10 CONTINUE                                                   LINESR    101
              C                                                                  LINESR    102
              C   QUADRATIC INTERPOLATION.                                       LINESR    103
              C                                                                  LINESR    104
                     WRITE(ITAPEW,204)                                           LINESR    105
105                  WRITE(ITAPEN,204)                                           LINESR    106
                     DEN= 2.0*(VNEW - VOLD - FD1*STEP)                           LINESR    107
                     A1= -FD1*STEP/DEN                                           LINESR    108
                     WRITE(ITAPEW,202) A1                                        LINESR    109
                     WRITE(ITAPEN,202) A1                                        LINESR    110
110                  STEP= A1*STEP                                               LINESR    111
                  11 CONTINUE                                                    LINESR    112
              C                                                                  LINESR    113
              C   REJECT CURRENT POINT. TAKE SMALLER STEP FROM PREVIOUS POINT.   LINESR    114
              C                                                                  LINESR    115
```

```
      SUBROUTINE LINESR(STEP)                                                  LINESR     2
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD             LINESR     3
      COMMON/CTAPES/ ITAPES(50)                                                LINESR     4
      COMMON/POWELL/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)           LINESR     5
     1              ,ZZ(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICONV,ICN       LINESR     6
      COMMON/CONS/CON(35,4)                                                    LINESR     7
      COMMON/ VSAVE / VNSAVE, VOSAVE                                           LINESR     8
      DIMENSION IPOINT(35)                                                     LINESR     9
      ITAPEW= ITAPES(6)                                                        LINESR    10
      ITAPEN= ITAPES(40)                                                       LINESR    11
      ICN = 1                                                                  LINESR    12
      IF(ICN.GT.0) GO TO 20                                                    LINESR    13
C                                                                              LINESR    14
C DETERMINE WHICH CONSTRAINED COMPONENTS                                       LINESR    15
C OF XK WERE CONSTRAINED AT XK-1                                               LINESR    16
C                                                                              LINESR    17
      III= 0                                                                   LINESR    18
      EPS= 1.0E-03                                                             LINESR    19
      DO 1 I= 1,NPARM                                                          LINESR    20
      IPOINT(I)= 0                                                             LINESR    21
      IF(CON(I,3) .GT. 0.) GO TO 1                                             LINESR    22
      DIF= XN(I)-XO(I)                                                         LINESR    23
      DIF= ABS(DIF)                                                            LINESR    24
      IF(DIF.LT.EPS) GO TO 1                                                   LINESR    25
      III= III + 1                                                             LINESR    26
      WRITE(ITAPEW,206) I,DIF                                                  LINESR    27
      WRITE(ITAPEN,206) I,DIF                                                  LINESR    28
      IPOINT(III)= I                                                           LINESR    29
    1 CONTINUE                                                                 LINESR    30
      IF(III .EQ. 0) GO TO 20                                                  LINESR    31
C                                                                              LINESR    32
C COMPUTE MINIMUM ALPHA REQUIRED                                               LINESR    33
C TO BRING ONE OF THESE TO CONSTRAINT                                          LINESR    34
C                                                                              LINESR    35
      ALPHA= 1.                                                                LINESR    36
      DO 2 I= 1,III                                                            LINESR    37
      II= IPOINT(I)                                                            LINESR    38
      WRITE(ITAPEW,206) II,DELX(II)                                            LINESR    39
      WRITE(ITAPEN,206) II,DELX(II)                                            LINESR    40
      ALPHA1= -DELX(II)/HGR(II)                                                LINESR    41
      ALPHA= AMIN1(ALPHA,ALPHA1)                                               LINESR    42
    2 CONTINUE                                                                 LINESR    43
C                                                                              LINESR    44
C COMPUTE NEW DELTA X USING ALPHA                                              LINESR    45
C                                                                              LINESR    46
      DO 3 I= 1,NPARM                                                          LINESR    47
      IF(XO(I) .EQ. XN(I)) GO TO 3                                             LINESR    48
      DELX(I)= -ALPHA*HGR(I)                                                   LINESR    49
    3 CONTINUE                                                                 LINESR    50
      STEP= 1.0                                                                LINESR    51
      ICN= 1                                                                   LINESR    52
      WRITE(ITAPEW,205) ALPHA                                                  LINESR    53
      WRITE(ITAPEN,205) ALPHA                                                  LINESR    54
      GO TO 11                                                                 LINESR    55
C                                                                              LINESR    56
C COMPUTE DV/DALPHA FOR CUBIC INTERPOLATION                                    LINESR    57
C                                                                              LINESR    58
```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
24	111	I	31 35	108	EXT REFS
36	13	I	38 46	238	NOT INNER
44	12	K	41 42	48	INSTACK
65	14	I	52 54	28	INSTACK
163	330	I	115 117	38	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
EPSIL	1	0	EPS	(1)							
JGL	4505	0	JSET	(50)	50	JDIM	(1)	51	G	(1750)	
		1801	LMK	(2500)	4301	BCOEF	(50)	4351	MSTAR	(1)	
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)	
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)	
CTAPES	50	0	ITAPES	(50)							
POWELL	2732	0	XO	(35)	35	XN	(35)	70	DELX	(35)	
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)	
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)	
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICON	(1)	
MAX	1	0	MAXDIM	(1)							
NEWCON	51	0	JNEW	(50)	50	NEWDIM	(1)				

STATISTICS

PROGRAM LENGTH	647B	423
CM LABELED COMMON LENGTH	16254B	7340

520000B CM USED

VARIABLES	SN	TYPE		RELOCATION							
					DEFINED	84					
474	PSUM	REAL			REFS	84	DEFINED	83			
0	STEP	REAL		F.P.	REFS	140	DEFINED	1			
473	SUM	REAL			REFS	83	125	DEFINED	78	120	
43	XN	REAL	ARRAY	POWELL	REFS	7					
0	XO	REAL	ARRAY	POWELL	REFS	7					
322	Z	REAL	ARRAY	POWELL	REFS	7					

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES		
ADDCON		3		34		
AORDER		4		70		
DELCON		1		100		
EXIT		0		138	145	
GRAPRO		0		92	127	
HYPER		1		63		
INSECT		1		140		
LAGMUL		1		58		
LDFIX		0		109		
LMKP1		0		28		
NRM2		3		93	134	135
SETJGL		0		24		
SOSCAP	REAL	8		83	125	
SQRT	REAL	1	LIBRARY	84		

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
ABS	REAL	1	INTRIN		73

STATEMENT LABELS				DEF LINE	REFERENCES	
347	2	FMT		147	59	
353	3	FMT		148	64	
357	4	FMT		149	85	
373	6	FMT		151	126	
377	7	FMT		152	141	
403	8	FMT	NO REFS	153		
414	9	FMT		155	20	
14	10			23	21	
17	11			27	22	
0	12			42	41	
56	13			46	38	43
0	14			54	52	
70	15			57	26	111
150	33			102	99	
167	34			118	103	
177	35			132	25	
212	36			139	133	136
22[illegible]	40			143	94	
132	41			91	86	
137	42			95	87	
223	50			146	142	
421	101	FMT		156	137	
430	103	FMT		157	144	
441	104	FMT		159	29	
445	105	FMT		160	110	
0	111			35	31	
34	115			36	30	
0	330			117	115	

ENTRY POINTS DEF LINE REFERENCES
3 CONSTR 1 161

VARIABLES	SN	TYPE	RELOCATION								
10315 BCOEF		REAL	ARRAY	JGL	REFS	4					
472 BETA		REAL			REFS	85	86	97	DEFINED	73	
257 DELG		REAL	ARRAY	POWELL	REFS	7					
106 DELX		REAL	ARRAY	POWELL	REFS	7	2*83	93	125	134	
					DEFINED	116					
0 EPS		REAL		EPSIL	REFS	3	2*86	94	2*136	DEFINED	18
63 G		REAL	ARRAY	JGL	REFS	4					
502 GNORM		REAL			REFS	135	136				
214 GRN		REAL	ARRAY	POWELL	REFS	7	125	135			
151 GRO		REAL	ARRAY	POWELL	REFS	7					
5207 HGR		REAL	ARRAY	POWELL	REFS	7	116				
2676 HN		REAL	ARRAY	POWELL	REFS	7					
365 HO		REAL	ARRAY	POWELL	REFS	7					
456 I		INTEGER			REFS	33	39	45	53	2*116	
					DEFINED	31	38	52	115		
5253 ICON		INTEGER		POWELL	REFS	7	42	DEFINED	39		
462 IND		INTEGER			REFS	44	45	50	DEFINED	37	44
503 IPERM		INTEGER	ARRAY		REFS	12	70	71			
0 ISTEP		INTEGER		F.P.	REFS	21	DEFINED	1			
0 ITAPES		INTEGER	ARRAY	CTAPES	REFS	6	12	19			
455 ITAPEW		INTEGER			DEFINED	19	I/O REFS	20	29	59	64 85
					110	126	137	141	144		
463 ITEST		INTEGER			REFS	43	DEFINED	40	42		
465 I1		INTEGER			REFS	52	DEFINED	51			
62 JDIM		INTEGER		JGL	REFS	4	22	25	69	111	133
477 JDPNT		INTEGER			REFS	99	100	DEFINED	96	97	
470 JM		INTEGER			REFS	72	3*73	6*85	97	DEFINED	71
471 JMAX	*	INTEGER			DEFINED	72					
460 JN		INTEGER			REFS	34	DEFINED	33			
0 JNEW		INTEGER	ARRAY	NEWCON	REFS	10	33				
0 JSET		INTEGER	ARRAY	JGL	REFS	4	72				
464 K		INTEGER			REFS	42	DEFINED	41			
457 KALL		INTEGER			REFS	34	DEFINED	32			
500 KDEL		INTEGER			REFS	103	DEFINED	98	101		
565 LAM		REAL	ARRAY		REFS	13	58	63	70	73	85
454 LAMMAX	*	REAL	*UNDEF		REFS	13					
461 LD	*	INTEGER			REFS	34					
10545 LDDIM		INTEGER		JGL	REFS	4	41	109	110		
10463 LINDEP		INTEGER	ARRAY	JGL	REFS	4	42				
3411 LMK		REAL	ARRAY	JGL	REFS	4	13	73	85		
0 MAXDIM		INTEGER		MAX	REFS	9					
467 MINUSN		INTEGER			REFS	70	DEFINED	69			
10377 MSTAR		INTEGER		JGL	REFS	4	52				
466 NCON		INTEGER			REFS	70	DEFINED	68			
10630 NDIM		INTEGER		JGL	REFS	4	51	DEFINED	50		
62 NEWDIM		INTEGER		NEWCON	REFS	10	30	31			
10546 NOTACT		INTEGER	ARRAY	JGL	REFS	4	DEFINED	45	53		
10462 NOTDIM		INTEGER		JGL	REFS	4	38				
10400 NOTJ		INTEGER	ARRAY	JGL	REFS	4	39	45			
5252 NPARM		INTEGER		POWELL	REFS	7	83	93	115	125	134 135
501 PG		REAL			REFS	126	127	DEFINED	125		
476 PGNORM		REAL			REFS	93	94				
475 PNORM		REAL			REFS	85	86	97	134	136	

```
115                 DO 330 I=1,NPARM                                          CONSTR  116
                    DELX(I) = -HGR(I)                                         CONSTR  117
              330   CONTINUE                                                  CONSTR  118
              34    CONTINUE                                                  CONSTR  119
              CCDC                                                            CONSTR  120
120                 SUM = 0.0                                                 CONSTR  121
              CCDC                                                            CONSTR  122
              CIBM                                                            CONSTR  123
              C     SUM = 0.D0                                                CONSTR  124
              CIBM                                                            CONSTR  125
125                 PG = SOSCAP(DELX,GRN,SUM,NPARM,1,1,1,1)                   CONSTR  126
                    WRITE(ITAPEW,6) PG                                        CONSTR  127
                    IF(PG.GE.0.0) CALL GRAPRO                                 CONSTR  128
              C                                                               CONSTR  129
              C     COMPUTE INTERSECTION OF STEP WITH EACH CONSTRAINT NOT ALREADY CONSTR  130
130           C     IN JSET.                                                  CONSTR  131
              C                                                               CONSTR  132
              35    CONTINUE                                                  CONSTR  133
                    IF(JDIM.NE.0) GO TO 36                                    CONSTR  134
                    CALL NRM2(DELX,PNORM,NPARM)                               CONSTR  135
135                 CALL NRM2(GRN,GNORM,NPARM)                                CONSTR  136
                    IF(PNORM.GT.EPS.OR.GNORM.GT.EPS) GO TO 36                 CONSTR  137
                    WRITE(ITAPEW,101)                                         CONSTR  138
                    CALL EXIT                                                 CONSTR  139
              36    CONTINUE                                                  CONSTR  140
140                 CALL INSECT(STEP)                                         CONSTR  141
                    WRITE(ITAPEW,7)                                           CONSTR  142
                    GO TO 50                                                  CONSTR  143
              40    CONTINUE                                                  CONSTR  144
                    WRITE(ITAPEW,103)                                         CONSTR  145
145                 CALL EXIT                                                 CONSTR  146
              50    CONTINUE                                                  CONSTR  147
                  2 FORMAT(1HO,10X,11HEXIT LAGMUL)                            CONSTR  148
                  3 FORMAT(1HO,10X,10HEXIT HYPER)                             CONSTR  149
                  4 FORMAT(1HO,10X,4HLAM(,I2,4H) = ,1P1E12.5,5X,4HLMK(,I2,1H,,I2,4H) = CONSTR  150
150               A ,1P1E12.5,5X,7HBETA = ,1P1E12.5,5X,8HPNORM = ,1P1E12.5)   CONSTR  151
                  6 FORMAT(1HO,10X,5HPG = ,1P1E12.5)                          CONSTR  152
                  7 FORMAT(1HO,10X,11HEXIT INSECT)                            CONSTR  153
                  8 FORMAT(1HO,10X,/10H STEPSS = ,1P1E12.5,3X,8HRATIO = ,1P1E12.5,3X, CONSTR  154
                   A7HSTEP = ,1P1E12.5)                                       CONSTR  155
155               9 FORMAT(1HO,/,10X,26HENTERING SUBROUTINE CONSTR)           CONSTR  156
                101 FORMAT(1HO,10X,46HUNCONSTRAINED MINIMUM REACHED, JOB TERMINATING) CONSTR  157
                103 FORMAT(1HO,10X,62HMINIMUM REACHED ACCORDING TO KUHN-TUCKER TEST, J CONSTR  158
                   AOB TERMINATING)                                           CONSTR  159
                104 FORMAT(1HO,10X,13HLEAVING LMKP1)                          CONSTR  160
160             105 FORMAT(1HO,10X,13HLEAVING LDFIX)                          CONSTR  161
                    RETURN                                                    CONSTR  162
                    END                                                       CONSTR  163
```

SYMBOLIC REFERENCE MAP (R=3)

```
                      CALL LAGMUL(LAM)                                          CONSTR     59
                      WRITE(ITAPEW,2)                                           CONSTR     60
60          C                                                                   CONSTR     61
            C     PROJECT UNCONSTRAINED STEP ONTO INTERSECTION OF HYPERPLANES    CONSTR     62
            C                                                                   CONSTR     63
                      CALL HYPER(LAM)                                           CONSTR     64
                      WRITE(ITAPEW,3)                                           CONSTR     65
65          C                                                                   CONSTR     66
            C     FORM BETA                                                     CONSTR     67
            C                                                                   CONSTR     68
                      NCON = 1                                                  CONSTR     69
                      MINUSN = -JDIM                                            CONSTR     70
70                    CALL AORDER(LAM,MINUSN,IPERM,NCON)                        CONSTR     71
                      JM = IPERM(1)                                             CONSTR     72
                      JMAX = JSET(JM)                                           CONSTR     73
                      BETA = (LAM(JM)/ABS(LMK(JM,JM))) * .5                     CONSTR     74
            C                                                                   CONSTR     75
75          C     DO KUHN-TUCKER TEST TO SEE IF MINIMUM HAS BEEN ACHEIVED       CONSTR     76
            C                                                                   CONSTR     77
            CCDC                                                                CONSTR     78
                      SUM = 0.0                                                 CONSTR     79
            CCDC                                                                CONSTR     80
80          CIBM                                                                CONSTR     81
            C     SUM = 0.D0                                                    CONSTR     82
            CIBM                                                                CONSTR     83
                      PSUM = SOSCAP(DELX,DELX,SUM,NPARM,1,1,1,1)                CONSTR     84
                      PNORM = SQRT(PSUM)                                        CONSTR     85
85                    WRITE(ITAPEW,4) JM,LAM(JM),JM,JM,LMK(JM,JM),BETA,PNORM    CONSTR     86
                      IF(PNORM.LE.EPS .AND. BETA.LE.EPS) GO TO 41               CONSTR     87
                      GO TO 42                                                  CONSTR     88
            C                                                                   CONSTR     89
            C COMPUTE A GRADIENT PROJECTION TO MAKE SURE IT IS SMALL             CONSTR     90
90          C                                                                   CONSTR     91
               41 CONTINUE                                                      CONSTR     92
                  CALL GRAPRO                                                   CONSTR     93
                  CALL NRM2(DELX,PGNORM,NPARM)                                  CONSTR     94
                  IF(PGNORM.LE.EPS) GO TO 40                                    CONSTR     95
95             42 CONTINUE                                                      CONSTR     96
                  JDPNT = 0                                                     CONSTR     97
                  IF(PNORM.LE.BETA) JDPNT = JM                                  CONSTR     98
                  KDEL = 0                                                      CONSTR     99
                  IF(JDPNT.EQ.0) GO TO 33                                       CONSTR    100
100               CALL DELCON(JDPNT)                                            CONSTR    101
                  KDEL = 1                                                      CONSTR    102
            33    CONTINUE                                                      CONSTR    103
                  IF(KDEL.NE.1) GO TO 34                                        CONSTR    104
            C                                                                   CONSTR    105
105         C     SINCE AT LEAST ONE CONSTRAINT HAS BEEN DELETED THE CONSTRAINTS CONSTR    106
            C     IN LINDEP MIGHT NOT BE LD ANYMORE.  AT THIS POINT, ATTEMPT TO CONSTR    107
            C     ADD ALL OF THEM AND RECALCULATE LINDEP.                       CONSTR    108
            C                                                                   CONSTR    109
                  IF(LDDIM.NE.0) CALL LDFIX                                     CONSTR    110
110               IF(LDDIM.NE.0) WRITE(ITAPEW,105)                              CONSTR    111
                  IF(JDIM.NE.0) GO TO 15                                        CONSTR    112
            C                                                                   CONSTR    113
            C     IF JDIM = 0, DELX = -HGR, IE. TAKE UNCONSTRAINED MOVE.        CONSTR    114
            C                                                                   CONSTR    115
```

```
      SUBROUTINE CONSTR(ISTEP,STEP)                                     CONSTR     2
C                                                                       CONSTR     3
      COMMON /EPSIL/ EPS                                                CONSTR     4
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)     CONSTR     5
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM CONSTR     6
      COMMON /CTAPES/ ITAPES                                            CONSTR     7
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35) CONSTR     8
     1                 ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON    CONSTR     9
      COMMON /MAX/ MAXDIM                                               CONSTR    10
      COMMON /NEWCON /  JNEW(50),NEWDIM                                 CONSTR    11
C                                                                       CONSTR    12
      DIMENSION IPERM(50),ITAPES(50)                                    CONSTR    13
      REAL LMK,LAM(50),LAMMAX                                           CONSTR    14
CIBM                                                                    CONSTR    15
C     REAL*8 SUM                                                        CONSTR    16
CIBM                                                                    CONSTR    17
C                                                                       CONSTR    18
      EPS = 1.0E-4                                                      CONSTR    19
      ITAPEW = ITAPES(6)                                                CONSTR    20
      WRITE(ITAPEW,9)                                                   CONSTR    21
      IF(ISTEP.EQ.1) GO TO 10                                           CONSTR    22
      IF(JDIM.NE.0) GO TO 11                                            CONSTR    23
10    CONTINUE                                                          CONSTR    24
      CALL SETJGL                                                       CONSTR    25
      IF(JDIM.EQ.0) GO TO 35                                            CONSTR    26
      GO TO 15                                                          CONSTR    27
11    CONTINUE                                                          CONSTR    28
      CALL LMKP1                                                        CONSTR    29
      WRITE(ITAPEW,104)                                                 CONSTR    30
      IF(NEWDIM.EQ.0) GO TO 115                                         CONSTR    31
      DO 111 I=1,NEWDIM                                                 CONSTR    32
      KALL = 1                                                          CONSTR    33
      JN = JNEW(I)                                                      CONSTR    34
      CALL ADDCON(JN,KALL,LD)                                           CONSTR    35
111   CONTINUE                                                          CONSTR    36
115   CONTINUE                                                          CONSTR    37
      IND = 0                                                           CONSTR    38
      DO 13 I=1,NOTDIM                                                  CONSTR    39
      ICON = NOTJ(I)                                                    CONSTR    40
      ITEST = 0                                                         CONSTR    41
      DO 12 K=1,LDDIM                                                   CONSTR    42
12    IF(LINDEP(K).EQ.ICON) ITEST = 1                                   CONSTR    43
      IF(ITEST.EQ.1) GO TO 13                                           CONSTR    44
      IND = IND + 1                                                     CONSTR    45
      NOTACT(IND) = NOTJ(I)                                             CONSTR    46
13    CONTINUE                                                          CONSTR    47
C                                                                       CONSTR    48
C     ZERO OUT REMAINING PORTION OF NOTACT                              CONSTR    49
C                                                                       CONSTR    50
      NDIM = IND                                                        CONSTR    51
      I1 = NDIM + 1                                                     CONSTR    52
      DO 14 I=I1,MSTAR                                                  CONSTR    53
      NOTACT(I) = 0                                                     CONSTR    54
14    CONTINUE                                                          CONSTR    55
C     COMPUTE LAGRANGE MULTIPLIERS                                      CONSTR    56
C                                                                       CONSTR    57
15    CONTINUE                                                          CONSTR    58
```

STATEMENT LABELS		DEF LINE	REFERENCES
30	1	19	10
0	2	15	12 13
0	3	22	20

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	2	I	12 15	14B	NOT INNER
21	2	J	13 15	3B	INSTACK
33	3	I	20 22	4B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
CTAPES	1	0	ITAPES	(1)						
POWELL	2733	0	XO	(35)	35	XN	(35)	70	DELX	(35)
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICONV	(1)
		2732	ICN	(1)						

STATISTICS

PROGRAM LENGTH	518	41
CM LABELED COMMON LENGTH	5256B	2734

52000B CM USED

```
      1              SUBROUTINE USTEP(STEP)                                          USTEP      2
                     COMMON/CTAPES/ ITAPES                                           USTEP      3
                     COMMON/POWELL/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)  USTEP      4
                    1              ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICONV,ICN USTEP     5
      5        C                                                                     USTEP      6
               C TEST ALPHA TO DETERMINE IF                                          USTEP      7
               C HESSIAN NEEDS TO BE RESCALED                                        USTEP      8
               C                                                                     USTEP      9
                     EPS= 1.0E-08                                                    USTEP     10
     10              IF (STEP.GE. EPS) GO TO 1                                       USTEP     11
                     F= 10.*EPS/STEP                                                 USTEP     12
                     DO 2 I= 1,NPARM                                                 USTEP     13
                     DO 2 J= 1,NPARM                                                 USTEP     14
                     HN(I,J)= HN(I,J)/F                                              USTEP     15
     15             2 CONTINUE                                                      USTEP     16
               C                                                                     USTEP     17
               C MAKE UNCONSTRAINED STEP                                             USTEP     18
               C                                                                     USTEP     19
                    1 CONTINUE                                                       USTEP     20
     20             DO 3 I= 1,NPARM                                                 USTEP     21
                    DELX(I)= STEP*DELX(I)                                           USTEP     22
                   3 XN(I)= XO(I) + DELX(I)                                         USTEP     23
                     RETURN                                                          USTEP     24
                     END                                                             USTEP     25
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	USTEP	1	23

VARIABLES

		SN	TYPE		RELOCATION							
257	DELG		REAL	ARRAY	POWELL	REFS	3					
106	DELX		REAL	ARRAY	POWELL	REFS	3	21	22	DEFINED	21	
43	EPS		REAL			REFS	10	11	DEFINED	9		
44	F		REAL			REFS	14	DEFINED	11			
214	GRN		REAL	ARRAY	POWELL	REFS	3					
151	GRO		REAL	ARRAY	POWELL	REFS	3					
5207	HGR		REAL	ARRAY	POWELL	REFS	3					
2676	HN		REAL	ARRAY	POWELL	REFS	3	14	DEFINED	14		
365	HO		REAL	ARRAY	POWELL	REFS	3					
45	I		INTEGER			REFS	2*14	2*21	3*22	DEFINED	12	20
5254	ICN		INTEGER		POWELL	REFS	3					
5253	ICONV		INTEGER		POWELL	REFS	3					
0	ITAPES		INTEGER		CTAPES	REFS	2					
46	J		INTEGER			REFS	2*14	DEFINED	13			
5252	NPARM		INTEGER		POWELL	REFS	3	12	13	20		
0	STEP		REAL		F.P.	REFS	10	11	21	DEFINED	1	
43	XN		REAL	ARRAY	POWELL	REFS	3	DEFINED	22			
0	XO		REAL	ARRAY	POWELL	REFS	3	22				
322	Z		REAL	ARRAY	POWELL	REFS	3					

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
16	1	I	19 22	6B	INSTACK
26	2	I	26 33	7B	EXT REFS
37	3	I	34 35	3B	INSTACK
74	100	I	58 59	20B	EXT REFS NOT INNER
77		J	59 59	11B	EXT REFS
150	25	I	73 76	14B	NOT INNER
155	25	J	74 76	3B	INSTACK
205	5	I	98 101	17B	NOT INNER
213	5	J	99 101	6B	INSTACK
226	7	I	107 110	17B	NOT INNER
234	7	J	108 110	6B	INSTACK
246	9	I	115 123	7B	EXT REFS
277	11	I	141 143	14B	NOT INNER
304	11	J	142 143	3B	INSTACK
321	101	I	148 150	35B	EXT REFS NOT INNER
324		J	149 149	11B	EXT REFS
341		J	150 150	11B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
CTAPES	50	0 ITAPES	(50)				
STRCLU	10	0 ICYCLE	(1)	1 ISTEP	(1)	2 M1	(1)
		3 M2	(1)	4 M3	(1)	5 M4	(1)
		6 VS	(1)	7 VOLD	(1)	8 VNEW	(1)
		9 STPOLD	(1)				
POWELL	2733	0 XO	(35)	35 XN	(35)	70 DELX	(35)
		105 GRO	(35)	140 GRN	(35)	175 DELG	(35)
		210 Z	(35)	245 HO	(1225)	1470 HN	(1225)
		2695 HGR	(35)	2730 NPARM	(1)	2731 ICONV	(1)
		2732 ICN	(1)				
MAX	1	0 MAXDIM	(1)				
MURTS	35	0 YK	(35)				

STATISTICS

PROGRAM LENGTH	776B	510
CM LABELED COMMON LENGTH	5415B	2829

52000B CM USED

VARIABLES	SN	TYPE		RELOCATION								
10	VNEW	REAL		STRCLU	REFS	6						
7	VOLD	REAL		STRCLU	REFS	6						
6	VS	REAL		STRCLU	REFS	6						
721	W	REAL			REFS	47	2*48	70	90	91	96	97
					DEFINED	88	90					
43	XN	REAL	ARRAY	POWELL	REFS	7	20					
0	XO	REAL	ARRAY	POWELL	REFS	7	20					
0	YK	REAL	ARRAY	MURTS	REFS	10	101	110	DEFINED	100	109	
322	Z	REAL	ARRAY	POWELL	REFS	7	42	47	63	88	100	101
					109	110	DEFINED	35				
722	Z2	REAL			REFS	64	80	100	DEFINED	48		

FILE NAMES	MODE		
TAPE6	FMT	WRITES	13
VARIABLES USED AS FILE NAMES, SEE ABOVE			

EXTERNALS	TYPE	ARGS	REFERENCES			
NRM2		3	47	129	130	
SOSCAP	REAL	8	33	42	88	122

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
ABS	REAL	1	INTRIN	81

STATEMENT LABELS			DEF LINE	REFERENCES							
0	1		22	19							
0	2		33	26							
0	3		35	34							
200	4		95	81							
0	5		101	98	99						
225	6		106	91							
0	7		110	107	108						
245	8		114	17	77	102					
0	9		123	115							
0	10	INACTIVE	128								
0	11		143	141	142						
314	15		145	132	134						
53	20		52	68							
141	21		69	65							
0	25		76	73	74						
164	30		78	70							
0	100		59	58							
0	101		150	148							
617	299	FMT	156	57							
623	300	FMT	157	54	56	59	61	63	149	150	152	153
626	301	FMT	158	64							
633	302	FMT	159	138	139						
641	303	FMT	160	146	147						
647	304	FMT	161	96	97						
655	305	FMT	162	71	72						
664	306	FMT	164	53							
670	307	FMT	165	55							
674	308	FMT	166	60							
700	309	FMT	167	62							
704	310	FMT	168	151							
456	400	FMT	14	13							

STATEMENT LABELS

			DEF LINE	REFERENCES			
375	205	FMT	126	52	53		
406	206	FMT	128	26	27	38	39

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
15	1	I	19 29	22B	EXT REFS
42	2	I	36 42	23B	EXT REFS
67	3	I	46 49	5B	INSTACK
110	4	I	61 64	7B	INSTACK
232	12	I	117 118	3B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
STRCLU	10	0	ICYCLE	(1)	1	ISTEP	(1)	2	M1	(1)
		3	M2	(1)	4	M3	(1)	5	M4	(1)
		6	VS	(1)	7	VOLD	(1)	8	VNEW	(1)
		9	STPOLD	(1)						
CTAPES	50	0	ITAPES	(50)						
POWELL	2733	0	XO	(35)	35	XN	(35)	70	DELX	(35)
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)
		210	ZZ	(35)	245	HO	(1225)	1470	HN	(1225)
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICONV	(1)
		2732	ICN	(1)						
CONS	140	0	CON	(140)						
VSAVE	2	0	VNSAVE	(1)	1	VOSAVE	(1)			

STATISTICS

PROGRAM LENGTH	515B	333
CM LABELED COMMON LENGTH	5567B	2935

52000B CM USED

```
      1                FUNCTION SOSCAP(X,Y,S,N,IX,IY,ISX,ISY)                  SOSCAP     2
                       DIMENSION X(1),Y(1)                                     SOSCAP     3
                CIBM                                                           SOSCAP     4
                C      DOUBLE PRECISION S,SOSCAP                               SOSCAP     5
      5         CIBM                                                           SOSCAP     6
                       IF( N ) 120 , 120 , 100                                 SOSCAP     7
                  100  JX = ISX                                               SOSCAP     8
                       JY = ISY                                                SOSCAP     9
                       DO 110 J = 1,N                                          SOSCAP    10
     10                S = S + DBLE( X (JX) ) * DBLE( Y (JY) )                 SOSCAP    11
                       JX = JX + IX                                            SOSCAP    12
                  110  JY = JY + IY                                           SOSCAP    13
                  120  SOSCAP = S                                             SOSCAP    14
                       RETURN                                                  SOSCAP    15
     15                END                                                     SOSCAP    16
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
4	SOSCAP	1	14

VARIABLES

	SN		TYPE		RELOCATION							
0	ISX		INTEGER		F.P.	REFS	7	DEFINED	1			
0	ISY		INTEGER		F.P.	REFS	8	DEFINED	1			
0	IX		INTEGER		F.P.	REFS	11	DEFINED	1			
0	IY		INTEGER		F.P.	REFS	12	DEFINED	1			
41	J	*	INTEGER			DEFINED	9					
37	JX		INTEGER			REFS	10	11	DEFINED	7	11	
40	JY		INTEGER			REFS	10	12	DEFINED	8	12	
0	N		INTEGER		F.P.	REFS	6	9	DEFINED	1		
0	S		REAL		F.P.	REFS	10	13	DEFINED	1	10	
36	SOSCAP		REAL			DEFINED	13					
0	X		REAL	ARRAY	F.P.	REFS	2	10	DEFINED	1		
0	Y		REAL	ARRAY	F.P.	REFS	2	10	DEFINED	1		

INLINE FUNCTIONS

	TYPE	ARGS		DEF LINE	REFERENCES
DBLE	DOUBLE	1	INTRIN		2*10

STATEMENT LABELS

			DEF LINE	REFERENCES
0	100	INACTIVE	7	6
0	110		12	9
34	120		13	2*6

LOOPS

LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
23 110	J	9 12	6B	INSTACK

STATISTICS

PROGRAM LENGTH 45B 37

52000B CM USED

```
      SUBROUTINE INCONS                                                 INCONS     2
C                                                                       INCONS     3
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    INCONS     4
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)          INCONS     5
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)               INCONS     6
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)               INCONS     7
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                       INCONS     8
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                          INCONS     9
     F      ,STRFDO(5,6),STRFDN(5,6)                                   INCONS    10
      COMMON /STRCLU/ ICYCLE,ISTEP,M1,M2,M3,M4,VS,VOLD,VNEW,STPOLD      INCONS    11
      COMMON /CTAPES/ ITAPES(50)                                        INCONS    12
      COMMON /JGLV/ JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50),        INCONS    13
     1              MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,            INCONS    14
     2              NOTACT(50),NDIM                                    INCONS    15
      COMMON /POWELV/ XO(35),XN(35),DELX(35),GRO(35),GRN(35),           INCONS    16
     1                DELG(35),Z(35),HO(35,35),HN(35,35),HGR(35),      INCONS    17
     2                NPARM,ICONV,ICN                                  INCONS    18
C                                                                       INCONS    19
CCDC                                                                    INCONS    20
      COMMON /INCCOM/ GECS(35,50),BCOECS(50),NPMECS,MSTRECS             INCONS    21
CCDC                                                                    INCONS    22
C                                                                       INCONS    23
      DIMENSION CORNM(10),CORNI(10),CORNS(10)                           INCONS    24
      DIMENSION IPARM(6)                                                INCONS    25
C                                                                       INCONS    26
CCDC                                                                    INCONS    27
      LEVEL 3, GECS,BCOECS,NPMECS,MSTRECS                               INCONS    28
CCDC                                                                    INCONS    29
C                                                                       INCONS    30
      ITAPER = ITAPES(5)                                                INCONS    31
      ITAPEW = ITAPES(6)                                                INCONS    32
C                                                                       INCONS    33
CIBM                                                                    INCONS    34
C     ITAPUP = 60                                                       INCONS    35
CIBM                                                                    INCONS    36
C                                                                       INCONS    37
C     ZERO OUT G MATRIX AND B VECTOR                                    INCONS    38
      DO 5 I = 1,50                                                     INCONS    39
      BCOEF(I) = 0.0                                                    INCONS    40
      DO 5 J = 1,35                                                     INCONS    41
      G(J,I) = 0.0                                                      INCONS    42
    5 CONTINUE                                                          INCONS    43
C                                                                       INCONS    44
      READ(ITAPER,100) ITOC1                                            INCONS    45
      II=0                                                              INCONS    46
      MSTAR=0                                                           INCONS    47
      NPARM=0                                                           INCONS    48
      IF(ITOC1.EQ.0) GO TO 6                                            INCONS    49
C                                                                       INCONS    50
C     CONSTRAINT EQUATIONS WILL BE INPUT DIRECTLY FOR ALL STATIONS      INCONS    51
C                                                                       INCONS    52
      READ(ITAPER,100) MSTAR                                            INCONS    53
C                                                                       INCONS    54
C     COMPUTE NPARM NUMBER OF SEARCH VARIABLES                          INCONS    55
C                                                                       INCONS    56
      DO 1 I=1,NUMSTR                                                   INCONS    57
      DO 2 J=1,13                                                       INCONS    58
```

```
                  IF(SCALE(I,J).EQ.0.) GO TO 2                                  INCONS     59
                  IF(J.EQ.3 .AND. KCONST.EQ.0) GO TO 2                          INCONS     60
60                NPARM = NPARM + 1                                             INCONS     61
                2 CONTINUE                                                      INCONS     62
                1 CONTINUE                                                      INCONS     63
              C                                                                 INCONS     64
                  DO 11 I= 1,MSTAR                                              INCONS     65
65                READ(ITAPER,101) (G(J,I),J=1,NPARM)                           INCONS     66
                  READ(ITAPER,101) BCOEF(I)                                     INCONS     67
               11 CONTINUE                                                      INCONS     68
                  GO TO 64                                                      INCONS     69
                6 CONTINUE                                                      INCONS     70
70            C                                                                 INCONS     71
              C     SET UP LOOP ON NUMSTR TO READ IN CONSTRAINT DATA            INCONS     72
              C     FOR SERS,MERS,AND PYLON FLEXIBILITY                         INCONS     73
              C                                                                 INCONS     74
                  DO 75 I = 1,NUMSTR                                            INCONS     75
75                READ(ITAPER,100) ITOC                                         INCONS     76
                  GO TO (20,30,40),ITOC                                         INCONS     77
              C                                                                 INCONS     78
              C SINGLE-STORE RACK INPUT                                         INCONS     79
              C                                                                 INCONS     80
80             20 CONTINUE                                                      INCONS     81
                  DO 23 J= 1,4                                                  INCONS     82
                  IF(SCALE(I,J).NE.0) GO TO 24                                  INCONS     83
               23 CONTINUE                                                      INCONS     84
                  GO TO 40                                                      INCONS     85
85             24 CONTINUE                                                      INCONS     86
                  READ(ITAPER,100) NCORN                                        INCONS     87
                  WRITE(ITAPEW,203) NCORN,I                                     INCONS     88
                  DO 22 J= 1,NCORN                                              INCONS     89
                  READ(ITAPER,101) CORNM(J),CORNI(J)                            INCONS     90
90                WRITE(ITAPEW,204) CORNM(J),CORNI(J)                           INCONS     91
               22 CONTINUE                                                      INCONS     92
                  CALL SERS(NCORN,I,NPARM,CORNM,CORNI)                          INCONS     93
                  NPARM = NPARM + 2                                             INCONS     94
                  GO TO 40                                                      INCONS     95
95            C                                                                 INCONS     96
              C MULTIPLE-EJECTION RACK INPUT                                    INCONS     97
              C                                                                 INCONS     98
               30 CONTINUE                                                      INCONS     99
                  DO 33 J= 1,7                                                  INCONS    100
100               IF(SCALE(I,J).NE.0) GO TO 34                                  INCONS    101
               33 CONTINUE                                                      INCONS    102
                  GO TO 40                                                      INCONS    103
               34 CONTINUE                                                      INCONS    104
                  READ(ITAPER,100) NCONST                                       INCONS    105
105               DO 32 J= 1,NCONST                                             INCONS    106
                  READ(ITAPER,101) (CORNM(K),CORNI(K),CORNS(K),K=1,3)           INCONS    107
                  CALL MERS(I,NPARM,CORNM,CORNI,CORNS)                          INCONS    108
               32 CONTINUE                                                      INCONS    109
                  NPARM = NPARM + 3                                             INCONS    110
110               GO TO 40                                                      INCONS    111
              C                                                                 INCONS    112
               40 CONTINUE                                                      INCONS    113
              C                                                                 INCONS    114
              C     INPUT PYLON FLEXIBILITY CONSTRAINTS                         INCONS    115
```

```
115           C                                                                  INCONS   116
                    READ( ITAPER, 100) NSTAR                                     INCONS   117
                    IF(NSTAR.EQ.0) GO TO 75                                      INCONS   118
              C                                                                  INCONS   119
              C     COMPUTE NEW VALUE OF NPARM                                   INCONS   120
120           C                                                                  INCONS   121
                    DO 60 J = 8, 13                                              INCONS   122
                    J7 = J - 7                                                   INCONS   123
                    IPARM(J7) = 0                                                INCONS   124
                    IF( SCALE(I,J) .EQ. 0.0 ) GO TO 60                           INCONS   125
125                 NPARM = NPARM + 1                                            INCONS   126
                    IPARM(J7) = NPARM                                            INCONS   127
                 60 CONTINUE                                                     INCONS   128
              C                                                                  INCONS   129
              C     INPUT CONSTRAINT EQUATIONS FOR PYLON FLEX                    INCONS   130
130           C                                                                  INCONS   131
                    DO 63 II = 1, NSTAR                                          INCONS   132
                    READ(ITAPER,102)  IDOF, CLIMIT                               INCONS   133
                102 FORMAT(I5,E15.5)                                             INCONS   134
                    MSTAR = MSTAR + 1                                            INCONS   135
135                 NAB = IABS( IDOF )                                           INCONS   136
                    NPOINT = IPARM(NAB)                                          INCONS   137
                    G(NPOINT,MSTAR) = 1.0 * ISIGN(1,IDOF)                        INCONS   138
                    BCOEF(MSTAR) = CLIMIT * ISIGN(1,IDOF)                        INCONS   139
                 63 CONTINUE                                                     INCONS   140
140              75 CONTINUE                                                     INCONS   141
                 64 CONTINUE                                                     INCONS   142
                    WRITE(ITAPEW,200)                                            INCONS   143
                    DO 51 I= 1,NPARM                                             INCONS   144
                 51 WRITE(ITAPEW,202) (G(I,J),J=1,MSTAR)                         INCONS   145
145                 WRITE(ITAPEW,201)                                            INCONS   146
                    WRITE(ITAPEW,202) (BCOEF(I),I= 1,MSTAR)                      INCONS   147
              C                                                                  INCONS   148
              CIBM                                                               INCONS   149
              C     WRITE (ITAPJP) JSET,JDIM,G,LMK,BCOEF,MSTAR,NOTJ,NOTDIM,LINDEP, INCONS 150
150           C    1               LDDIM,NOTACT,NDIM,XO,XN,DELX,GRO,GRN,DELG,Z,HO, INCONS 151
              C    2               HN,HGR,NPARM,ICONV,ICN                        INCONS   152
              C     REWIND ITAPJP                                                INCONS   153
              CIBM                                                               INCONS   154
              C                                                                  INCONS   155
155           CCDC                                                               INCONS   156
                    CALL WRITEC(G(1,1),GECS(1,1),1750)                           INCONS   157
                    CALL WRITEC(BCOEF(1),BCOECS(1),50)                           INCONS   158
                    CALL WRITEC(MSTAR,MSTRECS,1)                                 INCONS   159
                    CALL WRITEC(NPARM,NPMECS,1)                                  INCONS   160
160           CCDC                                                               INCONS   161
              C                                                                  INCONS   162
                    RETURN                                                       INCONS   163
                100 FORMAT(10I5)                                                 INCONS   164
                101 FORMAT(3(E15.5,5X))                                          INCONS   165
165             200 FORMAT(1H1,20X,16H CONSTRAINT EQS.,///,24X,                  INCONS   166
                   A       8HG MATRIX,//)                                        INCONS   167
                201 FORMAT(///,24X,8HB VECTOR,//)                                INCONS   168
                202 FORMAT(5(2X,E13.7))                                          INCONS   169
                203 FORMAT(1H1,20X,I4,22HCORNER POINTS ON RACK  ,I2,//           INCONS   170
170                A       ,10X,4HMASS,10X,7HINERTIA,//)                         INCONS   171
                204 FORMAT(6X,E13.7,2X,E13.7)                                    INCONS   172
```

END INCONS 173

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

76 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
1 INCONS 1 162

VARIABLES	SN	TYPE		RELOCATION								
3326	BCOECS	REAL	ARRAY	INCCOM	REFS	20	27	157				
10315	BCOEF	REAL	ARRAY	JGLV	REFS	12	146	157	DEFINED	39	66	138
552	CLIMIT	REAL			REFS	138	DEFINED	132				
567	CORNI	REAL	ARRAY		REFS	23	90	92	107	DEFINED	89	106
555	CORNM	REAL	ARRAY		REFS	23	90	92	107	DEFINED	89	106
601	CORNS	REAL	ARRAY		REFS	23	107	DEFINED	106			
257	DELG	REAL	ARRAY	POWELV	REFS	15						
106	DELX	REAL	ARRAY	POWELV	REFS	15						
63	G	REAL	ARRAY	JGLV	REFS	12	144	156	DEFINED	41	65	137
0	GECS	REAL	ARRAY	INCCOM	REFS	20	27	156				
214	GRN	REAL	ARRAY	POWELV	REFS	15						
151	GRO	REAL	ARRAY	POWELV	REFS	15						
5207	HGR	REAL	ARRAY	POWELV	REFS	15						
2676	HN	REAL	ARRAY	POWELV	REFS	15						
365	HO	REAL	ARRAY	POWELV	REFS	15						
537	I	INTEGER			REFS	39	41	58	65	66	82	87
						92	100	107	124	144	146	
					DEFINED	38	56	64	74	143	146	
5254	ICN	INTEGER		POWELV	REFS	15						
5253	ICONV	INTEGER		POWELV	REFS	15						
0	ICYCLE	INTEGER		STRCLU	REFS	10						
551	IDOF	INTEGER			REFS	135	137	138	DEFINED	132		
76	IDSTR	INTEGER	ARRAY	STORES	REFS	3						
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	3						
542	II	INTEGER			DEFINED	45	131					
613	IPARM	INTEGER	ARRAY		REFS	24	136	DEFINED	123	126		
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	3						
1	ISTEP	INTEGER		STRCLU	REFS	10						
535	ITAPER	INTEGER			DEFINED	30	I/O REFS	44	52	65	66	75
						86	89	104	106	116	132	
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	11	30	31				
536	ITAPEW	INTEGER			DEFINED	31	I/O REFS	87	90	142	144	145
						146						
543	ITOC	INTEGER			REFS	76	DEFINED	75				
541	ITOC1	INTEGER			REFS	48	DEFINED	44				
540	J	INTEGER			REFS	41	58	59	65	82	2*89	2*90
						100	122	124	144	DEFINED	40	57	65
						81	88	99	105	121	144	

VARIABLES	SN	TYPE		RELOCATION							
62	JDIM	INTEGER		JGLV	REFS	12					
0	JSET	INTEGER	ARRAY	JGLV	REFS	12					
550	J7	INTEGER			REFS	123	126	DEFINED	122		
546	K	INTEGER			REFS	3*106	DEFINED	106			
1	KCONST	INTEGER		STORES	REFS	3	59				
10545	LDDIM	INTEGER		JGLV	REFS	12					
10463	LINDEP	INTEGER	ARRAY	JGLV	REFS	12					
3411	LMK	INTEGER	ARRAY	JGLV	REFS	12					
10377	MSTAR	INTEGER		JGLV	REFS	12	64	134	137	138	144	146
						158	DEFINED	46	52	134		
3411	MSTRECS	INTEGER		INCCOM	REFS	20	27	158				
2	M1	INTEGER		STRCLU	REFS	10						
3	M2	INTEGER		STRCLU	REFS	10						
4	M3	INTEGER		STRCLU	REFS	10						
5	M4	INTEGER		STRCLU	REFS	10						
553	NAB	INTEGER			REFS	136	DEFINED	135				
545	NCONST	INTEGER			REFS	105	DEFINED	104				
544	NCORN	INTEGER			REFS	87	88	92	DEFINED	86		
10630	NDIM	INTEGER		JGLV	REFS	12						
10546	NOTACT	INTEGER	ARRAY	JGLV	REFS	12						
10462	NOTDIM	INTEGER		JGLV	REFS	12						
10400	NOTJ	INTEGER	ARRAY	JGLV	REFS	12						
5252	NPARM	INTEGER		POWELV	REFS	15	60	65	92	93	107	109
						125	126	143	159	DEFINED	47	60	93
						109	125					
3410	NPMECS	INTEGER		INCCOM	REFS	20	27	159				
554	NPOINT	INTEGER			REFS	137	DEFINED	136				
547	NSTAR	INTEGER			REFS	117	131	DEFINED	116			
0	NUMSTR	INTEGER		STORES	REFS	3	56	74				
362	SCALE	REAL	ARRAY	STORES	REFS	3	58	82	100	124		
11	STPOLD	REAL		STRCLU	REFS	10						
653	STRFDN	REAL	ARRAY	STORES	REFS	3						
615	STRFDO	REAL	ARRAY	STORES	REFS	3						
463	STRFI	REAL	ARRAY	STORES	REFS	3						
557	STRFN	REAL	ARRAY	STORES	REFS	3						
521	STRFO	REAL	ARRAY	STORES	REFS	3						
305	STRIDN	REAL	ARRAY	STORES	REFS	3						
266	STRIDO	REAL	ARRAY	STORES	REFS	3						
122	STRII	REAL	ARRAY	STORES	REFS	3						
160	STRIN	REAL	ARRAY	STORES	REFS	3						
141	STRIO	REAL	ARRAY	STORES	REFS	3						
343	STRRDN	REAL	ARRAY	STORES	REFS	3						
324	STRRDO	REAL	ARRAY	STORES	REFS	3						
177	STRRI	REAL	ARRAY	STORES	REFS	3						
235	STRRN	REAL	ARRAY	STORES	REFS	3						
216	STRRO	REAL	ARRAY	STORES	REFS	3						
261	STRWDN	REAL	ARRAY	STORES	REFS	3						
254	STRWDO	REAL	ARRAY	STORES	REFS	3						
103	STRWI	REAL	ARRAY	STORES	REFS	3						
115	STRWN	REAL	ARRAY	STORES	REFS	3						
110	STRWO	REAL	ARRAY	STORES	REFS	3						
10	VNEW	REAL		STRCLU	REFS	10						
7	VOLD	REAL		STRCLU	REFS	10						
6	VS	REAL		STRCLU	REFS	10						
43	XN	REAL	ARRAY	POWELV	REFS	15						
0	XO	REAL	ARRAY	POWELV	REFS	15						
322	Z	REAL	ARRAY	POWELV	REFS	15						

VARIABLES SN TYPE RELOCATION
VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES			
MERS		5	107			
SERS		5	92			
WRITEC		3	156	157	158	159

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
IABS	INTEGER	1	INTRIN		135	
ISIGN	INTEGER	2	INTRIN		137	138

STATEMENT LABELS			DEF LINE	REFERENCES					
0	1		62	56					
46	2		61	57	58	59			
0	5		42	38	40				
73	6		69	48					
0	11		67	64					
106	20		80	76					
0	22		91	88					
0	23		83	81					
115	24		85	82					
144	30		98	76					
0	32		108	105					
0	33		101	99					
153	34		103	100					
201	40		112	76	84	94	102	110	
0	51		144	143					
217	60		127	121	124				
0	63		139	131					
245	64		141	68					
242	75		140	74	117				
475	100	FMT	163	44	52	75	86	104	116
477	101	FMT	164	65	66	89	106		
453	102	FMT	133	132					
502	200	FMT	165	142					
510	201	FMT	167	145					
513	202	FMT	168	144	146				
516	203	FMT	169	87					
526	204	FMT	171	90					

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
6	5	I	38 42	14B		NOT INNER
15	5	J	40 42	2B	INSTACK	
32	1	I	56 62	21B		NOT INNER
41	2	J	57 61	7B	INSTACK	
54	11	I	64 67	17B		EXT REFS
74	75	I	74 140	151B		EXT REFS NOT INNER
107	23	J	81 83	5B	INSTACK	EXITS
122	22	J	88 91	17B		EXT REFS
145	33	J	99 101	5B	INSTACK	EXITS
156	32	J	105 108	22B		EXT REFS NOT INNER
161		K	106 106	11B		EXT REFS
212	60	J	121 127	7B	INSTACK	
225	63	II	131 139	17B		EXT REFS
250	51	I	143 144	20B		EXT REFS NOT INNER
253		J	144 144	11B		EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)			
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)			
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)			
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)			
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)			
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)			
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)			
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)			
		397 STRFDO (30)	427 STRFDN (30)				
STRCLU	10	0 ICYCLE (1)	1 ISTEP (1)	2 M1 (1)			
		3 M2 (1)	4 M3 (1)	5 M4 (1)			
		6 VS (1)	7 VOLD (1)	8 VNEW (1)			
		9 STPOLD (1)					
CTAPES	50	0 ITAPES (50)					
JGLV	4505	0 JSET (50)	50 JDIM (1)	51 G (1750)			
		1801 LMK (2500)	4301 BCOEF (50)	4351 MSTAR (1)			
		4352 NOTJ (50)	4402 NOTDIM (1)	4403 LINDEP (50)			
		4453 LDDIM (1)	4454 NOTACT (50)	4504 NDIM (1)			
POWELV	2733	0 XO (35)	35 XN (35)	70 DELX (35)			
		105 GRO (35)	140 GRN (35)	175 DELG (35)			
		210 Z (35)	245 HO (1225)	1470 HN (1225)			
		2695 HGR (35)	2730 NPARM (1)	2731 ICONV (1)			
		2732 ICN (1)					
INCCOM	1802 ECS	0 GECS (1750)	1750 BCOECS (50)	1800 NPMECS (1)			
		1801 MSTRECS(1)					

STATISTICS

PROGRAM LENGTH	621B	401
CM LABELED COMMON LENGTH	17113B	7755
ECS LABELED COMMON LENGTH	3412B	1802

52000B CM USED

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      SUBROUTINE SERS(NCP,IS,II,CORNM,CORNI)                            SERS       2
      COMMON /JGLV/ JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50),        SERS       3
     1              MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,            SERS       4
     2              NOTACT(50),NDIM                                    SERS       5
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    SERS       6
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)          SERS       7
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)               SERS       8
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)               SERS       9
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                       SERS      10
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                          SERS      11
     F      ,STRFDO(5,6),STRFDN(5,6)                                   SERS      12
       DIMENSION CORNM(1),CORNI(1),X(10),Y(10)                          SERS      13
C                                                                       SERS      14
C SCALE CORNER POINTS                                                   SERS      15
C                                                                       SERS      16
      DO 1 I= 1,NCP                                                     SERS      17
      X(I)  = CORNM(I)/SCALE(IS,1)                                      SERS      18
      Y(I)  = CORNI(I)/SCALE(IS,3)                                      SERS      19
    1 CONTINUE                                                          SERS      20
      DO 2 I= 1,NCP                                                     SERS      21
      IF(I.LT.NCP) GO TO 3                                              SERS      22
      DX    = X(1) - X(I)                                               SERS      23
      DY    = Y(1) - Y(I)                                               SERS      24
      GO TO 4                                                           SERS      25
    3 CONTINUE                                                          SERS      26
      DX    = X(I+1) - X(I)                                             SERS      27
      DY    = Y(I+1) - Y(I)                                             SERS      28
    4 CONTINUE                                                          SERS      29
      R     = SQRT(DX*DX + DY*DY)                                       SERS      30
C                                                                       SERS      31
C COMPUTE UNIT NORMAL                                                   SERS      32
C                                                                       SERS      33
      DNX   = -DY/R                                                     SERS      34
      DNY   = DX/R                                                      SERS      35
C                                                                       SERS      36
C COMPUTE OFFSET                                                        SERS      37
C                                                                       SERS      38
      OB    = DNX*X(I) + DNY*Y(I)                                       SERS      39
C                                                                       SERS      40
C FILL-UP B & G ARRAYS                                                  SERS      41
C                                                                       SERS      42
      MSTAR = MSTAR + 1                                                 SERS      43
      I1    = II+1                                                      SERS      44
      I2    = II+2                                                      SERS      45
      BCOEF(MSTAR)= OB                                                  SERS      46
      DO 5 J=1,35                                                       SERS      47
    5 G(J,MSTAR)= 0.                                                    SERS      48
      G(I1,MSTAR) = DNX                                                 SERS      49
      G(I2,MSTAR) = DNY                                                 SERS      50
    2 CONTINUE                                                          SERS      51
      RETURN                                                            SERS      52
      END                                                               SERS      53
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	SERS	1	51

VARIABLES	SN	TYPE		RELOCATION								
10315	BCOEF	REAL	ARRAY	JGLV	REFS	2	DEFINED	45				
0	CORNI	REAL	ARRAY	F.P.	REFS	12	18	DEFINED	1			
0	CORNM	REAL	ARRAY	F.P.	REFS	12	17	DEFINED	1			
106	DNX	REAL			REFS	38	48	DEFINED	33			
107	DNY	REAL			REFS	38	49	DEFINED	34			
103	DX	REAL			REFS	2*29	34	DEFINED	22	26		
104	DY	REAL			REFS	2*29	33	DEFINED	23	27		
63	G	REAL	ARRAY	JGLV	REFS	2	DEFINED	47	48	49		
102	I	INTEGER			REFS	2*17	2*18	21	22	23	2*26	2*27
						2*38	DEFINED	16	20			
76	IDSTR	INTEGER	ARRAY	STORES	REFS	5						
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	5						
0	II	INTEGER		F.P.	REFS	43	44	DEFINED	1			
0	IS	INTEGER		F.P.	REFS	17	18	DEFINED	1			
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	5						
111	I1	INTEGER			REFS	48	DEFINED	43				
112	I2	INTEGER			REFS	49	DEFINED	44				
113	J	INTEGER			REFS	47	DEFINED	46				
62	JDIM	INTEGER		JGLV	REFS	2						
0	JSET	INTEGER	ARRAY	JGLV	REFS	2						
1	KCONST	INTEGER		STORES	REFS	5						
10545	LDDIM	INTEGER		JGLV	REFS	2						
10463	LINDEP	INTEGER	ARRAY	JGLV	REFS	2						
3411	LMK	INTEGER	ARRAY	JGLV	REFS	2						
10377	MSTAR	INTEGER		JGLV	REFS	2	42	45	47	48	49	
					DEFINED	42						
0	NCP	INTEGER		F.P.	REFS	16	20	21	DEFINED	1		
10630	NDIM	INTEGER		JGLV	REFS	2						
10546	NOTACT	INTEGER	ARRAY	JGLV	REFS	2						
10462	NOTDIM	INTEGER		JGLV	REFS	2						
10400	NOTJ	INTEGER	ARRAY	JGLV	REFS	2						
0	NUMSTR	INTEGER		STORES	REFS	5						
110	OB	REAL			REFS	45	DEFINED	38				
105	R	REAL			REFS	33	34	DEFINED	29			
362	SCALE	REAL	ARRAY	STORES	REFS	5	17	18				
653	STRFDN	REAL	ARRAY	STORES	REFS	5						
615	STRFDO	REAL	ARRAY	STORES	REFS	5						
463	STRFI	REAL	ARRAY	STORES	REFS	5						
557	STRFN	REAL	ARRAY	STORES	REFS	5						
521	STRFO	REAL	ARRAY	STORES	REFS	5						
305	STRIDN	REAL	ARRAY	STORES	REFS	5						
266	STRIDO	REAL	ARRAY	STORES	REFS	5						
122	STRII	REAL	ARRAY	STORES	REFS	5						
160	STRIN	REAL	ARRAY	STORES	REFS	5						
141	STRIO	REAL	ARRAY	STORES	REFS	5						
343	STRRDN	REAL	ARRAY	STORES	REFS	5						
324	STRRDO	REAL	ARRAY	STORES	REFS	5						
177	STRRI	REAL	ARRAY	STORES	REFS	5						
235	STRRN	REAL	ARRAY	STORES	REFS	5						
216	STRRO	REAL	ARRAY	STORES	REFS	5						

VARIABLES	SN	TYPE	RELOCATION							
261	STRWDN	REAL	ARRAY	STORES	REFS	5				
254	STRWDO	REAL	ARRAY	STORES	REFS	5				
103	STRWI	REAL	ARRAY	STORES	REFS	5				
115	STRWN	REAL	ARRAY	STORES	REFS	5				
110	STRWO	REAL	ARRAY	STORES	REFS	5				
114	X	REAL	ARRAY		REFS	12	2*22	2*26	38	DEFINED 17
126	Y	REAL	ARRAY		REFS	12	2*23	2*27	38	DEFINED 18

EXTERNALS	TYPE	ARGS	REFERENCES
SQRT	REAL	1 LIBRARY	29

STATEMENT LABELS		DEF LINE	REFERENCES
0	1	19	16
0	2	50	20
34	3	25	21
41	4	28	24
0	5	47	46

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
16	1	I	16 19	5B	INSTACK
25	2	I	20 50	53B	EXT REFS NOT INNER
65	5	J	46 47	2B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
JGLV	4505	0 JSET (50)	50 JDIM (1)	51 G (1750)			
		1801 LMK (2500)	4301 BCOEF (50)	4351 MSTAR (1)			
		4352 NOTJ (50)	4402 NOTDIM (1)	4403 LINDEP (50)			
		4453 LDDIM (1)	4454 NOTACT (50)	4504 NDIM (1)			
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)			
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)			
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)			
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)			
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)			
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)			
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)			
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)			
		397 STRFDO (30)	427 STRFDN (30)				

STATISTICS

PROGRAM LENGTH	144B	100
CM LABELED COMMON LENGTH	11542B	4962
52000B CM USED		

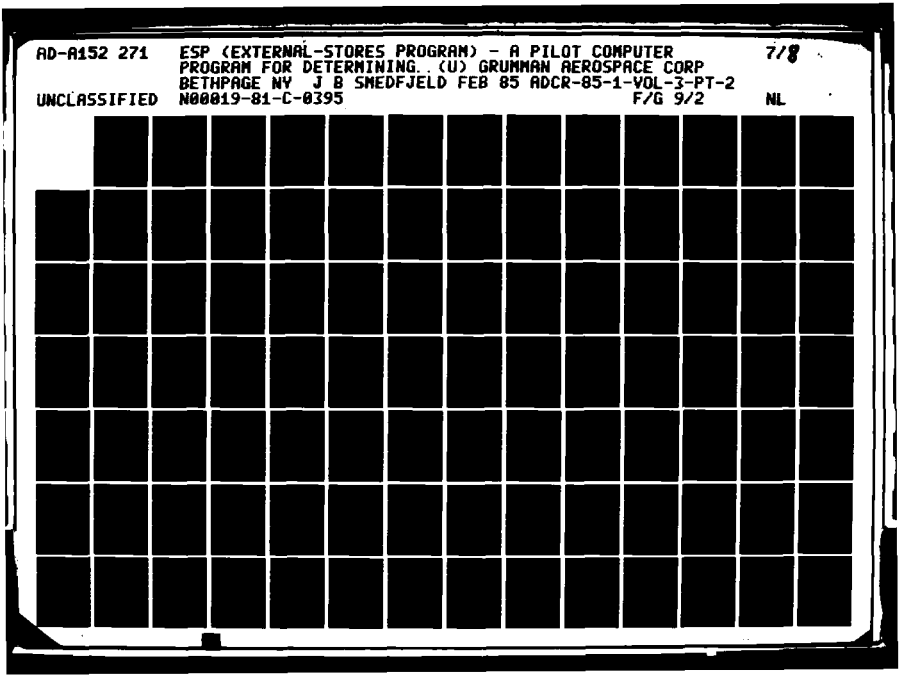
```
      SUBROUTINE MERS(IS,II,CORNM,CORNI,CORNS)                          MERS       2
      COMMON /JGLV/ JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50),        MERS       3
     1              MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,            MERS       4
     2              NOTACT(50),NDIM                                    MERS       5
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    MERS       6
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)          MERS       7
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)               MERS       8
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)               MERS       9
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                       MERS      10
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                          MERS      11
     F      ,STRFDO(5,6),STRFDN(5,6)                                   MERS      12
      DIMENSION CORNM(1),CORNI(1),CORNS(1),X(3),Y(3),Z(3)               MERS      13
      DIMENSION P21(3),P23(3)                                           MERS      14
C                                                                       MERS      15
C SCALE #OINTS ON PLANE                                                 MERS      16
C                                                                       MERS      17
      DO 1 I= 1,3                                                       MERS      18
      X(I)  = CORNM(I)/SCALE(IS,1)                                      MERS      19
      Y(I)  = CORNI(I)/SCALE(IS,3)                                      MERS      20
      Z(I)  = CORNS(I)/SCALE(IS,5)                                      MERS      21
    1 CONTINUE                                                          MERS      22
C                                                                       MERS      23
C COMPUTE 2 VECTORS IN THE PLANE                                        MERS      24
C                                                                       MERS      25
      P21(1) = X(1) - X(2)                                              MERS      26
      P21(2) = Y(1) - Y(2)                                              MERS      27
      P21(3) = Z(1) - Z(2)                                              MERS      28
      P23(1) = X(3) - X(2)                                              MERS      29
      P23(2) = Y(3) - Y(2)                                              MERS      30
      P23(3) = Z(3) - Z(2)                                              MERS      31
C                                                                       MERS      32
C COMPUTE NORMAL VECTOR                                                 MERS      33
C                                                                       MERS      34
      DX    = P21(2)*P23(3) - P21(3)*P23(2)                             MERS      35
      DY    = P21(3)*P23(1) - P21(1)*P23(3)                             MERS      36
      DZ    = P21(1)*P23(2) - P21(2)*P23(1)                             MERS      37
      R     = SQRT(DX*DX + DY*DY +DZ*DZ)                                MERS      38
C                                                                       MERS      39
C COMPUTE UNIT NORMAL                                                   MERS      40
C                                                                       MERS      41
      DX    = DX/R                                                      MERS      42
      DY    = DY/R                                                      MERS      43
      DZ    = DZ/R                                                      MERS      44
C                                                                       MERS      45
C COMPUTE OFFSET                                                        MERS      46
C                                                                       MERS      47
      OB    = DX*X(2) + DY*Y(2) + DZ*Z(2)                               MERS      48
C                                                                       MERS      49
C FILL-UP B & G ARRAYS                                                  MERS      50
C                                                                       MERS      51
      MSTAR = MSTAR + 1                                                 MERS      52
      I1    = II+1                                                      MERS      53
      I2    = II+2                                                      MERS      54
      I3    = II+3                                                      MERS      55
      BCOEF(MSTAR) = OB                                                 MERS      56
      DO 2 I=1,35                                                       MERS      57
    2 G(I,MSTAR) = 0.0                                                  MERS      58
```

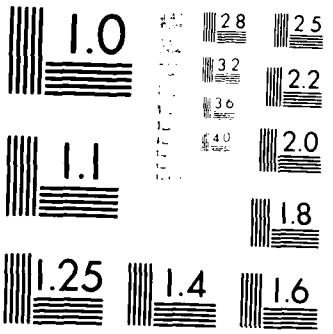
```
                    G(I1,MSTAR) = DX                                    MERS       59
                    G(I2,MSTAR) = DY                                    MERS       60
      60            G(I3,MSTAR) = DZ                                    MERS       61
                    RETURN                                              MERS       62
                    END                                                 MERS       63
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	MERS	1	61

VARIABLES	SN	TYPE		RELOCATION								
10315	BCOEF	REAL	ARRAY	JGLV	REFS	2	DEFINED	55				
0	CORNI	REAL	ARRAY	F.P.	REFS	12	19	DEFINED	1			
0	CORNM	REAL	ARRAY	F.P.	REFS	12	18	DEFINED	1			
0	CORNS	REAL	ARRAY	F.P.	REFS	12	20	DEFINED	1			
115	DX	REAL			REFS	2*37	41	47	58	DEFINED	34	41
116	DY	REAL			REFS	2*37	42	47	59	DEFINED	35	42
117	DZ	REAL			REFS	2*37	43	47	60	DEFINED	36	43
63	G	REAL	ARRAY	JGLV	REFS	2	DEFINED	57	58	59	60	
114	I	INTEGER			REFS	2*18	2*19	2*20	57	DEFINED	17	56
76	IDSTR	INTEGER	ARRAY	STORES	REFS	5						
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	5						
0	II	INTEGER		F.P.	REFS	52	53	54	DEFINED	1		
0	IS	INTEGER		F.P.	REFS	18	19	20	DEFINED	1		
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	5						
122	I1	INTEGER			REFS	58	DEFINED	52				
123	I2	INTEGER			REFS	59	DEFINED	53				
124	I3	INTEGER			REFS	60	DEFINED	54				
62	JDIM	INTEGER		JGLV	REFS	2						
0	JSET	INTEGER	ARRAY	JGLV	REFS	2						
1	KCONST	INTEGER		STORES	REFS	5						
10545	LDDIM	INTEGER		JGLV	REFS	2						
10463	LINDEP	INTEGER	ARRAY	JGLV	REFS	2						
3411	LMK	INTEGER	ARRAY	JGLV	REFS	2						
10377	MSTAR	INTEGER		JGLV	REFS	2	51	55	57	58	59	60
					DEFINED	51						
10630	NDIM	INTEGER		JGLV	REFS	2						
10546	NOTACT	INTEGER	ARRAY	JGLV	REFS	2						
10462	NOTDIM	INTEGER		JGLV	REFS	2						
10400	NOTJ	INTEGER	ARRAY	JGLV	REFS	2						
0	NUMSTR	INTEGER		STORES	REFS	5						
121	OB	REAL			REFS	55	DEFINED	47				
136	P21	REAL	ARRAY		REFS	13	2*34	2*35	2*36	DEFINED	25	26
					27							
141	P23	REAL	ARRAY		REFS	13	2*34	2*35	2*36	DEFINED	28	29
					30							
120	R	REAL			REFS	41	42	43	DEFINED	37		
362	SCALE	REAL	ARRAY	STORES	REFS	5	18	19	20			
653	STRFDN	REAL	ARRAY	STORES	REFS	5						
615	STRFDO	REAL	ARRAY	STORES	REFS	5						
463	STRFI	REAL	ARRAY	STORES	REFS	5						
557	STRFN	REAL	ARRAY	STORES	REFS	5						


AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING.. (U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2
UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL
7/8



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

VARIABLES	SN	TYPE	RELOCATION							
521	STRFO	REAL	ARRAY	STORES	REFS	5				
305	STRIDN	REAL	ARRAY	STORES	REFS	5				
266	STRIDO	REAL	ARRAY	STORES	REFS	5				
122	STRII	REAL	ARRAY	STORES	REFS	5				
160	STRIN	REAL	ARRAY	STORES	REFS	5				
141	STRIO	REAL	ARRAY	STORES	REFS	5				
343	STRRDN	REAL	ARRAY	STORES	REFS	5				
324	STRRDO	REAL	ARRAY	STORES	REFS	5				
177	STRRI	REAL	ARRAY	STORES	REFS	5				
235	STRRN	REAL	ARRAY	STORES	REFS	5				
216	STRRO	REAL	ARRAY	STORES	REFS	5				
261	STRWDN	REAL	ARRAY	STORES	REFS	5				
254	STRWDO	REAL	ARRAY	STORES	REFS	5				
103	STRWI	REAL	ARRAY	STORES	REFS	5				
115	STRWN	REAL	ARRAY	STORES	REFS	5				
110	STRWO	REAL	ARRAY	STORES	REFS	5				
12[illegible]	X	REAL	ARRAY		REFS	12	2*25	2*28	47	DEFINED 18
130	Y	REAL	ARRAY		REFS	12	2*26	2*29	47	DEFINED 19
133	Z	REAL	ARRAY		REFS	12	2*27	2*30	47	DEFINED 20

EXTERNALS	TYPE	ARGS	REFERENCES
SQRT	REAL	1 LIBRARY	37

STATEMENT LABELS		DEF LINE	REFERENCES
0	1	21	17
0	2	57	56

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
17	1	I	17 21	6B	INSTACK
76	2	I	56 57	2B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
JGLV	4505	0 JSET (50)	50 JDIM (1)	51 G (1750)
		1801 LMK (2500)	4301 BCOEF (50)	4351 MSTAR (1)
		4352 NOTJ (50)	4402 NOTDIM (1)	4403 LINDEP (50)
		4453 LDDIM (1)	4454 NOTACT (50)	4504 NDIM (1)
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)
		307 STRFI (30)	337 STRFO (30)	367 STRFN . (30)
		397 STRFDO (30)	427 STRFDN (30)	

STATISTICS

PROGRAM LENGTH	144B	100
CM LABELED COMMON LENGTH	11542B	4962
52000B CM USED		

```
      SUBROUTINE RECONS(II)                                                  RECONS     2
      COMMON /CTAPES/ ITAPES(50)                                             RECONS     3
      COMMON /JGL    / JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)           RECONS     4
     1         ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM       RECONS     5
      COMMON /NEWCON/  JNEW(50),NEWDIM                                       RECONS     6
C                                                                            RECONS     7
      ITAPER= ITAPES(5)                                                      RECONS     8
      ITAPEW= ITAPES(6)                                                      RECONS     9
      ITAPEP= ITAPES(48)                                                     RECONS    10
C                                                                            RECONS    11
CCDC                                                                         RECONS    12
      ITAPEI = ITAPES(47)                                                    RECONS    13
CCDC                                                                         RECONS    14
C                                                                            RECONS    15
      IF(II.EQ.0) GO TO 5                                                    RECONS    16
C                                                                            RECONS    17
C FOR RESTART, READ IN OLD CONSTRAINT INFO.                                  RECONS    18
C                                                                            RECONS    19
CIBM                                                                         RECONS    20
C     READ(ITAPER,10) JDIM,NOTDIM                                            RECONS    21
CIBM                                                                         RECONS    22
C                                                                            RECONS    23
CCDC                                                                         RECONS    24
      READ (ITAPEI,10) JDIM,NOTDIM                                           RECONS    25
CCDC                                                                         RECONS    26
C                                                                            RECONS    27
      IF(JDIM.EQ.0) GO TO 1                                                  RECONS    28
      WRITE(ITAPEW,12) JDIM                                                  RECONS    29
C                                                                            RECONS    30
CIBM                                                                         RECONS    31
C     READ (ITAPER,10) (JSET(I),I=1,MSTAR)                                   RECONS    32
CIBM                                                                         RECONS    33
C                                                                            RECONS    34
CCDC                                                                         RECONS    35
      READ (ITAPEI,10) (JSET(I),I=1,MSTAR)                                   RECONS    36
CCDC                                                                         RECONS    37
C                                                                            RECONS    38
      WRITE(ITAPEW,10) (JSET(I),I=1,MSTAR)                                   RECONS    39
    1 CONTINUE                                                               RECONS    40
      IF(NOTDIM.EQ.0) GO TO 2                                                RECONS    41
      WRITE(ITAPEW,13) NOTDIM                                                RECONS    42
C                                                                            RECONS    43
CIBM                                                                         RECONS    44
C     READ (ITAPER,10) (NOTJ(I),I=1,MSTAR)                                   RECONS    45
CIBM                                                                         RECONS    46
C                                                                            RECONS    47
CCDC                                                                         RECONS    48
      READ (ITAPEI,10) (NOTJ(I),I=1,MSTAR)                                   RECONS    49
CCDC                                                                         RECONS    50
C                                                                            RECONS    51
      WRITE(ITAPEW,10) (NOTJ(I),I=1,MSTAR)                                   RECONS    52
    2 CONTINUE                                                               RECONS    53
      IF(JDIM.EQ.0) GO TO 4                                                  RECONS    54
      WRITE(ITAPEW,15)                                                       RECONS    55
      DO 3 I= 1,JDIM                                                         RECONS    56
C                                                                            RECONS    57
CIBM                                                                         RECONS    58
```

```
      C     READ (ITAPER,14) (LMK(I,J),J=1,JDIM)                              RECONS     59
      CIBM                                                                    RECONS     60
60    C                                                                       RECONS     61
      CCDC                                                                    RECONS     62
            READ (ITAPEI,14) (LMK(I,J),J=1,JDIM)                              RECONS     63
      CCDC                                                                    RECONS     64
      C                                                                       RECONS     65
65          WRITE(ITAPEW,14) (LMK(I,J),J=1,JDIM)                              RECONS     66
          3 CONTINUE                                                          RECONS     67
          4 CONTINUE                                                          RECONS     68
      C                                                                       RECONS     69
      CIBM                                                                    RECONS     70
70    C     READ(ITAPER,10)  NEWDIM,(JNEW(I), I=1,NEWDIM)                     RECONS     71
      CIBM                                                                    RECONS     72
      C                                                                       RECONS     73
      CCDC                                                                    RECONS     74
            READ (ITAPEI,10) NEWDIM,(JNEW(I),I=1,NEWDIM)                      RECONS     75
75    CCDC                                                                    RECONS     76
      C                                                                       RECONS     77
            IF(NEWDIM.NE.0) WRITE(ITAPEW,16) NEWDIM,(JNEW(I), I=1,NEWDIM)     RECONS     78
            RETURN                                                            RECONS     79
      C                                                                       RECONS     80
80    C SAVE CONSTRAINT INFO. FOR RESTART                                     RECONS     81
      C                                                                       RECONS     82
          5 CONTINUE                                                          RECONS     83
            WRITE(ITAPEP,10) JDIM,NOTDIM                                      RECONS     84
            IF(JDIM.EQ.0) GO TO 6                                             RECONS     85
85          WRITE(ITAPEW,12) JDIM                                             RECONS     86
            WRITE(ITAPEW,10) (JSET(I),I=1,MSTAR)                              RECONS     87
            WRITE(ITAPEP,10) (JSET(I),I=1,MSTAR)                              RECONS     88
          6 CONTINUE                                                          RECONS     89
            IF(NOTDIM.EQ.0) GO TO 7                                           RECONS     90
90          WRITE(ITAPEW,13) NOTDIM                                           RECONS     91
            WRITE(ITAPEW,10) (NOTJ(I),I=1,MSTAR)                              RECONS     92
            WRITE(ITAPEP,10) (NOTJ(I),I=1,MSTAR)                              RECONS     93
          7 CONTINUE                                                          RECONS     94
            IF(JDIM.EQ.0) GO TO 9                                             RECONS     95
95          WRITE(ITAPEW,15)                                                  RECONS     96
            DO 8 I= 1,JDIM                                                    RECONS     97
            WRITE(ITAPEW,14) (LMK(I,J),J=1,JDIM)                              RECONS     98
            WRITE(ITAPEP,14) (LMK(I,J),J=1,JDIM)                              RECONS     99
          8 CONTINUE                                                          RECONS    100
100       9 CONTINUE                                                          RECONS    101
            WRITE(ITAPEP,10) NEWDIM,(JNEW(I), I=1,NEWDIM)                     RECONS    102
            RETURN                                                            RECONS    103
         10 FORMAT(10I5)                                                      RECONS    104
         12 FORMAT(//2X,27HAS RESTART BEGINS THERE ARE,                       RECONS    105
105       1       I3,46H ACTIVE CONSTRAINTS WITH THE FOLLOWING INDICES/)      RECONS    106
         13 FORMAT(//2X,27HAS RESTART BEGINS THERE ARE,                       RECONS    107
           1       I3,48H INACTIVE CONSTRAINTS WITH THE FOLLOWING INDICES/)   RECONS    108
         14 FORMAT(5(2X,E13.7))                                               RECONS    109
         15 FORMAT (//2X,28HTHE INVERSE MOMENT MATRIX IS/)                    RECONS    110
110      16 FORMAT(1HO,2X,I2,29H NEW CONSTRAINTS WITH INDICES,10I3)           RECONS    111
            END                                                               RECONS    112
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES	
3	RECONS	1	78	102

VARIABLES		SN	TYPE		RELOCATION							
10315	BCOEF		REAL	ARRAY	JGL	REFS	3					
63	G		REAL	ARRAY	JGL	REFS	3					
457	I		INTEGER			REFS	35	38	48	51	62	65	74
							77	86	87	91	92	97	98	101
						DEFINED	35	38	48	51	55	74	77
							86	87	91	92	96	101		
0	II		INTEGER		F.P.	REFS	15	DEFINED	1				
456	ITAPEI		INTEGER			DEFINED	12	I/O REFS	24	35	48	62	74
455	ITAPEP		INTEGER			DEFINED	9	I/O REFS	83	87	92	98	101
453	ITAPER	*	INTEGER			DEFINED	7						
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	2	7	8	9	12		
454	ITAPEW		INTEGER			DEFINED	8	I/O REFS	28	38	41	51	54
							65	77	85	86	90	91	95	97
460	J		INTEGER			REFS	62	65	97	98	DEFINED	62	65
							97	98					
62	JDIM		INTEGER		JGL	REFS	3	27	28	53	55	62	65
							83	84	85	94	96	97	98	
						DEFINED	24						
0	JNEW		INTEGER	ARRAY	NEWCON	REFS	5	77	101	DEFINED	74		
0	JSET		INTEGER	ARRAY	JGL	REFS	3	38	86	87	DEFINED	35	
10545	LDDIM		INTEGER		JGL	REFS	3						
10463	LINDEP		INTEGER	ARRAY	JGL	REFS	3						
3411	LMK		INTEGER	ARRAY	JGL	REFS	3	65	97	98	DEFINED	62	
10377	MSTAR		INTEGER		JGL	REFS	3	35	38	48	51	86	87
							91	92					
10630	NDIM		INTEGER		JGL	REFS	3						
62	NEWDIM		INTEGER		NEWCON	REFS	5	74	3*77	2*101	DEFINED	74	
10546	NOTACT		INTEGER	ARRAY	JGL	REFS	3						
10462	NOTDIM		INTEGER		JGL	REFS	3	40	41	83	89	90	
						DEFINED	24						
10400	NOTJ		INTEGER	ARRAY	JGL	REFS	3	51	91	92	DEFINED	48	

VARIABLES USED AS FILE NAMES, SEE ABOVE

STATEMENT LABELS			DEF LINE	REFERENCES								
32	1		39	27								
47	2		52	40								
0	3		66	55								
110	4		67	53								
126	5		82	15								
145	6		88	84								
162	7		93	89								
0	8		99	96								
223	9		100	94								
406	10	FMT	103	24	35	38	48	51	74	83	86	87
				91	92	101						
410	12	FMT	104	28	85							
422	13	FMT	106	41	90							
435	14	FMT	108	62	65	97	98					
440	15	FMT	109	54	95							
445	16	FMT	110	77								

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
53	3	I	55 66	35B	EXT REFS	NOT INNER
56		J	62 62	11B	EXT REFS	
73		J	65 65	11B	EXT REFS	
166	8	I	96 99	35B	EXT REFS	NOT INNER
171		J	97 97	11B	EXT REFS	
206		J	98 98	11B	EXT REFS	

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
CTAPES	50	0	ITAPES	(50)						
JGL	4505	0	JSET	(50)	50	JDIM	(1)	51	G	(1750)
		1801	LMK	(2500)	4301	BCOEF	(50)	4351	MSTAR	(1)
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)
NEWCON	51	0	JNEW	(50)	50	NEWDIM	(1)			

STATISTICS

PROGRAM LENGTH	461B	305
CM LABELED COMMON LENGTH	10776B	4606
520008 CM USED		

```
      SUBROUTINE SETJGL                                                 SETJGL     2
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)     SETJGL     3
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM SETJGL     4
      COMMON /CTAPES/ ITAPES                                            SETJGL     5
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35) SETJGL     6
     1               ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON      SETJGL     7
      COMMON /MAX/     MAXDIM                                           SETJGL     8
C                                                                       SETJGL     9
C                                                                       SETJGL    10
      DIMENSION CFCN(50),G1SK(35),ITAPES(50)                            SETJGL    11
CIBM                                                                    SETJGL    12
C     REAL*8 SUM                                                        SETJGL    13
CIBM                                                                    SETJGL    14
      REAL LMK                                                          SETJGL    15
C                                                                       SETJGL    16
      ITAPEW = ITAPES(6)                                                SETJGL    17
      WRITE(ITAPEW,1)                                                   SETJGL    18
C                                                                       SETJGL    19
C     CALCULATE VALUES OF CONSTRAINT FUNCTIONS AT XN                    SETJGL    20
C                                                                       SETJGL    21
      DO 100 J=1,MSTAR                                                  SETJGL    22
CCDC                                                                    SETJGL    23
      SUM = 0.0                                                         SETJGL    24
CCDC                                                                    SETJGL    25
CIBM                                                                    SETJGL    26
C     SUM = 0.D0                                                        SETJGL    27
CIBM                                                                    SETJGL    28
      JS = (J-1) * MAXDIM + 1                                           SETJGL    29
      CFCN(J) = SOSCAP(G,XN,SUM,NPARM,1,1,JS,1) - BCOEF(J)              SETJGL    30
100   CONTINUE                                                          SETJGL    31
      WRITE(ITAPEW,6)                                                   SETJGL    32
      WRITE(ITAPEW,5) (CFCN(J), J=1,MSTAR)                              SETJGL    33
C                                                                       SETJGL    34
C     TEST TO SEE WHICH CONSTRAINTS ARE ACTIVE AND SET UP POINTER VECTOR SETJGL    35
C                                                                       SETJGL    36
      NOTDIM = 0                                                        SETJGL    37
      JDIM = 0                                                          SETJGL    38
      LDDIM = 0                                                         SETJGL    39
      IND2 = 0                                                          SETJGL    40
      INDEX = 0                                                         SETJGL    41
      IND=0                                                             SETJGL    42
      DO 50 J=1,MSTAR                                                   SETJGL    43
      JSET(J) = 0                                                       SETJGL    44
      NOTJ(J) = 0                                                       SETJGL    45
      LINDEP(J) = 0                                                     SETJGL    46
      NOTACT(J) = 0                                                     SETJGL    47
      IF(CFCN(J).LT.-1.0E-03) GO TO 40                                  SETJGL    48
      IF(INDEX.GT.0) GO TO 20                                           SETJGL    49
C                                                                       SETJGL    50
C     INITIALIZE LMK AND JDIM                                           SETJGL    51
C                                                                       SETJGL    52
      INDEX = INDEX + 1                                                 SETJGL    53
      JSET(1) = J                                                       SETJGL    54
      JDIM = 1                                                          SETJGL    55
      DO 10 I=1,NPARM                                                   SETJGL    56
CCDC                                                                    SETJGL    57
      SUM = 0.0                                                         SETJGL    58
```

```
      CCDC                                                              SETJGL     59
      CIBM                                                              SETJGL     60
60    C     SUM = 0.DO                                                  SETJGL     61
      CIBM                                                              SETJGL     62
            KS = (J-1) * MAXDIM + 1                                     SETJGL     63
            IS = (I-1) * MAXDIM + 1                                     SETJGL     64
            G1SK(I) = SOSCAP(G,HN,SUM,NPARM,1,1,KS,IS)                  SETJGL     65
65          10    CONTINUE                                              SETJGL     66
      CCDC                                                              SETJGL     67
            SUM = 0.0                                                   SETJGL     68
      CCDC                                                              SETJGL     69
      CIBM                                                              SETJGL     70
70    C     SUM = 0.DO                                                  SETJGL     71
      CIBM                                                              SETJGL     72
            VAR = SOSCAP(G1SK,G,SUM,NPARM,1,1,1,KS)                     SETJGL     73
            LMK(1,1) = 1.0/VAR                                          SETJGL     74
            GO TO 50                                                    SETJGL     75
75          20    CONTINUE                                              SETJGL     76
            JDUM = J                                                    SETJGL     77
            LD = 0                                                      SETJGL     78
            KALL = 0                                                    SETJGL     79
            CALL ADDCON(JDUM,KALL,LD)                                   SETJGL     80
80          IF(LD.NE.1) GO TO 50                                        SETJGL     81
            IND2 = IND2 + 1                                             SETJGL     82
            LINDEP(IND2) = J                                            SETJGL     83
      40    CONTINUE                                                    SETJGL     84
            IND = IND + 1                                               SETJGL     85
85          NOTJ(IND) = J                                               SETJGL     86
      50    CONTINUE                                                    SETJGL     87
            NOTDIM = IND                                                SETJGL     88
            LDDIM = IND2                                                SETJGL     89
            IND = 0                                                     SETJGL     90
90          DO 70 I=1,NOTDIM                                            SETJGL     91
            ICON = NOTJ(I)                                              SETJGL     92
            ITEST = 0                                                   SETJGL     93
            DO 60 K=1,LDDIM                                             SETJGL     94
      60    IF(LINDEP(K).EQ.ICON) ITEST = 1                             SETJGL     95
95          IF(ITEST.EQ.1) GO TO 70                                     SETJGL     96
            IND = IND + 1                                               SETJGL     97
            NOTACT(IND) = NOTJ(I)                                       SETJGL     98
      70    CONTINUE                                                    SETJGL     99
            NDIM = IND                                                  SETJGL    100
100         IF(JDIM.EQ.0) RETURN                                        SETJGL    101
      C                                                                 SETJGL    102
            WRITE(ITAPEW,2) (JSET(J),J=1,JDIM)                          SETJGL    103
            WRITE(ITAPEW,4)                                             SETJGL    104
            DO 80 I=1,JDIM                                              SETJGL    105
105         WRITE(ITAPEW,3) (LMK(I,J),J=1,JDIM)                         SETJGL    106
      80    CONTINUE                                                    SETJGL    107
          1 FORMAT(1HO,/,10X,15HENTERING SETJGL)                        SETJGL    108
          2 FORMAT(1HO,10X,7HJSET = ,10I5)                              SETJGL    109
          3   FORMAT(10X,10(1X,1P1E11.4))                               SETJGL    110
110       4 FORMAT(//10X,27HINVERSE MOMENT MATRIX,  LMK/)               SETJGL    111
          5 FORMAT(5(2X,1PE12.5))                                       SETJGL    112
          6 FORMAT(//10X,26HCONSTRAINT FUNCTIONS AT XN/)                SETJGL    113
            RETURN                                                      SETJGL    114
            END                                                         SETJGL    115
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES
1 SETJGL 1 100 113

VARIABLES SN TYPE RELOCATION

10315	BCOEF	REAL	ARRAY	JGL	REFS	2	29					
327	CFCN	REAL	ARRAY		REFS	10	32	47	DEFINED	29		
257	DELG	REAL	ARRAY	POWELL	REFS	5						
106	DELX	REAL	ARRAY	POWELL	REFS	5						
63	G	REAL	ARRAY	JGL	REFS	2	29	64	72			
214	GRN	REAL	ARRAY	POWELL	REFS	5						
151	GRO	REAL	ARRAY	POWELL	REFS	5						
411	G1SK	REAL	ARRAY		REFS	10	72	DEFINED	64			
5207	HGR	REAL	ARRAY	POWELL	REFS	5						
2676	HN	REAL	ARRAY	POWELL	REFS	5	64					
365	HO	REAL	ARRAY	POWELL	REFS	5						
316	I	INTEGER			REFS	63	64	91	97	105		
					DEFINED	55	90	104				
5253	ICON	INTEGER		POWELL	REFS	5	94	DEFINED	91			
315	IND	INTEGER			REFS	84	85	87	96	97	99	
					DEFINED	41	84	89	96			
314	INDEX	INTEGER			REFS	48	52	DEFINED	40	52		
313	IND2	INTEGER			REFS	81	82	88	DEFINED	39	81	
320	IS	INTEGER			REFS	64	DEFINED	63				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	4	10	16				
307	ITAPEW	INTEGER			DEFINED	16	I/O REFS	17	31	32	102	103
					105							
325	ITEST	INTEGER			REFS	95	DEFINED	92	94			
310	J	INTEGER			REFS	28	2*29	32	43	44	45	46
					47	53	62	76	82	85	102	105
					DEFINED	21	32	42	102	105		
62	JDIM	INTEGER		JGL	REFS	2	100	102	104	105		
					DEFINED	37	54					
322	JDUM	INTEGER			REFS	79	DEFINED	76				
312	JS	INTEGER			REFS	29	DEFINED	28				
0	JSET	INTEGER	ARRAY	JGL	REFS	2	102	DEFINED	43	53		
326	K	INTEGER			REFS	94	DEFINED	93				
324	KALL	INTEGER			REFS	79	DEFINED	78				
317	KS	INTEGER			REFS	64	72	DEFINED	62			
323	LD	INTEGER			REFS	79	80	DEFINED	77			
10545	LDDIM	INTEGER		JGL	REFS	2	93	DEFINED	38	88		
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	2	94	DEFINED	45	82		
3411	LMK	REAL	ARRAY	JGL	REFS	2	14	105	DEFINED	73		
0	MAXDIM	INTEGER		MAX	REFS	7	28	62	63			
10377	MSTAR	INTEGER		JGL	REFS	2	21	32	42			
10630	NDIM	INTEGER		JGL	REFS	2	DEFINED	99				
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	2	DEFINED	46	97			
10462	NOTDIM	INTEGER		JGL	REFS	2	90	DEFINED	36	87		
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	2	91	97	DEFINED	44	85	
5252	NPARM	INTEGER		POWELL	REFS	5	29	55	64	72		
311	SUM	REAL			REFS	29	64	72	DEFINED	23	57	67
321	VAR	REAL			REFS	73	DEFINED	72				
43	XN	REAL	ARRAY	POWELL	REFS	5	29					
0	XO	REAL	ARRAY	POWELL	REFS	5						
322	Z	REAL	ARRAY	POWELL	REFS	5						

```
VARIABLES     SN  TYPE          RELOCATION
      VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS          TYPE   ARGS      REFERENCES
      ADDCON                3          79
      SOSCAP     REAL       8          29        64        72

STATEMENT LABELS            DEF LINE   REFERENCES
  253  1        FMT            107        17
  257  2        FMT            108       102
  263  3        FMT            109       105
  266  4        FMT            110       103
  273  5        FMT            111        32
  276  6        FMT            112        31
    0  10                       65        55
   65  20                       75        48
   76  40                       83        47
  101  50                       86        42        74        80
    0  60                       94        93
  130  70                       98        90        95
    0  80                      106       104
    0  100                      30        21

LOOPS  LABEL    INDEX     FROM-TO    LENGTH    PROPERTIES
    6  100      J          21 30        11B              EXT REFS
   33  50       J          42 86        51B              EXT REFS  NOT INNER
   45  10       I          55 65        13B              EXT REFS
  110  70       I          90 98        23B              NOT INNER
  116  60       K          93 94         4B     INSTACK
  145  80       I         104 106       20B              EXT REFS  NOT INNER
  150           J         105 105       11B              EXT REFS

COMMON BLOCKS   LENGTH    MEMBERS - BIAS NAME(LENGTH)
      JGL         4505          0 JSET   (50)        50 JDIM   (1)        51 G      (1750)
                             1801 LMK    (2500)    4301 BCOEF  (50)    4351 MSTAR  (1)
                             4352 NOTJ   (50)      4402 NOTDIM (1)     4403 LINDEP (50)
                             4453 LDDIM  (1)       4454 NOTACT (50)    4504 NDIM   (1)
      CTAPES        50          0 ITAPES (50)
      POWELL      2732          0 XO     (35)        35 XN     (35)        70 DELX   (35)
                              105 GRO    (35)       140 GRN    (35)       175 DELG   (35)
                              210 Z      (35)       245 HO     (1225)    1470 HN     (1225)
                             2695 HGR    (35)      2730 NPARM  (1)      2731 ICON   (1)
      MAX            1          0 MAXDIM (1)

STATISTICS
  PROGRAM LENGTH                4548      300
  CM LABELED COMMON LENGTH     16170B    7288
        52000B CM USED
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```
      SUBROUTINE LMKP1                                                  LMKP1      2
C                                                                       LMKP1      3
C     THIS ROUTINE UPDATES THE INVERSE MOMENT MATRIX WITH RESPECT TO K. LMKP1      4
C                                                                       LMKP1      5
      COMMON /CTAPES/ ITAPES                                            LMKP1      6
      COMMON /JGL/       JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)    LMKP1      7
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM LMKP1      8
      COMMON /POWELL/    XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35) LMKP1      9
     1           ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON          LMKP1     10
      COMMON /MAX/ MAXDIM                                               LMKP1     11
      COMMON /MURTS/    YK(35)                                          LMKP1     12
C                                                                       LMKP1     13
      DIMENSION VK(50),DUM(50),YKGM(50),ITAPES(50)                      LMKP1     14
C                                                                       LMKP1     15
CIBM                                                                    LMKP1     16
C     REAL*8 SUM                                                        LMKP1     17
CIBM                                                                    LMKP1     18
C                                                                       LMKP1     19
      REAL LMK                                                          LMKP1     20
C                                                                       LMKP1     21
C                                                                       LMKP1     22
      ITAPEW = ITAPES(6)                                                LMKP1     23
      WRITE(ITAPEW,1)                                                   LMKP1     24
      DO 10 I=1,JDIM                                                    LMKP1     25
CCDC                                                                    LMKP1     26
      SUM = 0.0                                                         LMKP1     27
CCDC                                                                    LMKP1     28
CIBM                                                                    LMKP1     29
C     SUM = 0.D0                                                        LMKP1     30
CIBM                                                                    LMKP1     31
      I1 = JSET(I)                                                      LMKP1     32
      IS = (I1-1) * MAXDIM + 1                                          LMKP1     33
      DUM(I) = SOSCAP(G,Z,SUM,NPARM,1,1,IS,1)                           LMKP1     34
10    CONTINUE                                                          LMKP1     35
      DO 20 I=1,JDIM                                                    LMKP1     36
CCDC                                                                    LMKP1     37
      SUM = 0.0                                                         LMKP1     38
CCDC                                                                    LMKP1     39
CIBM                                                                    LMKP1     40
C     SUM = 0.D0                                                        LMKP1     41
CIBM                                                                    LMKP1     42
      VK(I) = SOSCAP(LMK,DUM,SUM,JDIM,50,1,I,1)                         LMKP1     43
20    CONTINUE                                                          LMKP1     44
      DO 30 I=1,JDIM                                                    LMKP1     45
CCDC                                                                    LMKP1     46
      SUM = 0.0                                                         LMKP1     47
CCDC                                                                    LMKP1     48
CIBM                                                                    LMKP1     49
C     SUM = 0.D0                                                        LMKP1     50
CIBM                                                                    LMKP1     51
      I1 = JSET(I)                                                      LMKP1     52
      JS = (I1-1) * MAXDIM + 1                                          LMKP1     53
      YKGM(I) = SOSCAP(YK,G,SUM,NPARM,1,1,1,JS)                         LMKP1     54
30    CONTINUE                                                          LMKP1     55
      DO 40 I=1,JDIM                                                    LMKP1     56
CCDC                                                                    LMKP1     57
      SUM = 0.0                                                         LMKP1     58
```

```
                CCDC                                                                    LMKP1      59
                CIBM                                                                    LMKP1      60
60              C       SUM = 0.DO                                                      LMKP1      61
                CIBM                                                                    LMKP1      62
                        JS = (I-1) * 50 + 1                                             LMKP1      63
                        DUM(I) = SOSCAP(YKGM,LMK,SUM,JDIM,1,1,1,JS)                     LMKP1      64
                40      CONTINUE                                                        LMKP1      65
65              CCDC                                                                    LMKP1      66
                        SUM = 0.0                                                       LMKP1      67
                CCDC                                                                    LMKP1      68
                CIBM                                                                    LMKP1      69
                C       SUM = 0.DO                                                      LMKP1      70
70              CIBM                                                                    LMKP1      71
                        VAL = SOSCAP(YKGM,VK,SUM,JDIM,1,1,1,1) + 1.                     LMKP1      72
                        DO 50 I=1,JDIM                                                  LMKP1      73
                        DO 50 J=1,JDIM                                                  LMKP1      74
                CCDC                                                                    LMKP1      75
75                      SUM = 0.0                                                       LMKP1      76
                CCDC                                                                    LMKP1      77
                CIBM                                                                    LMKP1      78
                C       SUM = 0.DO                                                      LMKP1      79
                CIBM                                                                    LMKP1      80
80                      LMK(I,J) = LMK(I,J) -  SOSCAP(VK,DUM,SUM,1,1,1,I,J)/VAL         LMKP1      81
                50      CONTINUE                                                        LMKP1      82
                        WRITE(ITAPEW,2)                                                 LMKP1      83
                        DO 60 I=1,JDIM                                                  LMKP1      84
                        WRITE(ITAPEW,3) (LMK(I,J),J=1,JDIM)                             LMKP1      85
85              60      CONTINUE                                                        LMKP1      86
                    1   FORMAT(1HO,10X,14HENTERING LMKP1)                               LMKP1      87
                    2   FORMAT(1HO,10X,27HINVERSE MOMENT MATRIX,  LMK,/)                LMKP1      88
                3       FORMAT(1HO,10X,10(1X,1P1E11.4))                                 LMKP1      89
                        RETURN                                                          LMKP1      90
90                      END                                                             LMKP1      91
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
1	LMKP1	1	89

VARIABLES		SN	TYPE		RELOCATION							
10315	BCOEF		REAL	ARRAY	JGL	REFS	6					
257	DELG		REAL	ARRAY	POWELL	REFS	8					
106	DELX		REAL	ARRAY	POWELL	REFS	8					
337	DUM		REAL	ARRAY		REFS	13	42	80	DEFINED	33	63
63	G		REAL	ARRAY	JGL	REFS	6	33	53			
214	GRN		REAL	ARRAY	POWELL	REFS	8					
151	GRO		REAL	ARRAY	POWELL	REFS	8					
5207	HGR		REAL	ARRAY	POWELL	REFS	8					
2676	HN		REAL	ARRAY	POWELL	REFS	8					
365	HO		REAL	ARRAY	POWELL	REFS	8					
246	I		INTEGER			REFS	31	33	2*42	51	53	62	63
						3*80	84	DEFINED	24	35	44	55	72
						83							

VARIABLES	SN	TYPE		RELOCATION								
5253	ICON	INTEGER		POWELL	REFS	8						
251	IS	INTEGER			REFS	33	DEFINED	32				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	5	13	22				
245	ITAPEW	INTEGER			DEFINED	22	I/O REFS	23	82	84		
250	I1	INTEGER			REFS	32	52	DEFINED	31	51		
254	J	INTEGER			REFS	3*80	84	DEFINED	73	84		
62	JDIM	INTEGER		JGL	REFS	6	24	35	42	44	55	63
						71	72	73	83	84		
252	JS	INTEGER			REFS	53	63	DEFINED	52	62		
0	JSET	INTEGER	ARRAY	JGL	REFS	6	31	51				
10545	LDDIM	INTEGER		JGL	REFS	6						
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	6						
3411	LMK	REAL	ARRAY	JGL	REFS	6	19	42	63	80	84	
					DEFINED	80						
0	MAXDIM	INTEGER		MAX	REFS	10	32	52				
10377	MSTAR	INTEGER		JGL	REFS	6						
10630	NDIM	INTEGER		JGL	REFS	6						
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	6						
10462	NOTDIM	INTEGER		JGL	REFS	6						
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	6						
5252	NPARM	INTEGER		POWELL	REFS	8	33	53				
247	SUM	REAL			REFS	33	42	53	63	71	80	
					DEFINED	26	37	46	57	66	75	
253	VAL	REAL			REFS	80	DEFINED	71				
255	VK	REAL	ARRAY		REFS	13	71	80	DEFINED	42		
43	XN	REAL	ARRAY	POWELL	REFS	8						
0	XO	REAL	ARRAY	POWELL	REFS	8						
0	YK	REAL	ARRAY	MURTS	REFS	11	53					
421	YKGM	REAL	ARRAY		REFS	13	63	71	DEFINED	53		
322	Z	REAL	ARRAY	POWELL	REFS	8	33					

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES					
SOSCAP	REAL	8	33	42	53	63	71	80

STATEMENT LABELS			DEF LINE	REFERENCES	
225	1	FMT	86	23	
231	2	FMT	87	82	
236	3	FMT	88	84	
0	10		34	24	
0	20		43	35	
0	30		54	44	
0	40		64	55	
0	50		81	72	73
0	60		85	83	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
6	10	I	24 34	13B	EXT REFS	
22	20	I	35 43	7B	EXT REFS	
32	30	I	44 54	13B	EXT REFS	
46	40	I	55 64	11B	EXT REFS	
64	50	I	72 81	15B	EXT REFS	NOT INNER
65	50	J	73 81	11B	EXT REFS	
103	60	I	83 85	20B	EXT REFS	NOT INNER
106		J	84 84	11B	EXT REFS	

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS	DEF LINE	REFERENCES
3 HYPER	1	54

VARIABLES	SN	TYPE	RELOCATION								
10315	BCOEF	REAL	ARRAY	JGL	REFS	6					
257	DELG	REAL	ARRAY	POWELL	REFS	9					
106	DELX	REAL	ARRAY	POWELL	REFS	9	47	DEFINED	45		
63	G	REAL	ARRAY	JGL	REFS	6	35				
214	GRN	REAL	ARRAY	POWELL	REFS	9					
151	GRO	REAL	ARRAY	POWELL	REFS	9					
5207	HGR	REAL	ARRAY	POWELL	REFS	9	45	49			
2676	HN	REAL	ARRAY	POWELL	REFS	9	35				
365	HO	REAL	ARRAY	POWELL	REFS	9					
150	I	INTEGER			REFS	2*35	2*44	3*45	47	48	49
					DEFINED	25	37	47	48	49	
5253	ICON	INTEGER		POWELL	REFS	9					
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	8	18	23			
147	ITAPEW	INTEGER			DEFINED	23	I/O REFS	24	47	48	49
151	J	INTEGER			REFS	33	35	DEFINED	26		
62	JDIM	INTEGER		JGL	REFS	6	26	44			
154	JJ	INTEGER			REFS	35	DEFINED	34			
0	JSET	INTEGER	ARRAY	JGL	REFS	6	33				
153	J1	INTEGER			REFS	34	DEFINED	33			
0	LAM	REAL	ARRAY	F.P.	REFS	17	20	44	DEFINED	1	
10545	LDDIM	INTEGER		JGL	REFS	6					
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	6					
3411	LMK	INTEGER	ARRAY	JGL	REFS	6					
0	MAXDIM	INTEGER		MAX	REFS	11	34	35	44		
10377	MSTAR	INTEGER		JGL	REFS	6					
10630	NDIM	INTEGER		JGL	REFS	6					
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	6					
10462	NOTDIM	INTEGER		JGL	REFS	6					
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	6					
5252	NPARM	INTEGER		POWELL	REFS	9	25	35	37	47	48	49
3503	SGL	REAL	ARRAY		REFS	17	45	48	DEFINED	44	
155	SKGM	REAL	ARRAY		REFS	17	44	DEFINED	35		
152	SUM	REAL			REFS	35	44	DEFINED	28	39	
43	XN	REAL	ARRAY	POWELL	REFS	9					
0	XO	REAL	ARRAY	POWELL	REFS	9					
322	Z	REAL	ARRAY	POWELL	REFS	9					

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
SOSCAP	REAL	8	35	44

STATEMENT LABELS			DEF LINE	REFERENCES	
124	1	FMT	50	24	
130	2	FMT	51	47	
135	3	FMT	52	48	
142	4	FMT	53	49	
0	10		36	25	26
0	20		46	37	

```
      SUBROUTINE HYPER(LAM)                                                  HYPER      2
C                                                                            HYPER      3
C     THIS SUBROUTINE COMPUTES THE PROJECTION OF THE UNCONSTRAINED           HYPER      4
C     STEP ONTO THE INTERSECTION OF HYPERSPACES.                             HYPER      5
C                                                                            HYPER      6
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)          HYPER      7
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM     HYPER      8
      COMMON /CTAPES/ ITAPES                                                 HYPER      9
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)      HYPER     10
     1                ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON         HYPER     11
      COMMON /MAX/ MAXDIM                                                    HYPER     12
C                                                                            HYPER     13
CIBM                                                                         HYPER     14
C     REAL*8 SUM                                                             HYPER     15
CIBM                                                                         HYPER     16
C                                                                            HYPER     17
      DIMENSION SKGM(35,50),SGL(35),LAM(1)                                   HYPER     18
      DIMENSION ITAPES(50)                                                   HYPER     19
C                                                                            HYPER     20
      REAL LAM                                                               HYPER     21
C                                                                            HYPER     22
C                                                                            HYPER     23
      ITAPEW = ITAPES(6)                                                     HYPER     24
      WRITE(ITAPEW,1)                                                        HYPER     25
      DO 10 I=1,NPARM                                                        HYPER     26
      DO 10 J=1,JDIM                                                         HYPER     27
CCDC                                                                         HYPER     28
      SUM = 0.0                                                              HYPER     29
CCDC                                                                         HYPER     30
CIBM                                                                         HYPER     31
C     SUM = 0.D0                                                             HYPER     32
CIBM                                                                         HYPER     33
      J1 = JSET(J)                                                           HYPER     34
      JJ = (J1 - 1) * MAXDIM + 1                                             HYPER     35
      SKGM(I,J) = SOSCAP(HN,G,SUM,NPARM,MAXDIM,1,I,JJ)                       HYPER     36
10    CONTINUE                                                               HYPER     37
      DO 20 I=1,NPARM                                                        HYPER     38
CCDC                                                                         HYPER     39
      SUM = 0.0                                                              HYPER     40
CCDC                                                                         HYPER     41
CIBM                                                                         HYPER     42
C     SUM = 0.D0                                                             HYPER     43
CIBM                                                                         HYPER     44
      SGL(I) = SOSCAP(SKGM,LAM,SUM,JDIM,MAXDIM,1,I,1)                        HYPER     45
      DELX(I) = SGL(I) - HGR(I)                                              HYPER     46
20    CONTINUE                                                               HYPER     47
      WRITE(ITAPEW,2) (DELX(I),I=1,NPARM)                                    HYPER     48
      WRITE(ITAPEW,3) (SGL(I),I=1,NPARM)                                     HYPER     49
      WRITE(ITAPEW,4) (HGR(I),I=1,NPARM)                                     HYPER     50
    1 FORMAT(1HO,/,10X,14HENTERING HYPER)                                    HYPER     51
    2 FORMAT(//10X,14HDELX TRANSPOSE//5(2X,1PE12.5))                         HYPER     52
    3 FORMAT(//10X,9HSK*GM*LAM//5(2X,1PE12.5))                               HYPER     53
    4 FORMAT(//10X,6HSK*GRN//5(2X,1PE12.5))                                  HYPER     54
      RETURN                                                                 HYPER     55
      END                                                                    HYPER     56
```

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)	
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)	
CTAPES	50	0	ITAPES	(50)							
POWELL	2732	0	XO	(35)	35	XN	(35)	70	DELX	(35)	
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)	
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)	
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICON	(1)	
MAX	1	0	MAXDIM	(1)							

STATISTICS

PROGRAM LENGTH	2108	136
CM LABELED COMMON LENGTH	161708	7288
520008 CM USED		

ENTRY POINTS		DEF LINE	REFERENCES
3	LAGMUL	1	48

VARIABLES	SN	TYPE		RELOCATION									
10315	BCOEF	REAL	ARRAY	JGL	REFS	6							
257	DELG	REAL	ARRAY	POWELL	REFS	9							
106	DELX	REAL	ARRAY	POWELL	REFS	9							
124	DUM	REAL	ARRAY		REFS	13	41	DEFINED	32				
63	G	REAL	ARRAY	JGL	REFS	6	32						
214	GRN	REAL	ARRAY	POWELL	REFS	9							
151	GRO	REAL	ARRAY	POWELL	REFS	9							
5207	HGR	REAL	ARRAY	POWELL	REFS	9	32						
2676	HN	REAL	ARRAY	POWELL	REFS	9							
365	HO	REAL	ARRAY	POWELL	REFS	9							
5253	ICON	INTEGER		POWELL	REFS	9							
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	8	14	21					
117	ITAPEW	INTEGER			DEFINED	21	I/O REFS	22	43	44			
120	J	INTEGER			REFS	30	32	2*41	44	DEFINED	23	34	
					44								
62	JDIM	INTEGER		JGL	REFS	6	23	34	41	44			
123	JS	INTEGER			REFS	32	DEFINED	31					
0	JSET	INTEGER	ARRAY	JGL	REFS	6	30						
122	J1	INTEGER			REFS	31	DEFINED	30					
0	LAM	REAL	ARRAY	F.P.	REFS	13	20	44	DEFINED	1	41		
10545	LDDIM	INTEGER		JGL	REFS	6							
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	6							
3411	LMK	INTEGER	ARRAY	JGL	REFS	6	41						
0	MAXDIM	INTEGER		MAX	REFS	11	31						
10377	MSTAR	INTEGER		JGL	REFS	6							
10630	NDIM	INTEGER		JGL	REFS	6							
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	6							
10462	NOTDIM	INTEGER		JGL	REFS	6							
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	6							
5252	NPARM	INTEGER		POWELL	REFS	9	32						
121	SUM	REAL			REFS	32	41	DEFINED	25	36			
43	XN	REAL	ARRAY	POWELL	REFS	9							
0	XO	REAL	ARRAY	POWELL	REFS	9							
322	Z	REAL	ARRAY	POWELL	REFS	9							

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
SOSCAP	REAL	8	32	41

STATEMENT LABELS			DEF LINE	REFERENCES
100	1	FMT	45	22
104	2	FMT	46	44
110	3	FMT	47	43
0	20		33	23
0	30		42	34

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	20	J	23 33	13B	EXT REFS
26	30	J	34 42	7B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
JGL	4505	0 JSET	(50)	50 JDIM	(1)	51 G	(1750)
		1801 LMK	(2500)	4301 BCOEF	(50)	4351 MSTAR	(1)

```
      SUBROUTINE LAGMUL(LAM)                                                    LAGMUL     2
C                                                                               LAGMUL     3
C     THIS SUBROUTINE CALCULATES LAGRANGE MULTIPLIERS FOR JDIM                  LAGMUL     4
C     CONSTRAINTS.                                                              LAGMUL     5
C                                                                               LAGMUL     6
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)             LAGMUL     7
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM        LAGMUL     8
      COMMON /CTAPES/ ITAPES                                                    LAGMUL     9
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)         LAGMUL    10
     1                 ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON          LAGMUL    11
      COMMON /MAX/ MAXDIM                                                       LAGMUL    12
C                                                                               LAGMUL    13
      DIMENSION LAM(1),DUM(50)                                                  LAGMUL    14
      DIMENSION ITAPES(50)                                                      LAGMUL    15
C                                                                               LAGMUL    16
CIBM                                                                            LAGMUL    17
C     REAL*8 SUM                                                                LAGMUL    18
CIBM                                                                            LAGMUL    19
C                                                                               LAGMUL    20
      REAL LAM                                                                  LAGMUL    21
      ITAPEW = ITAPES(6)                                                        LAGMUL    22
      WRITE(ITAPEW,1)                                                           LAGMUL    23
      DO 20 J=1,JDIM                                                            LAGMUL    24
CCDC                                                                            LAGMUL    25
      SUM = 0.0                                                                 LAGMUL    26
CCDC                                                                            LAGMUL    27
CIBM                                                                            LAGMUL    28
C     SUM = 0.D0                                                                LAGMUL    29
CIBM                                                                            LAGMUL    30
      J1 = JSET(J)                                                              LAGMUL    31
      JS = (J1-1) * MAXDIM + 1                                                  LAGMUL    32
      DUM(J) = SOSCAP(G,HGR,SUM,NPARM,1,1,JS,1)                                 LAGMUL    33
   20 CONTINUE                                                                  LAGMUL    34
      DO 30 J=1,JDIM                                                            LAGMUL    35
CCDC                                                                            LAGMUL    36
      SUM = 0.0                                                                 LAGMUL    37
CCDC                                                                            LAGMUL    38
CIBM                                                                            LAGMUL    39
C     SUM = 0.D0                                                                LAGMUL    40
CIBM                                                                            LAGMUL    41
      LAM(J) = SOSCAP(LMK,DUM,SUM,JDIM,50,1,J,1)                                LAGMUL    42
   30 CONTINUE                                                                  LAGMUL    43
      WRITE(ITAPEW,3)                                                           LAGMUL    44
      WRITE(ITAPEW,2) (LAM(J),J=1,JDIM)                                         LAGMUL    45
    1 FORMAT(1HO,/,10X,15HENTERING LAGMUL)                                      LAGMUL    46
    2 FORMAT(1HO,10X,10(1X,1P1E11.4))                                           LAGMUL    47
    3 FORMAT(1HO,10X,26HLAGRANGE MULTIPLIERS,  LAM)                             LAGMUL    48
      RETURN                                                                    LAGMUL    49
      END                                                                       LAGMUL    50
```

SYMBOLIC REFERENCE MAP (R=3)

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
251	120	J	189 197	11B	EXT REFS
275	130	K	199 202	3B	INSTACK
306	140	I	206 208	20B	EXT REFS NOT INNER
311		J	207 207	11B	EXT REFS
340	150	I	221 226	10B	OPT
364	155	I	236 241	10B	OPT

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
JGL	4505	0	JSET (50)	50	JDIM (1)	51	G (1750)
		1801	LMK (2500)	4301	BCOEF (50)	4351	MSTAR (1)
		4352	NOTJ (50)	4402	NOTDIM (1)	4403	LINDEP (50)
		4453	LDDIM (1)	4454	NOTACT (50)	4504	NDIM (1)
CTAPES	50	0	ITAPES (50)				
POWELL	2732	0	XO (35)	35	XN (35)	70	DELX (35)
		105	GRO (35)	140	GRN (35)	175	DELG (35)
		210	Z (35)	245	HO (1225)	1470	HN (1225)
		2695	HGR (35)	2730	NPARM (1)	2731	ICON (1)
MAX	1	0	MAXDIM (1)				

STATISTICS

PROGRAM LENGTH	126468	5542
CM LABELED COMMON LENGTH	161708	7288

520008 CM USED

VARIABLES	SN	TYPE		RELOCATION								
					DEFINED	38	50	61	70	86	113	123
					133	142	153	162	171	180	191	
675	VAL	REAL			REFS	94	95					
43	XN	REAL	ARRAY	POWELL	REFS	9						
0	XO	REAL	ARRAY	POWELL	REFS	9						
322	Z	REAL	ARRAY	POWELL	REFS	9						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES							
NRM2		3	94							
SOSCAP	REAL	8	45	76	92	119	130	139	149	158	167
			176	186	196					

STATEMENT LABELS				DEF LINE	REFERENCES		
622	1	FMT		246	26		
631	2	FMT		248	207		
634	3	FMT		249	244		
640	4	FMT		250	205		
574	5	FMT		100	99		
0	10			46	35	36	
17	11			31	27		
0	20			63	55		
0	30			66	47	48	
0	40			78	67	68	
0	50			93	84		
135	60			107	95		
0	70			120	111		
0	80			131	121		
0	90			150	140		
0	95			159	151		
0	100			168	160		
564	102	FMT	NO REFS	65			
645	108	FMT		251	28		
0	110			187	178		
0	120			197	188	189	
0	130			202	199		
0	140			208	206		
347	150			226	221	224	
373	155			241	236	239	
377	160			243	214	232	233

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
20	10	I	35 46	178		EXT REFS	NOT INNER
21	10	J	36 46	148		EXT REFS	
40	30	I	47 66	278		NOT INNER	
41	30	J	48 66	238		NOT INNER	
47	20	K	55 63	78	INSTACK		
70	40	I	67 78	208		EXT REFS	NOT INNER
71	40	J	68 78	158		EXT REFS	
111	50	I	84 93	118		EXT REFS	
136	70	I	111 120	118		EXT REFS	
150	80	I	121 131	138		EXT REFS	
172	90	I	140 150	138		EXT REFS	
206	95	I	151 159	78		EXT REFS	
216	100	I	160 168	78		EXT REFS	
236	110	I	178 187	118		EXT REFS	
250	120	I	188 197	158		EXT REFS	NOT INNER

VARIABLES	SN	TYPE		RELOCATION								
					129	130	147	149	2*158	2*167	185	186
					3*196	207	222	223	225	237	238	240
					DEFINED	35	47	67	84	111	121	140
					151	160	178	188	206	221	236	
5253	ICON	INTEGER		POWELL	REFS	9						
676	IS	INTEGER			REFS	130	149	DEFINED	128	148		
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	8	21	25				
665	ITAPEW	INTEGER			DEFINED	25	I/O REFS	26	28	99	205	207
					244							
700	I1	INTEGER			REFS	148	DEFINED	147				
667	J	INTEGER			REFS	43	45	61	64	75	76	3*77
					3*196	207	244	DEFINED	36	48	68	189
					207	244						
62	JDIM	INTEGER		JGL	REFS	6	36	47	55	76	121	140
					151	158	167	178	186	188	189	198
					199	213	244	DEFINED	212			
703	JDIM1	INTEGER			REFS	200	201	2*203	206	207	212	
					DEFINED	198						
0	JNEW	INTEGER		F.P.	REFS	26	27	28	91	99	105	118
					128	138	169	213	223	238		
					DEFINED	1	29					
672	JS	INTEGER			REFS	45	76	92	119	130	139	176
					186	DEFINED	44	75	91	118	129	138
					169	185						
0	JSET	INTEGER	ARRAY	JGL	REFS	6	43	56	147	244		
					DEFINED	213						
705	JTEST	INTEGER			REFS	224	239	DEFINED	220	223	235	238
671	J1	INTEGER			REFS	44	DEFINED	43				
673	K	INTEGER			REFS	56	61	2*200	2*201	DEFINED	55	199
0	KALL	INTEGER		F.P.	REFS	103	214	232	DEFINED	1		
674	K1	INTEGER			REFS	61	DEFINED	56				
0	LD	INTEGER		F.P.	DEFINED	1	102					
10545	LDDIM	INTEGER		JGL	REFS	6	104	105	233	234		
					DEFINED	104	242					
707	LD1	INTEGER			REFS	236	242	DEFINED	234			
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	6	27	238	240	DEFINED	105	240
3411	LMK	REAL	ARRAY	JGL	REFS	6	18	61	158	186	196	207
					DEFINED	196	200	201	203			
710	LMKGMT	REAL	ARRAY		REFS	18	22	76	DEFINED	64		
0	MAXDIM	INTEGER		MAX	REFS	11	44	45	76	91	92	118
					119	128	129	138	148	167	169	
10377	MSTAR	INTEGER		JGL	REFS	6						
10630	NDIM	INTEGER		JGL	REFS	6						
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	6						
10462	NOTDIM	INTEGER		JGL	REFS	6	219	227	DEFINED	228		
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	6	223	225	DEFINED	225	227	
704	NOT1	INTEGER			REFS	221	228	DEFINED	219			
5252	NPARM	INTEGER		POWELL	REFS	9	35	45	48	67	68	84
					92	94	111	119	130	139	149	160
					176							
706	N1	INTEGER			REFS	225	240	DEFINED	222	237		
10264	PROJ	REAL	ARRAY		REFS	23	77	92	DEFINED	76	77	
12575	PROJG	REAL	ARRAY		REFS	23	94	DEFINED	92			
4464	SKGM	REAL	ARRAY		REFS	20	76	130	167	DEFINED	45	
10012	SKGMP1	REAL	ARRAY		REFS	22	139	149	DEFINED	119		
670	SUM	REAL			REFS	45	61	64	76	92	119	130
					139	149	158	167	176	186	196	

```
                C                                                                   ADDCON    230
  230           C     UPDATE LINDEP IF CALLED FROM CONSTR                           ADDCON    231
                C                                                                   ADDCON    232
                      IF(KALL.EQ.2) GO TO 160                                       ADDCON    233
                      IF(LDDIM.EQ.0) GO TO 160                                      ADDCON    234
                      LD1 = LDDIM - 1                                               ADDCON    235
  235                 JTEST = 0                                                     ADDCON    236
                      DO 155 I=1,LD1                                                ADDCON    237
                      N1 = I+1                                                      ADDCON    238
                      IF(LINDEP(I).EQ.JNEW) JTEST = 1                               ADDCON    239
                      IF(JTEST.NE.1) GO TO 155                                      ADDCON    240
  240                 LINDEP(I) = LINDEP(N1)                                        ADDCON    241
                155   CONTINUE                                                      ADDCON    242
                      LDDIM = LD1                                                   ADDCON    243
                160   CONTINUE                                                      ADDCON    244
                      WRITE(ITAPEW,3) (JSET(J),J=1,JDIM)                            ADDCON    245
  245           C                                                                   ADDCON    246
                    1 FORMAT(1HO,/,10X,27HENTERING ADDCON, CONSTRAINT,I4,12H TO BE ADDED ADDCON    247
                     1)                                                             ADDCON    248
                2     FORMAT(10X,10(1X,1P1E11.4))                                   ADDCON    249
                    3 FORMAT(1HO,10X,7HJSET = ,10I5)                                ADDCON    250
  250               4 FORMAT(1HO,10X,27HINVERSE MOMENT MATRIX,  LMK,/)              ADDCON    251
                  108 FORMAT(1HO,5X,11HCONSTRAINT ,I3,29HWAS LINEARLY DEPENDENT DURING, ADDCON    252
                     144H THIS STEP. IT SHOULD NOT BE ADDED TO BASIS.)              ADDCON    253
                      RETURN                                                        ADDCON    254
                      END                                                           ADDCON    255
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES			
3	ADDCON	1	30	103	106	253

VARIABLES

	SN	TYPE										
701	AZERO	REAL			REFS	177	196	DEFINED	176			
702	AZINV	REAL			REFS	186	203	DEFINED	177			
4236	A21	REAL	ARRAY		REFS	20	186	DEFINED	130			
4320	A21LMK	REAL	*UNDEF		REFS	20						
677	A22	REAL			REFS	176	DEFINED	139				
10315	BCOEF	REAL	ARRAY	JGL	REFS	6						
4402	B21	REAL	ARRAY		REFS	20	2*196	200	201	DEFINED	186	
257	DELG	REAL	ARRAY	POWELL	REFS	9						
106	DELX	REAL	ARRAY	POWELL	REFS	9						
10055	DUM1	REAL	ARRAY		REFS	22	158	DEFINED	149			
10137	DUM2	REAL	ARRAY		REFS	22	176	DEFINED	167			
10202	DUM3	REAL	ARRAY		REFS	22	167	DEFINED	158			
63	G	REAL	ARRAY	JGL	REFS	6	45	61	92	119	130	139
						149	176					
214	GRN	REAL	ARRAY	POWELL	REFS	9						
151	GRO	REAL	ARRAY	POWELL	REFS	9						
5207	HGR	REAL	ARRAY	POWELL	REFS	9						
2676	HN	REAL	ARRAY	POWELL	REFS	9	45	119				
365	HO	REAL	ARRAY	POWELL	REFS	9						
666	I	INTEGER			REFS	2*45	61	64	2*76	3*77	2*92	2*119

```
      CCDC                                                                  ADDCON   173
      CIBM                                                                  ADDCON   174
      C     SUM = 0.DO                                                      ADDCON   175
175   CIBM                                                                  ADDCON   176
            AZERO = A22 - SOSCAP(G,DUM2,SUM,NPARM,1,1,JS,1)                 ADDCON   177
            AZINV = 1./AZERO                                                ADDCON   178
            DO 110 I=1,JDIM                                                 ADDCON   179
      CCDC                                                                  ADDCON   180
180         SUM = 0.0                                                       ADDCON   181
      CCDC                                                                  ADDCON   182
      CIBM                                                                  ADDCON   183
      C     SUM = 0.DO                                                      ADDCON   184
      CIBM                                                                  ADDCON   185
185         JS = (I-1) * 50 + 1                                             ADDCON   186
            B21(I) = -AZINV * SOSCAP(A21,LMK,SUM,JDIM,1,1,1,JS)             ADDCON   187
      110   CONTINUE                                                        ADDCON   188
            DO 120 I=1,JDIM                                                 ADDCON   189
            DO 120 J=1,JDIM                                                 ADDCON   190
190   CCDC                                                                  ADDCON   191
            SUM = 0.0                                                       ADDCON   192
      CCDC                                                                  ADDCON   193
      CIBM                                                                  ADDCON   194
      C     SUM = 0.DO                                                      ADDCON   195
195   CIBM                                                                  ADDCON   196
            LMK(I,J) = LMK(I,J) + AZERO * SOSCAP(B21,B21,SUM,1,1,1,I,J)     ADDCON   197
      120   CONTINUE                                                        ADDCON   198
            JDIM1 = JDIM + 1                                                ADDCON   199
            DO 130 K=1,JDIM                                                 ADDCON   200
200         LMK(JDIM1,K) = B21(K)                                           ADDCON   201
            LMK(K,JDIM1) = B21(K)                                           ADDCON   202
      130   CONTINUE                                                        ADDCON   203
            LMK(JDIM1,JDIM1) = AZINV                                        ADDCON   204
      C                                                                     ADDCON   205
205         WRITE(ITAPEW,4)                                                 ADDCON   206
            DO 140 I=1,JDIM1                                                ADDCON   207
            WRITE(ITAPEW,2) (LMK(I,J), J=1,JDIM1)                           ADDCON   208
      140   CONTINUE                                                        ADDCON   209
      C                                                                     ADDCON   210
210   C     UPDATE JSET                                                     ADDCON   211
      C                                                                     ADDCON   212
            JDIM = JDIM1                                                    ADDCON   213
            JSET(JDIM) = JNEW                                               ADDCON   214
            IF(KALL.EQ.0) GO TO 160                                         ADDCON   215
215   C                                                                     ADDCON   216
      C                                                                     ADDCON   217
      C     UPDATE NOTJ WHEN ADDCON IS CALLED FROM CONSTR OR LDFIX          ADDCON   218
      C                                                                     ADDCON   219
            NOT1 = NOTDIM - 1                                               ADDCON   220
220         JTEST = 0                                                       ADDCON   221
            DO 150 I=1,NOT1                                                 ADDCON   222
            N1 = I+1                                                        ADDCON   223
            IF(NOTJ(I).EQ.JNEW) JTEST = 1                                   ADDCON   224
            IF(JTEST.NE.1) GO TO 150                                        ADDCON   225
225         NOTJ(I) = NOTJ(N1)                                              ADDCON   226
      150   CONTINUE                                                        ADDCON   227
            NOTJ(NOTDIM) = 0                                                ADDCON   228
            NOTDIM = NOT1                                                   ADDCON   229
```

```
115          CIBM                                                                    ADDCON   116
             C      SUM = 0.DO                                                       ADDCON   117
             CIBM                                                                    ADDCON   118
                    JS = (JNEW-1) * MAXDIM + 1                                      ADDCON   119
                    SKGMP1(I) = SOSCAP(HN,G,SUM,NPARM,MAXDIM,1,I,JS)                ADDCON   120
120          70     CONTINUE                                                        ADDCON   121
                    DO 80 I=1,JDIM                                                  ADDCON   122
             CCDC                                                                    ADDCON   123
                    SUM = 0.0                                                       ADDCON   124
             CCDC                                                                    ADDCON   125
125          CIBM                                                                    ADDCON   126
             C      SUM = 0.DO                                                       ADDCON   127
             CIBM                                                                    ADDCON   128
                    IS = (JNEW - 1) * MAXDIM + 1                                    ADDCON   129
                    JS = (I-1) * MAXDIM + 1                                         ADDCON   130
130                 A21(I) = SOSCAP(G,SKGM,SUM,NPARM,1,1,IS,JS)                     ADDCON   131
             80     CONTINUE                                                        ADDCON   132
             CCDC                                                                    ADDCON   133
                    SUM = 0.0                                                       ADDCON   134
             CCDC                                                                    ADDCON   135
135          CIBM                                                                    ADDCON   136
             C      SUM = 0.DO                                                       ADDCON   137
             CIBM                                                                    ADDCON   138
                    JS = (JNEW-1) * MAXDIM + 1                                      ADDCON   139
                    A22 = SOSCAP(G,SKGMP1,SUM,NPARM,1,1,JS,1)                       ADDCON   140
140                 DO 90 I=1,JDIM                                                  ADDCON   141
             CCDC                                                                    ADDCON   142
                    SUM = 0.0                                                       ADDCON   143
             CCDC                                                                    ADDCON   144
             CIBM                                                                    ADDCON   145
145          C      SUM = 0.DO                                                       ADDCON   146
             CIBM                                                                    ADDCON   147
                    I1 = JSET(I)                                                    ADDCON   148
                    IS = (I1 - 1) * MAXDIM + 1                                      ADDCON   149
                    DUM1(I) = SOSCAP(G,SKGMP1,SUM,NPARM,1,1,IS,1)                   ADDCON   150
150          90     CONTINUE                                                        ADDCON   151
                    DO 95 I=1,JDIM                                                  ADDCON   152
             CCDC                                                                    ADDCON   153
                    SUM = 0.0                                                       ADDCON   154
             CCDC                                                                    ADDCON   155
155          CIBM                                                                    ADDCON   156
             C      SUM = 0.DO                                                       ADDCON   157
             CIBM                                                                    ADDCON   158
                    DUM3(I) = SOSCAP(LMK,DUM1,SUM,JDIM,50,1,I,1)                    ADDCON   159
             95     CONTINUE                                                        ADDCON   160
160                 DO 100 I=1,NPARM                                                ADDCON   161
             CCDC                                                                    ADDCON   162
                    SUM = 0.0                                                       ADDCON   163
             CCDC                                                                    ADDCON   164
             CIBM                                                                    ADDCON   165
165          C      SUM = 0.DO                                                       ADDCON   166
             CIBM                                                                    ADDCON   167
                    DUM2(I) = SOSCAP(SKGM,DUM3,SUM,JDIM,MAXDIM,1,I,1)               ADDCON   168
             100    CONTINUE                                                        ADDCON   169
                    JS = (JNEW - 1) * MAXDIM + 1                                    ADDCON   170
170          CCDC                                                                    ADDCON   171
                    SUM = 0.0                                                       ADDCON   172
```

```
      C     SUM = SUM + DBLE(LMK(I,K)) * DBLE(G(J,K1))                        ADDCON     59
      CIBM                                                                    ADDCON     60
60    CCDC                                                                    ADDCON     61
            SUM = SUM + LMK(I,K) * G(J,K1)                                    ADDCON     62
      CCDC                                                                    ADDCON     63
      20    CONTINUE                                                          ADDCON     64
            LMKGMT(I,J) = SUM                                                 ADDCON     65
65      102 FORMAT(5X,7HLMKGMT ,1P1E12.5)                                     ADDCON     66
      30    CONTINUE                                                          ADDCON     67
            DO 40 I=1,NPARM                                                   ADDCON     68
            DO 40 J=1,NPARM                                                   ADDCON     69
      CCDC                                                                    ADDCON     70
70          SUM = 0.0                                                         ADDCON     71
      CCDC                                                                    ADDCON     72
      CIBM                                                                    ADDCON     73
      C     SUM = 0.D0                                                        ADDCON     74
      CIBM                                                                    ADDCON     75
75          JS = (J-1) * 50 + 1                                               ADDCON     76
            PROJ(I,J) = -SOSCAP(SKGM,LMKGMT,SUM,JDIM,MAXDIM,1,I,JS)           ADDCON     77
            IF(I.EQ.J) PROJ(I,J) = 1. + PROJ(I,J)                             ADDCON     78
      40    CONTINUE                                                          ADDCON     79
      C                                                                       ADDCON     80
80    C     PROJECT THE NEW CONSTRAINT ONTO THE HYPERPLANE.  IF THE VALUE IS  ADDCON     81
      C     ZERO THE CONSTRAINT IS NOT LINEARLY INDEPENDENT AND SHOULD NOT    ADDCON     82
      C     BE ADDED.                                                         ADDCON     83
      C                                                                       ADDCON     84
            DO 50 I=1,NPARM                                                   ADDCON     85
85    CCDC                                                                    ADDCON     86
            SUM = 0.0                                                         ADDCON     87
      CCDC                                                                    ADDCON     88
      CIBM                                                                    ADDCON     89
      C     SUM = 0.D0                                                        ADDCON     90
90    CIBM                                                                    ADDCON     91
            JS = (JNEW-1) * MAXDIM + 1                                        ADDCON     92
            PROJG(I) = SOSCAP(PROJ,G,SUM,NPARM,MAXDIM,1,I,JS)                 ADDCON     93
      50    CONTINUE                                                          ADDCON     94
            CALL NRM2(PROJG,VAL,NPARM)                                        ADDCON     95
95          IF(VAL.GT.1.E-04) GO TO 60                                        ADDCON     96
      C                                                                       ADDCON     97
      C     JNEW IS LD AND SHOULD NOT BE ADDED                                ADDCON     98
      C                                                                       ADDCON     99
            WRITE(ITAPEW,5) JNEW                                              ADDCON    100
100       5 FORMAT(1HO,10X,11HCONSTRAINT ,I3,44H IS LINEARLY DEPENDENT, IT WIL ADDCON    101
           1L NOT BE ADDED)                                                   ADDCON    102
            LD = 1                                                            ADDCON    103
            IF(KALL.EQ.0) RETURN                                              ADDCON    104
            LDDIM = LDDIM + 1                                                 ADDCON    105
105         LINDEP(LDDIM) = JNEW                                              ADDCON    106
            RETURN                                                            ADDCON    107
      60    CONTINUE                                                          ADDCON    108
      C                                                                       ADDCON    109
      C     UPDATE LMK                                                        ADDCON    110
110   C                                                                       ADDCON    111
            DO 70 I=1,NPARM                                                   ADDCON    112
      CCDC                                                                    ADDCON    113
            SUM = 0.0                                                         ADDCON    114
      CCDC                                                                    ADDCON    115
```

```
      SUBROUTINE ADDCON(JNEW,KALL,LD)                                   ADDCON     2
C                                                                       ADDCON     3
C     THIS SUBROUTINE IS TO UPDATE JSET AND LMK ARRAYS WHEN ADDING      ADDCON     4
C     A CONSTRAINT.                                                     ADDCON     5
C                                                                       ADDCON     6
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)     ADDCON     7
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM ADDCON     8
      COMMON /CTAPES/ ITAPES                                            ADDCON     9
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35) ADDCON    10
     1                 ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON    ADDCON    11
      COMMON /MAX/ MAXDIM                                               ADDCON    12
C                                                                       ADDCON    13
C                                                                       ADDCON    14
C                                                                       ADDCON    15
CIBM                                                                    ADDCON    16
C     REAL*8 SUM                                                        ADDCON    17
CIBM                                                                    ADDCON    18
      REAL LMK,LMKGMT                                                   ADDCON    19
C                                                                       ADDCON    20
      DIMENSION A21(50),A21LMK(50),B21(50),SKGM(35,50)                  ADDCON    21
      DIMENSION ITAPES(50)                                              ADDCON    22
      DIMENSION SKGMP1(35),LMKGMT(50,35),DUM1(50),DUM2(35),DUM3(50)     ADDCON    23
      DIMENSION PROJ(35,35),PROJG(35)                                   ADDCON    24
C                                                                       ADDCON    25
      ITAPEW = ITAPES(6)                                                ADDCON    26
      WRITE(ITAPEW,1) JNEW                                              ADDCON    27
      IF(LINDEP(JNEW).NE.1) GO TO 11                                    ADDCON    28
      WRITE(ITAPEW,108) JNEW                                            ADDCON    29
      JNEW = 0                                                          ADDCON    30
      RETURN                                                            ADDCON    31
11    CONTINUE                                                          ADDCON    32
C                                                                       ADDCON    33
C      SET UP PROJECTION OPERATOR                                       ADDCON    34
C                                                                       ADDCON    35
      DO 10 I=1,NPARM                                                   ADDCON    36
      DO 10 J=1,JDIM                                                    ADDCON    37
CCDC                                                                    ADDCON    38
      SUM = 0.0                                                         ADDCON    39
CCDC                                                                    ADDCON    40
CIBM                                                                    ADDCON    41
C     SUM = 0.D0                                                        ADDCON    42
CIBM                                                                    ADDCON    43
      J1 = JSET(J)                                                      ADDCON    44
      JS = (J1-1) * MAXDIM + 1                                          ADDCON    45
      SKGM(I,J) = SOSCAP(HN,G,SUM,NPARM,MAXDIM,1,I,JS)                  ADDCON    46
10    CONTINUE                                                          ADDCON    47
      DO 30 I=1,JDIM                                                    ADDCON    48
      DO 30 J=1,NPARM                                                   ADDCON    49
CCDC                                                                    ADDCON    50
      SUM = 0.0                                                         ADDCON    51
CCDC                                                                    ADDCON    52
CIBM                                                                    ADDCON    53
C     SUM = 0.D0                                                        ADDCON    54
CIBM                                                                    ADDCON    55
      DO 20 K=1,JDIM                                                    ADDCON    56
      K1 = JSET(K)                                                      ADDCON    57
CIBM                                                                    ADDCON    58
```

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

CTAPES	50	0	ITAPES	(50)							
JGL	4505	0	JSET	(50)	50	JDIM	(1)	51	G	(1750)	
		1801	LMK	(2500)	4301	BCOEF	(50)	4351	MSTAR	(1)	
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)	
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)	
POWELL	2732	0	XO	(35)	35	XN	(35)	70	DELX	(35)	
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)	
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)	
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICON	(1)	
MAX	1	0	MAXDIM	(1)							
MURTS	35	0	YK	(35)							

STATISTICS

PROGRAM LENGTH	503B	323
CM LABELED COMMON LENGTH	16233B	7323
52000B CM USED		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
12	10	I	25 36	17B	EXT REFS NOT INNER
13	10	J	26 36	14B	EXT REFS
32	20	I	37 46	11B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)								
JGL	4505	0	JSET	(50)	50	JDIM	(1)	51	G	(1750)
		1801	LMK	(2500)	4301	BCOEF	(50)	4351	MSTAR	(1)
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)
CTAPES	50	0	ITAPES	(50)						
POWELL	2732	0	XO	(35)	35	XN	(35)	70	DELX	(35)
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICON	(1)
MAX	1	0	MAXDIM	(1)						

STATISTICS

PROGRAM LENGTH	35508	1896
CM LABELED COMMON LENGTH	161708	7288
520008 CM USED		

```
1                     SUBROUTINE LDFIX                                                  LDFIX      2
                C                                                                       LDFIX      3
                C     THIS ROUTINE CHECKS TO SEE IF ANY OF THE CONSTRAINTS WHICH        LDFIX      4
                C     WERE PREVIOUSLY LINEARLY DEPENDENT ARE NOW INDEPENDENT            LDFIX      5
5               C                                                                       LDFIX      6
                      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)   LDFIX      7
                     1          ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM LDFIX     8
                      COMMON /CTAPES/ ITAPES                                            LDFIX      9
                C                                                                       LDFIX     10
10                    DIMENSION LTEMP(50),ITAPES(50)                                    LDFIX     11
                C                                                                       LDFIX     12
                      ITAPEW = ITAPES(6)                                                LDFIX     13
                      WRITE(6,1)                                                        LDFIX     14
                      LDIM = LDDIM                                                      LDFIX     15
15                    LDDIM = 0                                                         LDFIX     16
                      DO 10 I=1,LDIM                                                    LDFIX     17
                      LTEMP(I) = LINDEP(I)                                              LDFIX     18
                      LINDEP(I) = 0                                                     LDFIX     19
                10    CONTINUE                                                          LDFIX     20
20                    IND = 0                                                           LDFIX     21
                      DO 20 I=1,LDIM                                                    LDFIX     22
                      JN = LTEMP(I)                                                     LDFIX     23
                      KALL = 2                                                          LDFIX     24
                      LD = 0                                                            LDFIX     25
25                    CALL ADDCON(JN,KALL,LD)                                           LDFIX     26
                      IF(LD.EQ.0) GO TO 20                                              LDFIX     27
                      IND = IND + 1                                                     LDFIX     28
                      LINDEP(IND) = JN                                                  LDFIX     29
                20    CONTINUE                                                          LDFIX     30
30                    LDDIM = IND                                                       LDFIX     31
                     1 FORMAT(1HO,10X,14HENTERING LDFIX)                                LDFIX     32
                      RETURN                                                            LDFIX     33
                      END                                                               LDFIX     34
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
1	LDFIX	1	32

VARIABLES

		SN	TYPE		RELOCATION							
10315	BCOEF		REAL	ARRAY	JGL	REFS	6					
63	G		REAL	ARRAY	JGL	REFS	6					
54	I		INTEGER			REFS	2*17	18	22	DEFINED	16	21
55	IND		INTEGER			REFS	27	28	30	DEFINED	20	27
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	8	10	12			
52	ITAPEW	*	INTEGER			DEFINED	12					
62	JDIM		INTEGER		JGL	REFS	6					
56	JN		INTEGER			REFS	25	28	DEFINED	22		
0	JSET		INTEGER	ARRAY	JGL	REFS	6					
57	KALL		INTEGER			REFS	25	DEFINED	23			
60	LD		INTEGER			REFS	25	26	DEFINED	24		
10545	LDDIM		INTEGER		JGL	REFS	6	14	DEFINED	15	30	
53	LDIM		INTEGER			REFS	16	21	DEFINED	14		

VARIABLES	SN	TYPE		RELOCATION						
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	6	17	DEFINED	18	28
3411	LMK	INTEGER	ARRAY	JGL	REFS	6				
61	LTEMP	INTEGER	ARRAY		REFS	10	22	DEFINED	17	
10377	MSTAR	INTEGER		JGL	REFS	6				
10630	NDIM	INTEGER		JGL	REFS	6				
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	6				
10462	NOTDIM	INTEGER		JGL	REFS	6				
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	6				

FILE NAMES	MODE		
TAPE6	FMT	WRITES	13

EXTERNALS	TYPE	ARGS	REFERENCES
ADDCON		3	25

STATEMENT LABELS			DEF LINE	REFERENCES	
46	1	FMT	31	13	
0	10		19	16	
32	20		29	21	26

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
12	10	I	16 19	3B	INSTACK	
20	20	I	21 29	15B		EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
JGL	4505	0 JSET	(50)	50 JDIM	(1)	51 G	(1750)
		1801 LMK	(2500)	4301 BCOEF	(50)	4351 MSTAR	(1)
		4352 NOTJ	(50)	4402 NOTDIM	(1)	4403 LINDEP	(50)
		4453 LDDIM	(1)	4454 NOTACT	(50)	4504 NDIM	(1)
CTAPES	50	0 ITAPES	(50)				

STATISTICS

PROGRAM LENGTH	143B	99
CM LABELED COMMON LENGTH	10713B	4555

52000B CM USED

```
      SUBROUTINE DELCON(JM)                                                  DELCON     2
C                                                                            DELCON     3
C     THIS ROUTINE UPDATES JSET, NOTJ, AND LMK WHEN A CONSTRAINT             DELCON     4
C     IS DELETED.                                                            DELCON     5
C                                                                            DELCON     6
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)          DELCON     7
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM     DELCON     8
      COMMON /CTAPES/ ITAPES                                                 DELCON     9
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35)      DELCON    10
     1                 ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON         DELCON    11
C                                                                            DELCON    12
CIBM                                                                         DELCON    13
C     REAL*8 SUM                                                             DELCON    14
CIBM                                                                         DELCON    15
C                                                                            DELCON    16
      DIMENSION B11(50,50), B1221(50,50)                                     DELCON    17
      DIMENSION ITAPES(50)                                                   DELCON    18
C                                                                            DELCON    19
      REAL LMK                                                               DELCON    20
C                                                                            DELCON    21
      JMAX = JSET(JM)                                                        DELCON    22
      ITAPEW = ITAPES(6)                                                     DELCON    23
      WRITE(ITAPEW,1) JMAX                                                   DELCON    24
      DO 9 I= 1,JDIM                                                         DELCON    25
      DO 9 J= 1,JDIM                                                         DELCON    26
    9 B11(I,J)= LMK(I,J)                                                     DELCON    27
C                                                                            DELCON    28
C     UPDATE LMK                                                             DELCON    29
C                                                                            DELCON    30
C      FIRST REPLACE ROW AND COLUMN JM WITH ROW AND COLUMN JDIM IN B11       DELCON    31
C                                                                            DELCON    32
      JDIM1 = JDIM-1                                                         DELCON    33
      IF(JDIM1.EQ.0) GO TO 50                                                DELCON    34
      DO 10 I=1,JDIM1                                                        DELCON    35
      DO 10 J=1,JDIM1                                                        DELCON    36
      B11(I,J) = LMK(I,J)                                                    DELCON    37
      IF(I.EQ.JM.AND.J.EQ.JM) GO TO 210                                      DELCON    38
      IF(I.NE.JM) GO TO 110                                                  DELCON    39
      B11(I,J) = LMK(JDIM,J)                                                 DELCON    40
      B11(JDIM,J) = LMK(I,J)                                                 DELCON    41
  110 CONTINUE                                                               DELCON    42
      IF(J.NE.JM) GO TO 210                                                  DELCON    43
      B11(I,J) = LMK(I,JDIM)                                                 DELCON    44
      B11(I,JDIM) = LMK(I,J)                                                 DELCON    45
  210 CONTINUE                                                               DELCON    46
      IF(J.NE.JM.OR.I.NE.JM) GO TO 10                                        DELCON    47
      B11(I,J) = LMK(JDIM,JDIM)                                              DELCON    48
      B11(JDIM,JDIM) = LMK(JM,JM)                                            DELCON    49
      B11(JDIM,JM) = LMK(JM,JDIM)                                            DELCON    50
      B11(JM,JDIM) = LMK(JDIM,JM)                                            DELCON    51
   10 CONTINUE                                                               DELCON    52
      DO 400 I=1,JDIM                                                        DELCON    53
  400 CONTINUE                                                               DELCON    54
      DO 20 I=1,JDIM1                                                        DELCON    55
      DO 20 J=1,JDIM1                                                        DELCON    56
CCDC                                                                         DELCON    57
      SUM = 0.0                                                              DELCON    58
```

```
                CCDC                                                                DELCON     59
                CIBM                                                                DELCON     60
     60         C       SUM = 0.DO                                                  DELCON     61
                CIBM                                                                DELCON     62
                        IS = (JDIM-1) * 50 + I                                      DELCON     63
                        JS = (J-1) * 50 + JDIM                                      DELCON     64
                        B1221(I,J) = SOSCAP(B11,B11,SUM,1,1,50,IS,JS) / B11(JDIM,JDIM)  DELCON 65
     65         20      CONTINUE                                                    DELCON     66
                        DO 30 I=1,JDIM1                                             DELCON     67
                        DO 30 J=1,JDIM1                                             DELCON     68
                        LMK(I,J) = B11(I,J) - B1221(I,J)                            DELCON     69
                30      CONTINUE                                                    DELCON     70
     70                 WRITE(ITAPEW,2)                                             DELCON     71
                        DO 35 I=1,JDIM1                                             DELCON     72
                        WRITE(ITAPEW,3) (LMK(I,J),J=1,JDIM1)                        DELCON     73
                35      CONTINUE                                                    DELCON     74
                C                                                                   DELCON     75
     75         C       UPDATE JSET                                                 DELCON     76
                C                                                                   DELCON     77
                        JSET(JM) = JSET(JDIM)                                       DELCON     78
                        JSET(JDIM) = 0                                              DELCON     79
                        JDIM = JDIM1                                                DELCON     80
     80                 WRITE(ITAPEW,4) (JSET(I),I=1,JDIM)                          DELCON     81
                C                                                                   DELCON     82
                C       UPDATE NOTJ                                                 DELCON     83
                C                                                                   DELCON     84
                        IF(JDIM1.NE.0) GO TO 60                                     DELCON     85
     85         50      CONTINUE                                                    DELCON     86
                        JSET(1) = 0                                                 DELCON     87
                        JDIM = 0                                                    DELCON     88
                60      CONTINUE                                                    DELCON     89
                        NOTDIM = MSTAR - JDIM                                       DELCON     90
     90                 NOTJ(NOTDIM) = JMAX                                         DELCON     91
                        WRITE(ITAPEW,5) (NOTJ(I),I=1,NOTDIM)                        DELCON     92
                C                                                                   DELCON     93
                    1 FORMAT(1HO,/,10X,27HENTERING DELCON, CONSTRAINT,I4,17H IS TO BE DE DELCON 94
                     ALETED)                                                        DELCON     95
     95             2 FORMAT(1HO,10X,27HINVERSE MOMENT MATRIX,  LMK)               DELCON     96
                3       FORMAT(10X,10(1X,1P1E11.4))                                 DELCON     97
                    4 FORMAT(1HO,10X,7HJSET = ,10I5)                                DELCON     98
                    5 FORMAT(1HO,10X,7HNOTJ = ,10I5)                                DELCON     99
                        RETURN                                                      DELCON    100
    100                 END                                                         DELCON    101
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES								
3	DELCON	1	99								
VARIABLES	**SN**	**TYPE**	**RELOCATION**								
10315	BCOEF	REAL	ARRAY	JGL	REFS	6					
327	B11	REAL	ARRAY		REFS	16	3*64	68	DEFINED	26	36	39
						40	43	44	47	48	49	50

VARIABLES	SN	TYPE	RELOCATION									
5233	B1221	REAL	ARRAY		REFS	16	68	DEFINED	64			
257	DELG	REAL	ARRAY	POWELL	REFS	9						
106	DELX	REAL	ARRAY	POWELL	REFS	9						
63	G	REAL	ARRAY	JGL	REFS	6						
214	GRN	REAL	ARRAY	POWELL	REFS	9						
151	GRO	REAL	ARRAY	POWELL	REFS	9						
5207	HGR	REAL	ARRAY	POWELL	REFS	9						
2676	HN	REAL	ARRAY	POWELL	REFS	9						
365	HO	REAL	ARRAY	POWELL	REFS	9						
321	I	INTEGER			REFS	2*26	2*36	37	38	39	40	2*43
					2*44	46	47	62	64	3*68	72	80
					91	DEFINED	24	34	52	54	66	71
					80	91						
5253	ICON	INTEGER		POWELL	REFS	9						
325	IS	INTEGER			REFS	64	DEFINED	62				
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	8	17	22				
320	ITAPEW	INTEGER			DEFINED	22	I/O REFS	23	70	72	80	91
322	J	INTEGER			REFS	2*26	2*36	37	2*39	2*40	42	43
					44	46	47	63	64	3*68	72	
					DEFINED	25	35	55	67	72		
62	JDIM	INTEGER		JGL	REFS	6	24	25	32	39	40	43
					44	2*47	2*48	2*49	2*50	52	62	63
					2*64	77	78	80	89	DEFINED	79	87
323	JDIM1	INTEGER			REFS	33	34	35	54	55	66	67
					71	72	79	84	DEFINED	32		
0	JM	INTEGER		F.P.	REFS	21	2*37	38	42	2*46	2*48	2*49
					2*50	77	DEFINED	1				
317	JMAX	INTEGER			REFS	23	90	DEFINED	21			
326	JS	INTEGER			REFS	64	DEFINED	63				
0	JSET	INTEGER	ARRAY	JGL	REFS	6	21	77	80	DEFINED	77	78
					86							
10545	LDDIM	INTEGER		JGL	REFS	6						
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	6						
3411	LMK	REAL	ARRAY	JGL	REFS	6	19	26	36	39	40	43
					44	47	48	49	50	72		
					DEFINED	68						
10377	MSTAR	INTEGER		JGL	REFS	6	89					
10630	NDIM	INTEGER		JGL	REFS	6						
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	6						
10462	NOTDIM	INTEGER		JGL	REFS	6	90	91	DEFINED	89		
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	6	91	DEFINED	90			
5252	NPARM	INTEGER		POWELL	REFS	9						
324	SUM	REAL			REFS	64	DEFINED	57				
43	XN	REAL	ARRAY	POWELL	REFS	9						
0	XO	REAL	ARRAY	POWELL	REFS	9						
322	Z	REAL	ARRAY	POWELL	REFS	9						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
SOSCAP	REAL	8	64

STATEMENT LABELS			DEF LINE	REFERENCES
265	1	FMT	93	23
275	2	FMT	95	70
302	3	FMT	96	72
305	4	FMT	97	80
311	5	FMT	98	91

STATEMENT LABELS		DEF LINE	REFERENCES		
0	9	26	24	25	
100	10	51	34	35	46
0	20	65	54	55	
0	30	69	66	67	
0	35	73	71		
207	50	85	33		
211	60	88	84		
61	110	41	38		
66	210	45	37	42	
0	400	53	52		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	9	I	24 26	14B	NOT INNER
21	9	J	25 26	3B	INSTACK
33	10	I	34 51	53B	NOT INNER
51	10	J	35 51	31B	OPT
110	400	I	52 53	1B	INSTACK
113	20	I	54 65	23B	EXT REFS NOT INNER
114	20	J	55 65	17B	EXT REFS
137	30	I	66 69	14B	NOT INNER
144	30	J	67 69	4B	INSTACK
156	35	I	71 73	20B	EXT REFS NOT INNER
161		J	72 72	11B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)					
JGL	4505	0	JSET (50)	50	JDIM (1)	51	G (1750)
		1801	LMK (2500)	4301	BCOEF (50)	4351	MSTAR (1)
		4352	NOTJ (50)	4402	NOTDIM (1)	4403	LINDEP (50)
		4453	LDDIM (1)	4454	NOTACT (50)	4504	NDIM (1)
CTAPES	50	0	ITAPES (50)				
POWELL	2732	0	XO (35)	35	XN (35)	70	DELX (35)
		105	GRO (35)	140	GRN (35)	175	DELG (35)
		210	Z (35)	245	HO (1225)	1470	HN (1225)
		2695	HGR (35)	2730	NPARM (1)	2731	ICON (1)

STATISTICS

PROGRAM LENGTH	12144B	5220
CM LABELED COMMON LENGTH	16167B	7287

520000B CM USED

```
      SUBROUTINE GRAPRO                                                 GRAPRO     2
C                                                                       GRAPRO     3
C     THIS ROUTINE CALCULATES THE GRADIENT PROJECTION.                  GRAPRO     4
C                                                                       GRAPRO     5
      COMMON /JGL/      JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)     GRAPRO     6
     1          ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM GRAPRO     7
      COMMON /CTAPES/ ITAPES                                            GRAPRO     8
      COMMON /POWELL/   XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35) GRAPRO     9
     1                 ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON    GRAPRO    10
      COMMON /MAX/ MAXDIM                                               GRAPRO    11
C                                                                       GRAPRO    12
CIBM                                                                    GRAPRO    13
C     REAL*8 SUM                                                        GRAPRO    14
CIBM                                                                    GRAPRO    15
C                                                                       GRAPRO    16
      DIMENSION PM(35,35),GGINV(50,50),GGG(35,50),LOC(50)               GRAPRO    17
      DIMENSION ITAPES(50)                                              GRAPRO    18
C                                                                       GRAPRO    19
      ITAPEW = ITAPES(6)                                                GRAPRO    20
      WRITE(ITAPEW,1)                                                   GRAPRO    21
      DO 10 I=1,JDIM                                                    GRAPRO    22
      DO 10 J=1,JDIM                                                    GRAPRO    23
CCDC                                                                    GRAPRO    24
      SUM = 0.0                                                         GRAPRO    25
CCDC                                                                    GRAPRO    26
CIBM                                                                    GRAPRO    27
C     SUM = 0.D0                                                        GRAPRO    28
CIBM                                                                    GRAPRO    29
      J1 = JSET(J)                                                      GRAPRO    30
      I1 = JSET(I)                                                      GRAPRO    31
      IS = (I1-1) * MAXDIM + 1                                          GRAPRO    32
      JS = (J1-1)*MAXDIM + 1                                            GRAPRO    33
      GGINV(I,J) = SDSCAP(G,G,SUM,NPARM,1,1,IS,JS)                      GRAPRO    34
10    CONTINUE                                                          GRAPRO    35
      DO 15 I=1,JDIM                                                    GRAPRO    36
      WRITE(ITAPEW,4) (GGINV(I,J),J=1,JDIM)                             GRAPRO    37
15    CONTINUE                                                          GRAPRO    38
      NIX = 0                                                           GRAPRO    39
      CALL SREVNI(GGINV,JDIM,LOC,50,NIX)                                GRAPRO    40
      IF(NIX.NE.0) WRITE(ITAPEW,2)                                      GRAPRO    41
      DO 30 I=1,NPARM                                                   GRAPRO    42
      DO 30 J=1,JDIM                                                    GRAPRO    43
CCDC                                                                    GRAPRO    44
      SUM = 0.0                                                         GRAPRO    45
CCDC                                                                    GRAPRO    46
CIBM                                                                    GRAPRO    47
C     SUM = 0.D0                                                        GRAPRO    48
CIBM                                                                    GRAPRO    49
      DO 20 K=1,JDIM                                                    GRAPRO    50
      K1 = JSET(K)                                                      GRAPRO    51
      SUM = SUM + DBLE(G(I,K1)) * DBLE(GGINV(K,J))                      GRAPRO    52
20    CONTINUE                                                          GRAPRO    53
      GGG(I,J) = SUM                                                    GRAPRO    54
30    CONTINUE                                                          GRAPRO    55
      DO 40 I=1,NPARM                                                   GRAPRO    56
      DO 40 J=1,NPARM                                                   GRAPRO    57
CCDC                                                                    GRAPRO    58
```

```
                      SUM = 0.0                                                  GRAPRO     59
                CCDC                                                             GRAPRO     60
     60         CIBM                                                             GRAPRO     61
                C     SUM = 0.DO                                                 GRAPRO     62
                CIBM                                                             GRAPRO     63
                      DO 35 K=1,JDIM                                             GRAPRO     64
                      K1 = JSET(K)                                               GRAPRO     65
     65               SUM = SUM + DBLE(GGG(I,K)) * DBLE(G(J,K1))                 GRAPRO     66
                35    CONTINUE                                                   GRAPRO     67
                      PM(I,J) = SUM                                              GRAPRO     68
                      IF(I.EQ.J) PM(I,J) = PM(I,J)-1.                            GRAPRO     69
                40    CONTINUE                                                   GRAPRO     70
     70               DO 50 I=1,NPARM                                            GRAPRO     71
                CCDC                                                             GRAPRO     72
                      SUM = 0.0                                                  GRAPRO     73
                CCDC                                                             GRAPRO     74
                CIBM                                                             GRAPRO     75
     75         C     SUM = 0.DO                                                 GRAPRO     76
                CIBM                                                             GRAPRO     77
                      DELX(I) = SOSCAP(PM,GRN,SUM,NPARM,MAXDIM,1,I,1)            GRAPRO     78
                50    CONTINUE                                                   GRAPRO     79
                      WRITE(ITAPEW,3) (DELX(I), I=1,NPARM)                       GRAPRO     80
     80             1 FORMAT(1HO,/,10X,15HENTERING GRAPRO)                       GRAPRO     81
                    2 FORMAT(1HO,10X,29HERROR IN SREVNI CALLED GRAPRO)           GRAPRO     82
                    3 FORMAT(1HO,10X,17HDELX TRANSPOSE = ,5(2X,1P1E12.5))        GRAPRO     83
                4     FORMAT(1HO,9(1X,1P1E11.4))                                 GRAPRO     84
                      RETURN                                                     GRAPRO     85
     85               END                                                        GRAPRO     86
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
1	GRAPRO	1	84

VARIABLES	SN	TYPE		RELOCATION									
10315	BCOEF	REAL	ARRAY	JGL	REFS	5							
257	DELG	REAL	ARRAY	POWELL	REFS	8							
106	DELX	REAL	ARRAY	POWELL	REFS	8	79	DEFINED	77				
63	G	REAL	ARRAY	JGL	REFS	5	2*33	51	65				
7507	GGG	REAL	ARRAY		REFS	16	65	DEFINED	53				
2603	GGINV	REAL	ARRAY		REFS	16	36	39	51	DEFINED	33		
214	GRN	REAL	ARRAY	POWELL	REFS	8	77						
151	GRO	REAL	ARRAY	POWELL	REFS	8							
5207	HGR	REAL	ARRAY	POWELL	REFS	8							
2676	HN	REAL	ARRAY	POWELL	REFS	8							
365	HO	REAL	ARRAY	POWELL	REFS	8							
260	I	INTEGER			REFS	30	33	36	51	53	65	67	
						3*68	2*77	79	DEFINED	21	35	41	55
						70	79						
5253	ICON	INTEGER		POWELL	REFS	8							
265	IS	INTEGER			REFS	33	DEFINED	31					
0	ITAPES	INTEGER	ARRAY	CTAPES	REFS	7	17	19					
257	ITAPEW	INTEGER			DEFINED	19	I/O REFS	20	36	40	79		

VARIABLES	SN	TYPE	RELOCATION									
264	I1	INTEGER			REFS	31	DEFINED	30				
261	J	INTEGER			REFS	29	33	36	51	53	65	67
					3*68	DEFINED	22	36	42	56		
62	JDIM	INTEGER		JGL	REFS	5	21	22	35	36	39	42
					49	63						
266	JS	INTEGER			REFS	33	DEFINED	32				
0	JSET	INTEGER	ARRAY	JGL	REFS	5	29	30	50	64		
263	J1	INTEGER			REFS	32	DEFINED	29				
270	K	INTEGER			REFS	50	51	64	65	DEFINED	49	63
271	K1	INTEGER			REFS	51	65	DEFINED	50	64		
10545	LDDIM	INTEGER		JGL	REFS	5						
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	5						
3411	LMK	INTEGER	ARRAY	JGL	REFS	5						
13035	LOC	INTEGER	ARRAY		REFS	16	39					
0	MAXDIM	INTEGER		MAX	REFS	10	31	32	77			
10377	MSTAR	INTEGER		JGL	REFS	5						
10630	NDIM	INTEGER		JGL	REFS	5						
267	NIX	INTEGER			REFS	39	40	DEFINED	38			
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	5						
10462	NOTDIM	INTEGER		JGL	REFS	5						
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	5						
5252	NPARM	INTEGER		POWELL	REFS	8	33	41	55	56	70	77
					79							
272	PM	REAL	ARRAY		REFS	16	68	77	DEFINED	67	68	
262	SUM	REAL			REFS	33	51	53	65	67	77	
					DEFINED	24	44	51	58	65	72	
43	XN	REAL	ARRAY	POWELL	REFS	8						
0	XO	REAL	ARRAY	POWELL	REFS	8						
322	Z	REAL	ARRAY	POWELL	REFS	8						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
SOSCAP	REAL	8	33	77
SREVNI		5	39	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES	
DBLE	DOUBLE	1	INTRIN		2*51	2*65

STATEMENT LABELS			DEF LINE	REFERENCES	
232	1	FMT	80	20	
236	2	FMT	81	40	
243	3	FMT	82	79	
251	4	FMT	83	36	
0	10		34	21	22
0	15		37	35	
0	20		52	49	
0	30		54	41	42
0	35		66	63	
0	40		69	55	56
0	50		78	70	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
6	10	I	21 34	22B	EXT REFS	NOT INNER
7	10	J	22 34	17B	EXT REFS	
31	15	I	35 37	20B	EXT REFS	NOT INNER
34		J	36 36	11B	EXT REFS	
57	30	I	41 54	31B	NOT INNER	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
60	30	J	42 54	25B	NOT INNER
66	20	K	43 52	11B	OPT
111	40	I	55 69	33B	NOT INNER
112	40	J	56 69	30B	NOT INNER
120	35	K	63 66	11B	OPT
145	50	I	70 78	7B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
JGL	4505	0	JSET	(50)	50	JDIM	(1)	51	G	(1750)	
		1801	LMK	(2500)	4301	BCOEF	(50)	4351	MSTAR	(1)	
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)	
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)	
CTAPES	50	0	ITAPES	(50)							
POWELL	2732	0	XO	(35)	35	XN	(35)	70	DELX	(35)	
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)	
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)	
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICON	(1)	
MAX	1	0	MAXDIM	(1)							

STATISTICS

PROGRAM LENGTH	13117B	5711
CM LABELED COMMON LENGTH	16170B	7288
52000B CM USED		

```
      SUBROUTINE INSECT(STEP)                                           INSECT     2
C                                                                       INSECT     3
C     THIS ROUTINE COMPUTES THE DISTANCE ALONG THE CALCULATED DIRECTION  INSECT     4
C     TO THE NEAREST CONSTRAINT NOT IN SET JSET.  THIS CONSTRAINT IS     INSECT     5
C     CONSIDERED JNEW AND THE MULTIPLICATION FACTOR ON THE STEP IS STEPS INSECT     6
C                                                                       INSECT     7
      COMMON /JGL/       JSET(50),JDIM,G(35,50),LMK(50,50),BCOEF(50)    INSECT     8
     1           ,MSTAR,NOTJ(50),NOTDIM,LINDEP(50),LDDIM,NOTACT(50),NDIM INSECT     9
      COMMON /POWELL/    XO(35),XN(35),DELX(35),GRO(35),GRN(35),DELG(35) INSECT    10
     1                  ,Z(35),HO(35,35),HN(35,35),HGR(35),NPARM,ICON   INSECT    11
      COMMON /MAX/ MAXDIM                                               INSECT    12
      COMMON /NEWCON/    JNEW(50),NEWDIM                                INSECT    13
C                                                                       INSECT    14
CIBM                                                                    INSECT    15
C     REAL*8 SUM                                                        INSECT    16
CIBM                                                                    INSECT    17
C                                                                       INSECT    18
      DIMENSION GTX(50),GTP(50),IPERM(50),ALPHA(50)                     INSECT    19
      WRITE(6,1)                                                        INSECT    20
      CALL NRM2(DELX,PNORM,NPARM)                                       INSECT    21
      VALU = .33/PNORM                                                  INSECT    22
      IF(NDIM.NE.O) GO TO 101                                           INSECT    23
      NEWDIM = O                                                        INSECT    24
      STEP = AMIN1(VALU,1.)                                             INSECT    25
      RETURN                                                            INSECT    26
  101 CONTINUE                                                          INSECT    27
      WRITE(6,6) (NOTACT(I), I=1,NDIM)                                  INSECT    28
C      WRITE(7,6) (NOTACT(I),I=1,NDIM)                                  INSECT    29
      IND = O                                                           INSECT    30
    6 FORMAT(10X,9HNOTACT = ,10I5)                                      INSECT    31
      DO 10 J=1,NDIM                                                    INSECT    32
CCDC                                                                    INSECT    33
      SUM = O.O                                                         INSECT    34
CCDC                                                                    INSECT    35
CIBM                                                                    INSECT    36
C     SUM = O.DO                                                        INSECT    37
CIBM                                                                    INSECT    38
      N1 = NOTACT(J)                                                    INSECT    39
      IF(N1.EQ.O) GO TO 10                                              INSECT    40
      JS = (N1-1) * MAXDIM + 1                                          INSECT    41
      IND = IND + 1                                                     INSECT    42
      GTX(IND) = SOSCAP(G,XN,SUM,NPARM,1,1,JS,1)                        INSECT    43
CCDC                                                                    INSECT    44
      SUM = O.O                                                         INSECT    45
CCDC                                                                    INSECT    46
CIBM                                                                    INSECT    47
C     SUM = O.DO                                                        INSECT    48
CIBM                                                                    INSECT    49
      GTP(IND) = SOSCAP(G,DELX,SUM,NPARM,1,1,JS,1)                      INSECT    50
   10 CONTINUE                                                          INSECT    51
C                                                                       INSECT    52
C     TEST TO SEE IF GTP(J) = O.  THIS CAN HAPPEN IF MOTION IS          INSECT    53
C     PARALLEL TO CONSTRAINT JSET(J).  IF THIS THE CASE, SET ALPHA(J) = INSECT    54
C     1.OE+10 FOR THIS CONSTRAINT.                                      INSECT    55
C                                                                       INSECT    56
      DO 20 J=1,NDIM                                                    INSECT    57
      N1 = NOTACT(J)                                                    INSECT    58
```

```
                VAL = ABS(GTP(J))                                                INSECT     59
                IF(VAL .GT. .00001) GO TO 15                                     INSECT     60
60              ALPHA(J) = 1.0E+10                                               INSECT     61
                GO TO 20                                                         INSECT     62
           15   CONTINUE                                                         INSECT     63
                ALPHA(J) = (BCOEF(N1) - GTX(J)) / GTP(J)                         INSECT     64
           20   CONTINUE                                                         INSECT     65
65         C     WRITE(7,9) (ALPHA(J),J=1,9)                                     INSECT     66
           C     IF(NDIM .GT. 9) WRITE(7,9) (ALPHA(J),J=10,NDIM)                 INSECT     67
               9 FORMAT(9H ALPHA = ,9(1P1E11.4,1X))                               INSECT     68
                NCON = 1                                                         INSECT     69
                CALL AORDER(ALPHA,NDIM,IPERM,NCON)                               INSECT     70
70         C                                                                     INSECT     71
           C     FIND SMALLEST POSITIVE ALPHA                                    INSECT     72
           C                                                                     INSECT     73
                I=0                                                              INSECT     74
           30   CONTINUE                                                         INSECT     75
75              IF(I .NE. NDIM) GO TO 31                                         INSECT     76
           C                                                                     INSECT     77
           C     THERE ARE NO POSITIVE ALPHAS                                    INSECT     78
           C                                                                     INSECT     79
                STEP = AMIN1(VALU,1.)                                            INSECT     80
80              NEWDIM = 0                                                       INSECT     81
                RETURN                                                           INSECT     82
           31    CONTINUE                                                       INSECT     83
                I=I+1                                                            INSECT     84
                JP = IPERM(I)                                                    INSECT     85
85              STEPS = ALPHA(JP)                                                INSECT     86
                IF(STEPS.LE.1.0E-04) GO TO 30                                    INSECT     87
                JNEW(1) = NOTACT(JP)                                             INSECT     88
                STEPSS = AMIN1(1.0,STEPS)                                        INSECT     89
                STEP = AMIN1(STEPSS,VALU)                                        INSECT     90
90              WRITE(6,2) JNEW(1),STEPSS,STEPS,VALU,STEP                        INSECT     91
                IF(STEP.EQ.STEPS) GO TO 40                                       INSECT     92
                NEWDIM = 0                                                       INSECT     93
                RETURN                                                           INSECT     94
           40   CONTINUE                                                         INSECT     95
95         C                                                                     INSECT     96
           C     CHECK TO SEE IF STEP BRINGS US TO MORE THAN ONE CONSTRAINT.     INSECT     97
           C                                                                     INSECT     98
                NEWDIM = 1                                                       INSECT     99
                JP1 = JP + 1                                                     INSECT    100
100             IF(JP1.GT.NDIM) GO TO 60                                         INSECT    101
                DO 50 I=JP1,NDIM                                                 INSECT    102
                DIF = ABS(STEP - ALPHA(I))                                       INSECT    103
                IF(DIF.GT.1.0E-04) GO TO 50                                      INSECT    104
                NEWDIM = NEWDIM + 1                                              INSECT    105
105             JNEW(NEWDIM) = NOTACT(I)                                         INSECT    106
           50   CONTINUE                                                         INSECT    107
           60   CONTINUE                                                         INSECT    108
               1 FORMAT(1HO,/,10X,15HENTERING INSECT)                            INSECT    109
               2 FORMAT(1HO,1X,10HJNEW(1) = ,I4,1X,9HSTEPSS = ,1P1E11.4,1X,      INSECT    110
110             1 8HSTEPS = ,1P1E11.4,1X,7HVALU = ,1P1E11.4,1X,7HSTEP = ,1P1E11.4) INSECT    111
                RETURN                                                           INSECT    112
                END                                                              INSECT    113
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES									
3	INSECT	1	25	81	93	111						
VARIABLES		**SN TYPE**		**RELOCATION**								
522	ALPHA	REAL	ARRAY		REFS	18	69	85	102	DEFINED	60	63
10315	BCOEF	REAL	ARRAY	JGL	REFS	7	63					
257	DELG	REAL	ARRAY	POWELL	REFS	9						
106	DELX	REAL	ARRAY	POWELL	REFS	9	20	49				
273	DIF	REAL			REFS	103	DEFINED	102				
63	G	REAL	ARRAY	JGL	REFS	7	42	49				
214	GRN	REAL	ARRAY	POWELL	REFS	9						
151	GRO	REAL	ARRAY	POWELL	REFS	9						
356	GTP	REAL	ARRAY		REFS	18	58	63	DEFINED	49		
274	GTX	REAL	ARRAY		REFS	18	63	DEFINED	42			
5207	HGR	REAL	ARRAY	POWELL	REFS	9						
2676	HN	REAL	ARRAY	POWELL	REFS	9						
365	HO	REAL	ARRAY	POWELL	REFS	9						
257	I	INTEGER			REFS	27	75	83	84	102	105	
					DEFINED	27	73	83	101			
5253	ICON	INTEGER		POWELL	REFS	9						
260	IND	INTEGER			REFS	41	42	49	DEFINED	29	41	
440	IPERM	INTEGER	ARRAY		REFS	18	69	84				
261	J	INTEGER			REFS	38	57	58	60	3*63		
					DEFINED	31	56					
62	JDIM	INTEGER		JGL	REFS	7						
0	JNEW	INTEGER	ARRAY	NEWCON	REFS	12	90	DEFINED	87	105		
267	JP	INTEGER			REFS	85	87	99	DEFINED	84		
272	JP1	INTEGER			REFS	100	101	DEFINED	99			
264	JS	INTEGER			REFS	42	49	DEFINED	40			
0	JSET	INTEGER	ARRAY	JGL	REFS	7						
10545	LDDIM	INTEGER		JGL	REFS	7						
10463	LINDEP	INTEGER	ARRAY	JGL	REFS	7						
3411	LMK	INTEGER	ARRAY	JGL	REFS	7						
0	MAXDIM	INTEGER		MAX	REFS	11	40					
10377	MSTAR	INTEGER		JGL	REFS	7						
266	NCON	INTEGER			REFS	69	DEFINED	68				
1063[illegible]	NDIM	INTEGER		JGL	REFS	7	22	27	31	56	69	75
					100	101						
62	NEWDIM	INTEGER		NEWCON	REFS	12	104	105	DEFINED	23	80	92
					98	104						
10546	NOTACT	INTEGER	ARRAY	JGL	REFS	7	27	38	57	87	105	
10462	NOTDIM	INTEGER		JGL	REFS	7						
10400	NOTJ	INTEGER	ARRAY	JGL	REFS	7						
5252	NPARM	INTEGER		POWELL	REFS	9	20	42	49			
263	N1	INTEGER			REFS	39	40	63	DEFINED	38	57	
255	PNORM	REAL			REFS	20	21					
0	STEP	REAL		F.P.	REFS	90	91	102	DEFINED	1	24	79
					89							
270	STEPS	REAL			REFS	86	88	90	91	DEFINED	85	
271	STEPSS	REAL			REFS	89	90	DEFINED	88			
262	SUM	REAL			REFS	42	49	DEFINED	33	44		
265	VAL	REAL			REFS	59	DEFINED	58				
256	VALU	REAL			REFS	24	79	89	90	DEFINED	21	
43	XN	REAL	ARRAY	POWELL	REFS	9	42					

```
                      KREAD = KREAD + ( N - KRED - 1)                          SOQUAS   515
     515              DO 297 LREAD=1,KREAD                                     SOQUAS   516
                    297 READ(LTAPE)                                            SOQUAS   517
                      DO 299 NROW = 1,ND                                       SOQUAS   518
                      READ(MT) ICNT,(A(I),I=1,ICNT)                            SOQUAS   519
                    299 WRITE(LTAPE)ICNT,(A(I),I=1,ICNT)                       SOQUAS   520
     520            C                                                          SOQUAS   521
                    C   ***   REWIND ALL FILES EXCEPT THE OUTPUT FILE   NW     SOQUAS   522
                    C                                                          SOQUAS   523
                      REWIND NI                                                SOQUAS   524
                      REWIND MM                                                SOQUAS   525
     525              REWIND NO                                                SOQUAS   526
                      REWIND NAT                                               SOQUAS   527
                      IF( RHSTAP .NE. 0 ) REWIND RHSTAP                        SOQUAS   528
                      MD = MTOTAL                                              SOQUAS   529
                   9999 CONTINUE                                               SOQUAS   530
     530              RETURN                                                   SOQUAS   531
                      END                                                      SOQUAS   532
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	SOQUAS	1	37 530

VARIABLES

	SN	TYPE	RELOCATION							
1675	A	REAL	ARRAY	REFS	14	2*97	3*101	108	119	2*137	3*140
				148	149	2*222	223	2*246	247	268	288
				313	2*340	2*352	2*353	363	372	2*422	426
				2*433	437	495	519	DEFINED	75	97	101
				128	137	140	189	212	223	236	247
				288	308	313	340	353	363	407	409
				426	437	480	518				
1603	B	REAL		REFS	2*61	2*259	DEFINED	59	257		
1604	C	REAL		REFS	61	259	DEFINED	60	258		
1634	I	INTEGER		REFS	189	212	220	284	518	519	
				DEFINED	189	206	232	283	298	510	518
				519							
1607	IB	INTEGER		REFS	90	93	107	119	128	344	345
				348	349	401	431	DEFINED	72	89	106
				119	128	134	343	399	471		
1674	ICNT	INTEGER		REFS	518	2*519	DEFINED	518			
1655	IDUMMY	INTEGER		DEFINED	299	308					
1631	IINIT	INTEGER		REFS	263	264	265	DEFINED	185		
1650	INITP1	INTEGER		REFS	266	DEFINED	264				
1611	IO	INTEGER		REFS	75	350	351	372	407	409	2*433
				DEFINED	75	93	116	127	349	372	407
				409	421	2*433	479	492			
1625	J	INTEGER		REFS	148	268	308	DEFINED	148	188	268
				285	308						
1637	JCNT	INTEGER		REFS	217	219	241	243	DEFINED	213	2 /
				237	241	304					
1562	JPASS1	LOGICAL		REFS	18	404	410	444	497		
				DEFINED	271	448					

```
                      NOUT = NT                                                 SOQUAS   458
                C                                                               SOQUAS   459
                C - - LOOP BACK THRU THE SOLUTION                               SOQUAS   460
460             C                                                               SOQUAS   461
                      NL = NF                                                   SOQUAS   462
                      GO TO 119                                                 SOQUAS   463
                C                                                               SOQUAS   464
                C - - START TO WRAP IT UP                                       SOQUAS   465
465             C                                                               SOQUAS   466
                  200 REWIND NIN                                                SOQUAS   467
                      N2 = N                                                    SOQUAS   468
                C                                                               SOQUAS   469
                C * * NOTE . AT THIS POINT ALL LOCATIONS A(1) THRU A(KORE) ARE FREE SOQUAS 470
470             C                                                               SOQUAS   471
                      DO 220 IB = 1, NPASS                                      SOQUAS   472
                      READ (NIN) K                                              SOQUAS   473
                      N1 = N2 - K + 1                                           SOQUAS   474
                      NS = N1                                                   SOQUAS   475
475                   NT = N2                                                   SOQUAS   476
                C                                                               SOQUAS   477
                C - - READ IN THE SOLUTIONS                                     SOQUAS   478
                C                                                               SOQUAS   479
                      DO 210 IO = 1, M                                          SOQUAS   480
480                   READ (NIN) (A(NN), NN = NS, NT)                           SOQUAS   481
                      NT = NT + N                                               SOQUAS   482
                  210 NS = NS + N                                               SOQUAS   483
                  220 N2 = N1 - 1                                               SOQUAS   484
                C                                                               SOQUAS   485
485             C  ---  REWIND ALL INPUT TAPES                                  SOQUAS   486
                      REWIND NIN                                                SOQUAS   487
                      REWIND MT                                                 SOQUAS   488
                      REWIND NOUT                                               SOQUAS   489
                C - - WRITE THE SOLUTIONS ON TAPE                               SOQUAS   490
490             C                                                               SOQUAS   491
                      NT = 0                                                    SOQUAS   492
                      DO 230 IO = 1, M                                          SOQUAS   493
                      NS = NT + 1                                               SOQUAS   494
                      NT = NT + N                                               SOQUAS   495
495                 230 WRITE (NW) (A(NN), NN = NS, NT)                         SOQUAS   496
                C    ***   IF TAPE WAS NEVER SWITCHED IT WOULD BE FOOLISH TO SWITCH BACK SOQUAS 497
                      IF(JPASS1)GO TO 290                                       SOQUAS   498
                C                                                               SOQUAS   499
                C***    ***SWITCH TAPES                                         SOQUAS   500
500             C*** ***BACK SO THAT  MT WILL CONAIN THE TRAPEZOIDAL MATRIX     SOQUAS   501
                C*** ***NATAPE WILL HAVE NOTHING USEFUL ON IT.                  SOQUAS   502
                      NTEMP = NATAPE                                            SOQUAS   503
                      NATAPE = MT                                               SOQUAS   504
                      MT = NTEMP                                                SOQUAS   505
505                   REWIND NATAPE                                             SOQUAS   506
                  290 IF( .NOT. LASTRS)GO TO 109                                SOQUAS   507
                  295 REWIND LTAPE                                              SOQUAS   508
                      REWIND MT                                                 SOQUAS   509
                      KRED = 0                                                  SOQUAS   510
510                   DO 297 I=1,NLCNT                                          SOQUAS   511
                      READ(LTAPE)KREAD                                          SOQUAS   512
                  304 CONTINUE                                                  SOQUAS   513
                      KRED = KRED + KREAD                                       SOQUAS   514
```

```
                      NT = NT - 1                                                SOQUAS   401
                      IF (IB .LE. NROW) GO TO 160                                SOQUAS   402
                      NS = NS + NN                                               SOQUAS   403
                      NT = NT + NN                                               SOQUAS   404
                  160 IF (.NOT. JPASS1)GO TO 161                                 SOQUAS   405
                      NBEG = NT - M + 1                                          SOQUAS   406
                C*** ***READ RHS FROM NATAPE                                     SOQUAS   407
                      READ (NATAPE) ( A(IO),IO = NBEG,NT)                        SOQUAS   408
                      NT = NT - M                                                SOQUAS   409
                  161 READ(MT)NN,(A(IO),IO=NS,NT)                                SOQUAS   410
                      IF( .NOT. JPASS1 ) GO TO 163                               SOQUAS   411
                      NT = NT + M                                                SOQUAS   412
                      NN = NN + M                                                SOQUAS   413
                  163 NP = N1 - 1                                                SOQUAS   414
                      NF = NT - M - KM1                                          SOQUAS   415
                      NN = NN - KOLD                                             SOQUAS   416
                      DO 170 MN = 1, M                                           SOQUAS   417
                      N2 = NF                                                    SOQUAS   418
                      NA = NP + MN                                               SOQUAS   419
                      NB = NA                                                    SOQUAS   420
                      SUM = 0.0                                                  SOQUAS   421
                      DO 165 IO = 1, KOLD                                        SOQUAS   422
                      SUM = SUM + A(N2) * A(NA)                                  SOQUAS   423
                      N2 = N2 + 1                                                SOQUAS   424
                  165 NA = NA + M                                                SOQUAS   425
                      N2 = N2 + MN - 1                                           SOQUAS   426
                  170 A(N2) = A(N2) - SUM                                        SOQUAS   427
                C                                                                SOQUAS   428
                C - - WRITE THE MODIFIED ROW ON TAPE OR CONDENSE THE ROW         SOQUAS   429
                C                                                                SOQUAS   430
                      NL = NT - M + 1                                            SOQUAS   431
                      IF (IB .GE. NROW) GO TO 175                                SOQUAS   432
                      NF = NL - KP1                                              SOQUAS   433
                      WRITE (NOUT) NN, (A(IO), IO = NS, NF), (A(IO), IO = NL, NT) SOQUAS   434
                      GO TO 190                                                  SOQUAS   435
                  175 NF = NL - KOLD                                             SOQUAS   436
                      DO 180 MN = NL, NT                                         SOQUAS   437
                      A(NF) = A(MN)                                              SOQUAS   438
                  180 NF = NF + 1                                                SOQUAS   439
                  190 CONTINUE                                                   SOQUAS   440
                C*** ***IF 1ST TIME THRU BACK SOLN,SWITCH TAPES SO THAT MT WHICH HAS THE SOQUAS   441
                C*** ***ORIGINAL TRAPEZOIDAL MATRIX ON IT BECOME NATAPE AND IS NOT TO    SOQUAS   442
                C*** ***TAPE PART IN ALTERNATING SHRINKING MATRICES.  NATAPE BECOMES MT  SOQUAS   443
                C*** ***AND THIS NOW DOES THE ALTERNATING WITH NOUT.             SOQUAS   444
                      IF( .NOT. JPASS1 ) GO TO 195                               SOQUAS   445
                      NTEMP = MT                                                 SOQUAS   446
                      MT = NATAPE                                                SOQUAS   447
                      NATAPE = NTEMP                                             SOQUAS   448
                      JPASS1= .FALSE.                                            SOQUAS   449
                      REWIND NATAPE                                              SOQUAS   450
                  195 REWIND MT                                                  SOQUAS   451
                      REWIND NOUT                                                SOQUAS   452
                C                                                                SOQUAS   453
                C - - SWITCH THE TAPES                                           SOQUAS   454
                C                                                                SOQUAS   455
                      NT = MT                                                    SOQUAS   456
                      MT = NOUT                                                  SOQUAS   457
```

```
                DO 125 IB = 1, KM1                                              SOQUAS   344
                NF = NF - IB - M                                                SOQUAS   345
345             NT = NT - MP1 - IB                                              SOQUAS   346
                SUM = 0.0                                                       SOQUAS   347
                NP = NF                                                         SOQUAS   348
                N2 = MP1 + IB                                                   SOQUAS   349
                DO 120 IO = 1, IB                                               SOQUAS   350
350             NN = NT + IO                                                    SOQUAS   351
                NP = NP + N2 - IO                                               SOQUAS   352
              120 SUM = SUM + A(NN) * A(NP)                                     SOQUAS   353
              125 A(NF) = (A(NF) - SUM) / A(NT)                                 SOQUAS   354
              130 CONTINUE                                                      SOQUAS   355
355         C                                                                   SOQUAS   356
            C - - MOVE THE SOLUTIONS TO CONTIGUOUS LOCATIONS STARTING AT A(N1)  SOQUAS   357
            C                                                                   SOQUAS   358
                N1 = KORE + 1                                                   SOQUAS   359
                DO 140 NN = 1, K                                                SOQUAS   360
360             DO 135 MN = 1, M                                                SOQUAS   361
                NL = NL - 1                                                     SOQUAS   362
                N1 = N1 - 1                                                     SOQUAS   363
              135 A(N1) = A(NL)                                                 SOQUAS   364
              140 NL = NL - NN                                                  SOQUAS   365
365         C                                                                   SOQUAS   366
            C - - WRITE THE SOLUTIONS ON TAPE                                   SOQUAS   367
            C                                                                   SOQUAS   368
                WRITE (NIN) K                                                   SOQUAS   369
                NS = N1 - 1                                                     SOQUAS   370
370             DO 145 MN = 1, M                                                SOQUAS   371
                NT = NS + MN                                                    SOQUAS   372
              145 WRITE ( NIN ) (A(IO), IO = NT, KORE, M)                       SOQUAS   373
            C                                                                   SOQUAS   374
            C - - TEST IF THIS IS THE LAST PASS                                 SOQUAS   375
375         C                                                                   SOQUAS   376
                IF (LAST) GO TO 200                                             SOQUAS   377
            C                                                                   SOQUAS   378
            C - - WE MUST NOW MODIFY THE TRIANGULAR MATRIX TO REFLECT THE EFFECT OF SOQUAS 379
            C     THE SOLUTIONS OBTAINED SO FAR  (EQ 21)                        SOQUAS   380
380         C * * NOTE..LOCATIONS A(1) TO A(N1-1) ARE NOW FREE TO USE           SOQUAS   381
            C                                                                   SOQUAS   382
            C - - CALCULATE THE NEXT VALUES OF 'NEL' AND 'NREM'                 SOQUAS   383
            C                                                                   SOQUAS   384
                NELOLD = NEL                                                    SOQUAS   385
385             KOLD = K                                                        SOQUAS   386
                NEL = NEL - K                                                   SOQUAS   387
                NREM = NREM - K                                                 SOQUAS   388
            C                                                                   SOQUAS   389
                NROW = NREM - K + 1                                             SOQUAS   390
390             IF (K .LT. NREM) GO TO 150                                      SOQUAS   391
                LAST = .TRUE.                                                   SOQUAS   392
                NROW = 1                                                        SOQUAS   393
                K = NREM                                                        SOQUAS   394
              150 NS = 1                                                        SOQUAS   395
395             NT = NELOLD + 1                                                 SOQUAS   396
            C                                                                   SOQUAS   397
            C - - READ IN THE ROWS TO BE MODIFIED                               SOQUAS   398
            C                                                                   SOQUAS   399
                DO 190 IB = 1, NREM                                             SOQUAS   400
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                NNEW = NNEW - 1                                                 SOQUAS   287
                NOLD = NOLD - 1                                                 SOQUAS   288
                A(NNEW) = A(NOLD)                                               SOQUAS   289
              118 CONTINUE                                                      SOQUAS   290
290           1118 CONTINUE                                                     SOQUAS   291
            C                                                                   SOQUAS   292
            C***    ***NOW NNEW = KORE - (M*KF) + 1                             SOQUAS   293
            C***    ***NOW NOLD = KORE - (M - 1) * N + 1 - KF                   SOQUAS   294
            C    ***    SKIP 1ST PART OF TRAPEZOIDAL MATRIX + READ LAST K ROWS  SOQUAS   295
295         C*** ***ATTATCH RHS TO IT SO THAT EVERYTHING IS IN CONSECUTIVE ORDER SOQUAS   296
                NREMAN = ND - K                                                 SOQUAS   297
                IF(NREMAN .EQ. 0)GO TO 126                                      SOQUAS   298
                DO 122 I = 1,NREMAN                                             SOQUAS   299
              122 READ(MT) IDUMMY                                               SOQUAS   300
300           126 NEND = 0                                                      SOQUAS   301
                KCNT = K                                                        SOQUAS   302
                NNEW = NNEW - 1                                                 SOQUAS   303
            C***    ***NOTE THAT K = KF WHICH IS ALREADY KNOWN IN CORE          SOQUAS   304
                DO 121 JCNT = 1,K                                               SOQUAS   305
305             NBEG = NEND + 1                                                 SOQUAS   306
                KCNT = KCNT - 1                                                 SOQUAS   307
                NEND = NBEG + KCNT                                              SOQUAS   308
                READ(MT)IDUMMY,(A(J),J=NBEG,NEND)                               SOQUAS   309
                NNEW = NNEW + 1                                                 SOQUAS   310
310             KEND = (MM1 * KF) + NNEW                                        SOQUAS   311
                DO 121 NPP=NNEW,KEND,KF                                         SOQUAS   312
                NEND = NEND + 1                                                 SOQUAS   313
              121 A(NEND) = A(NPP)                                              SOQUAS   314
                REWIND LTAPE                                                    SOQUAS   315
315             REWIND MT                                                       SOQUAS   316
            C                                                                   SOQUAS   317
            C - - THERE, NOW WE CAN START THE BACK-SOLUTION                     SOQUAS   318
            C * * NOTE. THE FIRST AVAILABLE LOCATION FOR THE SOLUTIONS IS A(N1) SOQUAS   319
            C                                                                   SOQUAS   320
320         C                                                                   SOQUAS   321
            C***    ***NL IS THE LAST SUBSCRIPT + 1 OF THE TRAPEZOIDAL A MATRIX THAT SOQUAS   322
            C***    ***CORE                                                     SOQUAS   323
            C                                                                   SOQUAS   324
                NL = NEND + 1                                                   SOQUAS   325
325             NREM = N                                                        SOQUAS   326
                NPM = N + M                                                     SOQUAS   327
                NEL = NPM                                                       SOQUAS   328
                MP1 = M + 1                                                     SOQUAS   329
                LAST = K .EQ. N                                                 SOQUAS   330
330             NPASS = 0                                                       SOQUAS   331
            C                                                                   SOQUAS   332
            C - - SOLVE FOR THE ANSWERS CORRESPONDING TO 'K' ROWS               SOQUAS   333
            C                                                                   SOQUAS   334
              119 KM1 = K - 1                                                   SOQUAS   335
335             KP1 = K + 1                                                     SOQUAS   336
                NS = NL - MP1                                                   SOQUAS   337
                NPASS = NPASS + 1                                               SOQUAS   338
                DO 130 MN = 1, M                                                SOQUAS   339
                NF = NS + MN                                                    SOQUAS   340
340             A(NF) = A(NF) / A(NS)                                           SOQUAS   341
                NT = NS                                                         SOQUAS   342
                IF (KM1 .EQ. 0) GO  TO 130                                      SOQUAS   343
```

```
                      NTEND = NEND                                                  SOQUAS   230
230                   KSUMP1 = KSUM + 1                                             SOQUAS   231
                    C*** ***READ REST OF LROWS 1 ROW AT A TIME FOR CONSTANT SECTION SOQUAS   232
                      DO 115 I=KSUMP1,N                                             SOQUAS   233
                      NTBEG = NTBEG + 1                                             SOQUAS   234
                      NTEND = NTEND + 1                                             SOQUAS   235
235                  1115 CONTINUE                                                  SOQUAS   236
                      READ (LTAPE)( A(NN),NN=1,K)                                   SOQUAS   237
                      JCNT = -1                                                     SOQUAS   238
                    C*** ***PARTIALLY  REDUCE A RHS ACROSS A RHS ROW BY APPLYING K NUMBER SOQUAS 239
                    C*** ***OF L(I,J) S                                             SOQUAS   240
240                   DO 124 NPP = NTBEG,NTEND,N                                    SOQUAS   241
                      JCNT = JCNT + 1                                               SOQUAS   242
                      SUM = 0.0                                                     SOQUAS   243
                      NROW = KINIT + ( JCNT * N )                                   SOQUAS   244
                      DO 123 NN = 1,K                                               SOQUAS   245
245                   NROW = NROW + 1                                               SOQUAS   246
                    123 SUM = SUM + ( A(NN) * A(NROW) )                             SOQUAS   247
                    124 A(NPP) = A(NPP) - SUM                                       SOQUAS   248
                    115 CONTINUE                                                    SOQUAS   249
                      NBEG = NBEG + 1                                               SOQUAS   250
250                   NEND = NEND + 1                                               SOQUAS   251
                    C*** ***KINIT IS HOW FAR DOWN A COLUMN OF RHS TO START MULTIPLYING BY SOQUAS 252
                    C*** ***L(I,J) AT EACH PASS THROUGH                             SOQUAS   253
                      KINIT = KINIT + K                                             SOQUAS   254
                    C*** ***IF KSUMP1 = N THERE ARE NO MORE L(I,J)'S LEFT           SOQUAS   255
255                   IF(KSUMP1 .LT. N)GO TO 111                                    SOQUAS   256
                    C*** ***WRITE OUT ALL BUT LAST K ROWS OF RHS IN ROW ORDER ON NATAPE SOQUAS 257
                    116 B = 4*M + 3                                                 SOQUAS   258
                      C = -2 * KORE                                                 SOQUAS   259
                      K = (  -B  +  SQRT( B**2  -4.0*C )  )/2.0                     SOQUAS   260
260                   IF(K .GT. ND) K = ND                                          SOQUAS   261
                      KF = K                                                        SOQUAS   262
                      KM1 = K - 1                                                   SOQUAS   263
                      KLEFT = N - KF + IINIT                                        SOQUAS   264
                      INITP1 = IINIT + 1                                            SOQUAS   265
265                   NEND = (M-1)*N + IINIT                                        SOQUAS   266
                      DO 117 NPP = INITP1,KLEFT                                     SOQUAS   267
                      NEND = NEND + 1                                               SOQUAS   268
                    117 WRITE(NATAPE) ( A(J),J=NPP,NEND,N)                          SOQUAS   269
                      REWIND NATAPE                                                 SOQUAS   270
270                 C*** ***JPASS1 IS TRUE ON 1ST PASS THRU BACK SOLUTION           SOQUAS   271
                      JPASS1 = .TRUE.                                               SOQUAS   272
                    C                                                               SOQUAS   273
                    C***   ***PUT REMAINING RHS IN CONTIGUOUS LOCATIONS BY COLUMNS  SOQUAS   274
                    C***  FROM KORE - (M * KF) + 1  TO  KORE                        SOQUAS   275
275                 C                                                               SOQUAS   276
                      NNEW = KORE - KF + 1                                          SOQUAS   277
                      MM1 = M - 1                                                   SOQUAS   278
                    C                                                               SOQUAS   279
                    C***   ***IF M = 1, THE ELTS OF THE 1 RHS COLUMN ARE ALREADY IN CONTIGUO SOQUAS 280
280                 C***   ***LOCATIONS                                             SOQUAS   281
                    C                                                               SOQUAS   282
                      IF (M.EQ.1)  GO TO 1118                                       SOQUAS   283
                      DO 118 I = 1,MM1                                              SOQUAS   284
                      NOLD = KORE - (I*N) + 1                                       SOQUAS   285
285                   DO 118 J = 1,KF                                               SOQUAS   286
```

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                REWIND MT                                                       SOQUAS   173
              C*** ***CALCULATE THE NUMBER OF COLUMNS TO BRING OFF OF THE RHS TAPE SOQUAS   174
                MTOTAL = 0                                                      SOQUAS   175
  175           M = MMAX                                                        SOQUAS   176
                IF(M .EQ. 0)GO TO 295                                           SOQUAS   177
              C*** ***MTOTALIS THE TOTAL NUMBER OF RHS COLUMNS ALREADY BROUGHT IN SOQUAS   178
                109 MTOTAL = MTOTAL + M                                         SOQUAS   179
                LASTRS = MTOTAL.GE. MRHS                                        SOQUAS   180
  180           MTOTAL = MTOTAL - M                                             SOQUAS   181
                IF (LASTRS)M = MRHS - MTOTAL                                    SOQUAS   182
                MTOTAL = MTOTAL + M                                             SOQUAS   183
              C*** ***BRING IN M COLUMNS OF RHS                                 SOQUAS   184
                KINIT = KORE - (M*N)                                            SOQUAS   185
  185           IINIT = KINIT                                                   SOQUAS   186
                NBEG = KINIT + 1                                                SOQUAS   187
                NEND = KINIT+ N                                                 SOQUAS   188
                DO 110 J =1,M                                                   SOQUAS   189
                READ (RHSTAP)( A(I),I=NBEG,NEND)                               SOQUAS   190
  190           NBEG = NEND + 1                                                 SOQUAS   191
                110 NEND = NEND + N                                             SOQUAS   192
              C*** ***BRING IN L(I,J) MATRIX AND APPLY IT TO RHS                SOQUAS   193
                NBEG = 1 + KINIT                                                SOQUAS   194
                NEND = 1 + (M-1) * N + KINIT                                    SOQUAS   195
  195           KSUM = 0                                                        SOQUAS   196
              C*** ***DO TRIANGULAR SECTION OF LMATRIX                          SOQUAS   197
                NLCNT = 0                                                       SOQUAS   198
                111 READ (LTAPE)K                                               SOQUAS   199
                NLCNT = NLCNT + 1                                               SOQUAS   200
  200       C*** ***KSUM IS THE TOTAL NUMBER OF L ROWS THAT WILL                SOQUAS   201
            C*** ***BE READ AFTER THIS TRIANGULAR SECTION IS FINISHED           SOQUAS   202
                KSUM = KSUM + K                                                 SOQUAS   203
                KM1 = K - 1                                                     SOQUAS   204
            C***   ***NOTE THAT KM1 CAN'T BE 0 SINCE K CAN'T BE 1 AND STILL HAVE SOM SOQUAS   205
  205       C***   ***ON THE LTAPE                                              SOQUAS   206
                DO 114  I = 1,KM1                                               SOQUAS   207
                NBEG = NBEG + 1                                                 SOQUAS   208
                NEND = NEND + 1                                                 SOQUAS   209
              C*** ***READ 1 ROW OF L(I,J) FROM LTAPE---K-1 TIMES---EACH TIME   SOQUAS   210
  210       C*** ***STARTING WITH L(1)                                          SOQUAS   211
                1114 CONTINUE                                                   SOQUAS   212
                READ (LTAPE) ( A(NN),NN=1,I)                                    SOQUAS   213
                JCNT = -1                                                       SOQUAS   214
              C*** ***REDUCE THE RHS BY GOING ACROSS A SOLUTION ROW (WHICH      SOQUAS   215
  215       C*** ***ARE NOT IN CONSECUTIVE ORDER, BUT A(1), A(N+1), A(2N+1) ETC.) SOQUAS   216
                DO 113 NPP = NBEG,NEND,N                                        SOQUAS   217
                JCNT = JCNT + 1                                                 SOQUAS   218
                SUM = 0.0                                                       SOQUAS   219
                NROW = KINIT + ( JCNT * N )                                     SOQUAS   220
  220           DO 112 NN=1,I                                                   SOQUAS   221
                NROW = NROW + 1                                                 SOQUAS   222
                112 SUM = SUM + ( A(NN)*A(NROW))                                SOQUAS   223
                113 A(NPP) = A(NPP) - SUM                                       SOQUAS   224
                114 CONTINUE                                                    SOQUAS   225
  225           IF (KSUM .EQ. N)GO TO 116                                       SOQUAS   226
              C*** ***KSUM = N IF YOU HAVE READ ENTIRE LMATRIX AND              SOQUAS   227
              C*** ***THERE IS NO CONSTANT SECTION LEFT                         SOQUAS   228
                NTBEG = NBEG                                                    SOQUAS   229
```

```
115                NS = - NEL                                              SOQUAS  116
                   DO 60 IO = 1, K                                         SOQUAS  117
                   NS = NS + NELP1                                         SOQUAS  118
                   NT = NT + NEL                                           SOQUAS  119
                   WRITE (MT) NP, (A(IB), IB = NS, NT)                     SOQUAS  120
120             60 NP = NP - 1                                             SOQUAS  121
                   IF (LAST) GO TO 90                                      SOQUAS  122
                   NP = NP - M                                             SOQUAS  123
                   NS = KORE - NEL + 1                                     SOQUAS  124
                C                                                          SOQUAS  125
125             C - - READ ANOTHER ROW                                     SOQUAS  126
                C                                                          SOQUAS  127
                   DO 80 IO = 1, NP                                        SOQUAS  128
                   READ (NIN) (A(IB), IB = NS, KORE)                       SOQUAS  129
                C                                                          SOQUAS  130
130             C - - MODIFY THIS ROW BY THE 'TRAPEZOIDAL' ARRAY           SOQUAS  131
                C                                                          SOQUAS  132
                   NT = 1                                                  SOQUAS  133
                   MN = NS                                                 SOQUAS  134
                   DO 70 IB = 1, K                                         SOQUAS  135
135                NB = NT                                                 SOQUAS  136
                   NF = MN + 1                                             SOQUAS  137
                   A(MN) = A(MN) / A(NT)                                   SOQUAS  138
                   DO 65 NN = NF, KORE                                     SOQUAS  139
                   NB = NB + 1                                             SOQUAS  140
140             65 A(NN) = A(NN) - A(MN) * A(NB)                           SOQUAS  141
                   MN = NF                                                 SOQUAS  142
                70 NT = NT + NELP1                                         SOQUAS  143
                C                                                          SOQUAS  144
                C - - WRITE THE MODIFIED ROW ON TAPE                       SOQUAS  145
145             C                                                          SOQUAS  146
                C*** ***WRITE REST OF LMATRIX ON LTAPE                     SOQUAS  147
                   MNM1 = MN - 1                                           SOQUAS  148
                   WRITE(LTAPE)(A(J),J=NS,MNM1)                            SOQUAS  149
                80 WRITE (NOUT)      (A(NT), NT = MN, KORE)                SOQUAS  150
150                REWIND NOUT                                             SOQUAS  151
                   REWIND NIN                                              SOQUAS  152
                C                                                          SOQUAS  153
                C - - SWITCH THE TAPES                                     SOQUAS  154
                C                                                          SOQUAS  155
155                NT = NIN                                                SOQUAS  156
                   NIN = NOUT                                              SOQUAS  157
                   NOUT = NT                                               SOQUAS  158
                C                                                          SOQUAS  159
                C - - RE-CALCULATE ROW LENGTH AND LOOP BACK                SOQUAS  160
160             C                                                          SOQUAS  161
                   NEL = NEL - K                                           SOQUAS  162
                   NN = NEL - M                                            SOQUAS  163
                   GO TO 10                                                SOQUAS  164
                C                                                          SOQUAS  165
165             C - - REWIND ALL TAPES                                     SOQUAS  166
                C                                                          SOQUAS  167
                90 REWIND NIN                                              SOQUAS  168
                   REWIND NOUT                                             SOQUAS  169
                C                                                          SOQUAS  170
170           105 N1 = KORE - K * M + 1                                    SOQUAS  171
                   REWIND LTAPE                                            SOQUAS  172
```

```
                  K = NN                                                    SOQUAS     59
                  B = 3 + MMAX*2                                            SOQUAS     60
60                C = 2 * (1 + MMAX - KORE )                                SOQUAS     61
                  KTEMP = ( -B + SQRT(B**2  - 4.0* C )  ) / 2.0             SOQUAS     62
                  IF(KTEMP .GE. K)GO TO 30                                  SOQUAS     63
                C                                                           SOQUAS     64
                C***   *  WE MUST REDUCE THE FINAL K                        SOQUAS     65
65              C                                                           SOQUAS     66
                  K = KTEMP                                                 SOQUAS     67
                  LAST = .FALSE.                                            SOQUAS     68
                C                                                           SOQUAS     69
                C - - READ 'K' ROWS OF THE AUGMENTED 'A' MATRIX             SOQUAS     70
70              C                                                           SOQUAS     71
               30 NT = 0                                                    SOQUAS     72
                  DO 40 IB = 1, K                                           SOQUAS     73
                  NS = NT + 1                                               SOQUAS     74
                  NT = NT + NEL                                             SOQUAS     75
75             40 READ (NIN) (A(IO), IO = NS, NT)                           SOQUAS     76
                C                                                           SOQUAS     77
                C - - CHECK TO SEE IF WE WERE UNLUCKY ENOUGH TO END UP WITH ONLY ONE ROW SOQUAS 78
                C                                                           SOQUAS     79
                  IF (K .EQ. 1) GO TO 90                                    SOQUAS     80
80              C                                                           SOQUAS     81
                C - - 'K' IS GREATER THAN '1' SO WE CAN START THE TRIANGULARIZATION SOQUAS 82
                C                                                           SOQUAS     83
                  NELP1 = NEL + 1                                           SOQUAS     84
                  NS = - NEL                                                SOQUAS     85
85                NELP2 = NELP1 + 1                                         SOQUAS     86
                C                                                           SOQUAS     87
                C - - FORM THE 'TRAPEZOIDAL' ARRAY  (8)                     SOQUAS     88
                C                                                           SOQUAS     89
                  DO 50 IB = 2, K                                           SOQUAS     90
90                NP = NELP2 - IB                                           SOQUAS     91
                  NS = NS + NELP1                                           SOQUAS     92
                  NT = NS                                                   SOQUAS     93
                  DO 50 IO = IB, K                                          SOQUAS     94
                  NT = NT + NEL                                             SOQUAS     95
95                MN = NT                                                   SOQUAS     96
                  NB = NS                                                   SOQUAS     97
                  A(NT) = A(NT) / A(NS)                                     SOQUAS     98
                  DO 50 NF = 2, NP                                          SOQUAS     99
                  MN = MN + 1                                               SOQUAS    100
100               NB = NB + 1                                               SOQUAS    101
               50 A(MN) = A(MN) - A(NT) * A(NB)                             SOQUAS    102
              C*** ***WRITE PART OF THE LMATRIX ON LTAPE   (TRIANGULAR PART) SOQUAS    103
                  WRITE (LTAPE)K                                            SOQUAS    104
                  LBEG =NELP1                                               SOQUAS    105
105               KM1 = K - 1                                               SOQUAS    106
                  DO 55 IB = 1,KM1                                          SOQUAS    107
                  LEND = LBEG + IB- 1                                       SOQUAS    108
                  WRITE (LTAPE) ( A(L),L=LBEG,LEND)                         SOQUAS    109
               55 LBEG = LBEG + NN                                          SOQUAS    110
110             C                                                           SOQUAS    111
                C - - WRITE THE 'TRAPEZOIDAL' MATRIX ON TAPE                SOQUAS    112
                C                                                           SOQUAS    113
                  NT = 0                                                    SOQUAS    114
                  NP = NEL                                                  SOQUAS    115
```

```
      SUBROUTINE SOQUAS (ND,MD,KD,NI,MM,NO,NAT,NW,LTAPE,RHSTAP)
C   ***   REAL   SOLVIT     QUASI INVERSE
C
C          ****    ***/  *******  *****  *       ***/          *
C          *   *  *  /*     *       *      *       *  /*        ******
C     ****  ****   * / *     *      ***     *       * / *  ****      *  *
C          *      */  *     *      *       *       */  *            ***
C          *      /***      *      *       *****   /***             *  *
C
C            D I R E C T   M A T R I X   S O L U T I O N
C
C*** ***LTAPE IS THE TAPE THE L(I,J) MATRIX WILL BE PUT ON
C*** ***RHSTAP IS THE TAPE THAT THE RIGHT HAND SIDES ARE INPUT ON
      DIMENSION  A(4000)
      INTEGER RHSTAP
C
C
      LOGICAL JPASS1
      LOGICAL  LASTRS
      LOGICAL  LAST
C
    1 CONTINUE
      NATAPE = NAT
      REWIND NATAPE
      REWIND NW
      N = ND
      KORE = KD
C*** *  RHSTAP = 0 IF THERE ARE NO RHS TO BE PROCESSED THIS RUN
      IF(RHSTAP .NE. 0 )GO TO 5
      MRHS = 0
      GO TO 6
    5 REWIND RHSTAP
      READ(RHSTAP)MRHS
    6 M = KORE / N  -  1
      MMAX = MINO(MRHS,M)
      NPM = N + MMAX
      IF (MAXO(3 * NPM, M * N) .GT. KORE) RETURN
      M = 0
      NPM = N
      MT = MM
      REWIND MT
      NIN = NI
      REWIND NIN
      NOUT = NO
      REWIND NOUT
      MP1 = M + 1
      NN = N
      NEL = NPM
C
C - - CALCULATE THE MAXIMUM NO. OF ROWS, 'K'
C
   10 K = (KORE - NEL) / NEL
C
C - - TEST TO SEE IF THE REST OF THE MATRIX WILL FIT IN CORE
C
      LAST = K .GE. NN
      IF( .NOT  LAST ) GO TO 30
```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
14	5	I	16 19	15B	EXT REFS
51	20	I	28 34	20B	EXT REFS NOT INNER
54	10	J	29 32	4B	INSTACK

STATISTICS
PROGRAM LENGTH 300B 192
520000B CM USED

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

42 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTED GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES
3	INV	1	49 55

VARIABLES	SN	TYPE		RELOCATION								
0	BUF	REAL	ARRAY	F.P.	REFS	3	52	DEFINED	1			
261	I	INTEGER			REFS	31	DEFINED	16	28			
0	INPUT	INTEGER		F.P.	DEFINED	1	I/O REFS	17				
0	ISIZE	INTEGER		F.P.	REFS	52	DEFINED	1				
264	IWHICH	INTEGER			REFS	42	DEFINED	36	39	45		
263	J	INTEGER			REFS	30	2*31	DEFINED	29			
262	K	INTEGER			REFS	17	18	33	DEFINED	17	18	33
256	KD	INTEGER			REFS	37	44	DEFINED	12			
0	KEY	INTEGER		F.P.	REFS	49	DEFINED	1				
0	LTAPE	INTEGER		F.P.	REFS	37	44	52	DEFINED	1		
					I/O REFS	26	50	53				
260	M	INTEGER			REFS	37	38	39	44	45		
					DEFINED	14						
0	NBOX	INTEGER		F.P.	REFS	13	16	17	18	2*27	28	29
					33	39	45	2*52	DEFINED	1		
257	ND	INTEGER			REFS	37	44	DEFINED	13			
0	NTP1	INTEGER		F.P.	REFS	37	44	DEFINED	1	I/O REFS	15	18
					20							
0	NTP2	INTEGER		F.P.	REFS	37	44	DEFINED	1	I/O REFS	21	
0	NTP3	INTEGER		F.P.	REFS	37	44	52	DEFINED	1		
					I/O REFS	22	41	48	54			
0	NTP4	INTEGER		F.P.	REFS	37	44	DEFINED	1	I/O REFS	23	27
					33	35						
0	NTP8	INTEGER		F.P.	REFS	37	44	52	DEFINED	1		
					I/O REFS	24	51					
0	NTP9	INTEGER		F.P.	REFS	37	44	DEFINED	1	I/O REFS	25	
0	VEC	REAL	ARRAY	F.P.	REFS	3	18	33	52	DEFINED	1	17
					30	31						

VARIABL' USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES
SOFUT		10	44
SOQUAS		10	37
TRPOSE		8	52

STATEMENT LABELS		DEF LINE	REFERENCES	
0	5	19	16	
0	10	32	29	
0	20	34	28	
113	90	40	46	
124	100	43	38	42
144	105	47	42	

```
      SUBROUTINE INV(NBOX,INPUT,LTAPE,NTP3,NTP4,NTP8,NTP9,NTP1,NTP2,     INV      2
     AISIZE,VEC,BUF,KEY)                                                 INV      3
      DIMENSION VEC(1), BUF(1)                                           INV      4
C                                                                        INV      5
C     INPUT = UNIT CONTAINING MATRIX TO BE INVERTED, POSITIONED          INV      6
C             TO FIRST RECORD                                            INV      7
C     NTP1 = UNIT CONTAINING MATRIX TO BE INVERTED( ROW SORT)            INV      8
C     NTP3 = UNIT CONTAINING INVERTED MATRIX ( COLUMN SORT )             INV      9
C     LTAPE = UNIT CONTAINING INVERTED MATRIX ( ROW SORT )               INV     10
C     NBOX = ORDER OF MATRIX TO BE INVERTED ( MAX = 1200 )               INV     11
C                                                                        INV     12
      KD = 4000                                                          INV     13
      ND = NBOX                                                          INV     14
      M  =  0                                                            INV     15
      REWIND NTP1                                                        INV     16
      DO 5 I = 1, NBOX                                                   INV     17
      READ(INPUT) ( VEC(K) , K = 1, NBOX )                               INV     18
      WRITE( NTP1 ) ( VEC(K), K = 1, NBOX )                              INV     19
    5 CONTINUE                                                           INV     20
      REWIND NTP1                                                        INV     21
      REWIND NTP2                                                        INV     22
      REWIND NTP3                                                        INV     23
      REWIND NTP4                                                        INV     24
      REWIND NTP8                                                        INV     25
      REWIND NTP9                                                        INV     26
      REWIND LTAPE                                                       INV     27
      WRITE(NTP4) NBOX, NBOX                                             INV     28
      DO 20 I = 1, NBOX                                                  INV     29
      DO 10 J = 1, NBOX                                                  INV     30
      VEC(J) = 0.0                                                       INV     31
      IF( J .EQ. I ) VEC(J) = 1.0                                        INV     32
   10 CONTINUE                                                           INV     33
      WRITE(NTP4) ( VEC(K), K = 1, NBOX )                                INV     34
   20 CONTINUE                                                           INV     35
      REWIND NTP4                                                        INV     36
      IWHICH = 1                                                         INV     37
      CALL SOQUAS (ND,M,KD,NTP1,NTP8,NTP9,NTP2,NTP3,LTAPE,NTP4)          INV     38
      IF (M .EQ. 0) GO TO 100                                            INV     39
      IF (M .EQ.  NBOX) IWHICH=2                                         INV     40
   90 CONTINUE                                                           INV     41
      REWIND NTP3                                                        INV     42
      GO TO (100,105), IWHICH                                            INV     43
  100 CONTINUE                                                           INV     44
      CALL SOFUT (ND,M,KD,NTP1,NTP8,NTP9,NTP2,NTP3,LTAPE,NTP4)           INV     45
      IF (M .EQ.  NBOX) IWHICH = 2                                       INV     46
      GO TO 90                                                           INV     47
  105 CONTINUE                                                           INV     48
      REWIND NTP3                                                        INV     49
      IF( KEY .EQ. 0 ) RETURN                                            INV     50
      REWIND LTAPE                                                       INV     51
      REWIND NTP8                                                        INV     52
      CALL TRPOSE(NTP3,BUF,VEC,NBOX,NBOX,LTAPE,NTP8,ISIZE)               INV     53
      REWIND LTAPE                                                       INV     54
      REWIND NTP3                                                        INV     55
      RETURN                                                             INV     56
      END                                                                INV     57
```

VARIABLES	SN	TYPE		RELOCATION			
0	XO	REAL	ARRAY	POWELL	REFS	9	
322	Z	REAL	ARRAY	POWELL	REFS	9	

FILE NAMES	MODE				
TAPE6	FMT	WRITES	19	27	90

EXTERNALS	TYPE	ARGS	REFERENCES		
AORDER		4	69		
NRM2		3	20		
SOSCAP	REAL	8	42	49	

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES			
ABS	REAL	1	INTRIN	58	102		
AMIN1	REAL	0	INTRIN	24	79	88	89

STATEMENT LABELS			DEF LINE	REFERENCES		
227	1	FMT	108	19		
233	2	FMT	109	90		
210	6	FMT	30	27		
213	9	FMT NO REFS	67			
46	10		50	31	39	
63	15		62	59		
66	20		64	56	61	
74	30		74	86		
102	31		82	75		
124	40		94	91		
142	50		106	101	103	
145	60		107	100		
21	101		26	22		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
30	10	J	31 50	21B	EXT REFS
55	20	J	56 64	12B	OPT
134	50	I	101 106	7B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)					
JGL	4505	0	JSET	(50)	50	JDIM	(1)	51	G	(1750)
		1801	LMK	(2500)	4301	BCOEF	(50)	4351	MSTAR	(1)
		4352	NOTJ	(50)	4402	NOTDIM	(1)	4403	LINDEP	(50)
		4453	LDDIM	(1)	4454	NOTACT	(50)	4504	NDIM	(1)
POWELL	2732	0	XO	(35)	35	XN	(35)	70	DELX	(35)
		105	GRO	(35)	140	GRN	(35)	175	DELG	(35)
		210	Z	(35)	245	HO	(1225)	1470	HN	(1225)
		2695	HGR	(35)	2730	NPARM	(1)	2731	ICON	(1)
MAX	1	0	MAXDIM	(1)						
NEWCON	51	0	JNEW	(50)	50	NEWDIM	(1)			

STATISTICS

PROGRAM LENGTH	606B	390
CM LABELED COMMON LENGTH	16171B	7289

52000B CM USED

VARIABLES	SN	TYPE	RELOCATION							
1602	K	INTEGER		REFS	56	62	72	79	89	93	103
					105	116	134	161	170	202	203	236
					244	253	260	261	262	296	301	304
					329	334	335	359	368	385	386	387
					389	390	473	DEFINED	52	58	66	198
					259	260	393	472				
1656	KCNT	INTEGER		REFS	306	307	DEFINED	301	306			
0	KD	INTEGER	F.P.	REFS	27	DEFINED	1					
1657	KEND	INTEGER		REFS	311	DEFINED	310					
1646	KF	INTEGER		REFS	263	276	285	310	311			
				DEFINED	261							
1630	KINIT	INTEGER		REFS	185	186	187	193	194	219	243	
					253	DEFINED	184	253				
1647	KLEFT	INTEGER		REFS	266	DEFINED	263					
1621	KM1	INTEGER		REFS	106	206	342	343	414			
				DEFINED	105	203	262	334				
1666	KOLD	INTEGER		REFS	415	421	435	DEFINED	385			
1567	KORE	INTEGER		REFS	34	37	52	60	123	128	138	
					149	170	184	258	276	284	358	372
				DEFINED	27							
1663	KP1	INTEGER		REFS	432	DEFINED	335					
1672	KREAD	INTEGER		REFS	513	514	515	DEFINED	511	514		
1671	KRED	INTEGER		REFS	513	514	DEFINED	509	513			
1635	KSUM	INTEGER		REFS	202	225	230	DEFINED	195	202		
1645	KSUMP1	INTEGER		REFS	232	255	DEFINED	230				
1605	KTEMP	INTEGER		REFS	62	66	DEFINED	61				
1623	L	INTEGER		REFS	108	DEFINED	108					
1564	LAST	LOGICAL		REFS	20	57	121	376	DEFINED	56	67	
					329	391						
1563	LASTRS	LOGICAL		REFS	19	181	506	DEFINED	179			
1620	LBEG	INTEGER		REFS	107	108	109	DEFINED	104	109		
1622	LEND	INTEGER		REFS	108	DEFINED	107					
1673	LREAD *	INTEGER		DEFINED	515							
0	LTAPE	INTEGER	F.P.	DEFINED	1	I/O REFS	103	108	148	171	198	
					212	236	314	507	511	516	519	
1571	M	INTEGER		REFS	35	37	46	122	162	170	176	
					178	180	182	184	188	194	257	265
					277	282	326	328	338	344	360	370
					372	405	408	411	412	414	416	424
					430	479	492	DEFINED	34	38	175	181
0	MD	INTEGER	F.P.	DEFINED	1	528						
0	MM	INTEGER	F.P.	REFS	40	DEFINED	1	I/O REFS	524			
1572	MMAX	INTEGER		REFS	36	59	60	175	DEFINED	35		
1652	MM1	INTEGER		REFS	283	310	DEFINED	277				
1615	MN	INTEGER		REFS	99	2*101	136	2*137	140	147	149	
					339	371	418	425	437	DEFINED	95	99
					133	141	338	360	370	416	436	
1624	MNM1	INTEGER		REFS	148	DEFINED	147					
1577	MP1	INTEGER		REFS	336	345	348	DEFINED	46	328		
1570	MRHS	INTEGER		REFS	35	179	181	DEFINED	30	33		
1574	MT	INTEGER		REFS	445	455	503	DEFINED	40	446	456	
					504	I/O REFS	41	119	172	299	308	315
					409	450	487	508	518			
1627	MTOTAL	INTEGER		REFS	178	179	180	181	182	528		
				DEFINED	174	178	180	182				
1566	N	INTEGER		REFS	34	36	37	39	47	184	187	
					191	194	216	219	225	232	240	243

VARIABLES	SN	TYPE	RELOCATION							
				255	263	265	268	284	325	326	329
				467	481	482	494	514	DEFINED	26	
1667	NA	INTEGER		REFS	419	422	424	DEFINED	418	424	
0	NAT	INTEGER	F.P.	REFS	23	DEFINED	1	I/O REFS	526		
1565	NATAPE	INTEGER		REFS	446	502	DEFINED	23	447	503	
				I/O REFS	24	268	269	407	449	505	
1616	NB	INTEGER		REFS	100	101	139	140	DEFINED	96	100
				135	139	419					
1632	NBEG	INTEGER		REFS	189	207	216	228	249	307	308
				407	DEFINED	186	190	193	207	249	305
				405							
0	ND	INTEGER	F.P.	REFS	26	2*260	296	517	DEFINED	1	
1601	NEL	INTEGER		REFS	2*52	74	83	84	94	114	115
				118	123	161	162	384	386		
				DEFINED	48	161	327	386			
1665	NELOLD	INTEGER		REFS	395	DEFINED	384				
1612	NELP1	INTEGER		REFS	85	91	104	117	142		
				DEFINED	83						
1613	NELP2	INTEGER		REFS	90	DEFINED	85				
1633	NEND	INTEGER		REFS	189	190	191	208	216	229	250
				267	268	305	308	312	313	324	
				DEFINED	187	191	194	208	250	265	267
				300	307	312					
1617	NF	INTEGER		REFS	138	141	2*340	344	347	2*353	417
				433	437	438	461	DEFINED	98	136	339
				344	414	432	435	438			
0	NI	INTEGER	F.P.	REFS	42	DEFINED	1	I/O REFS	523		
1575	NIN	INTEGER		REFS	155	DEFINED	42	156	I/O REFS	43	75
				128	151	167	368	372	466	472	480
				486							
1660	NL	INTEGER		REFS	336	361	363	364	432	433	435
				436	DEFINED	324	361	364	430	461	
1636	NLCNT	INTEGER		REFS	199	510	DEFINED	197	199		
1600	NN	INTEGER		REFS	56	58	109	2*140	212	222	236
				246	352	364	402	403	412	415	433
				480	495	DEFINED	47	138	162	212	220
				236	244	350	359	409	412	415	480
				495							
1651	NNEW	INTEGER		REFS	286	288	302	309	310	311	
				DEFINED	276	286	302	309			
0	NO	INTEGER	F.P.	REFS	44	DEFINED	1	I/O REFS	525		
1653	NOLD	INTEGER		REFS	287	288	DEFINED	284	287		
1576	NOUT	INTEGER		REFS	156	456	DEFINED	44	157	457	
				I/O REFS	45	149	150	168	433	451	488
1614	NP	INTEGER		REFS	98	119	120	122	127	351	352
				418	DEFINED	90	114	120	122	347	351
				413							
1662	NPASS	INTEGER		REFS	337	471	DEFINED	330	337		
1573	NPM	INTEGER		REFS	37	48	327	DEFINED	36	39	326
1640	NPP	INTEGER		REFS	2*223	2*247	268	313	DEFINED	216	240
				266	311						
1661	NREM	INTEGER		REFS	387	389	390	393	399		
				DEFINED	325	387					
1654	NREMAN	INTEGER		REFS	297	298	DEFINED	296			
1642	NROW	INTEGER		REFS	221	222	245	246	401	431	
				DEFINED	219	221	243	245	389	392	517
1610	NS	INTEGER		REFS	75	91	92	96	97	117	119

VARIABLES	SN	TYPE	RELOCATION							
				128	133	148	339	340	341	371	402
				409	433	480	482	495	DEFINED	73	84
				91	115	117	123	336	369	394	402
				474	482	493					
1606	NT	INTEGER		REFS	73	74	75	94	95	2*97	101
				118	119	135	137	142	149	157	345
				350	353	372	400	403	405	407	408
				409	411	414	430	433	436	457	480
				481	493	494	495	DEFINED	71	74	92
				94	113	118	132	142	149	155	341
				345	371	395	400	403	408	411	455
				475	481	491	494				
1643	NTBEG	INTEGER		REFS	233	240	DEFINED	228	233		
1670	NTEMP	INTEGER		REFS	447	504	DEFINED	445	502		
1644	NTEND	INTEGER		REFS	234	240	DEFINED	229	234		
0	NW	INTEGER	F.P.	DEFINED	1	I/O REFS	25	495			
1626	N1	INTEGER		REFS	362	363	369	413	474	483	
				DEFINED	170	358	362	473			
1664	N2	INTEGER		REFS	351	422	423	425	2*426	473	475
				DEFINED	348	417	423	425	467	483	
0	RHSTAP	INTEGER	F.P.	REFS	15	29	527	DEFINED	1		
				I/O REFS	32	33	189	527			
1641	SUM	REAL		REFS	222	223	246	247	352	353	422
				426	DEFINED	218	222	242	246	346	352
				420	422						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
SQRT	REAL	1	LIBRARY	61 259

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
MAXO	INTEGER	0	INTRIN		37
MINO	INTEGER	0	INTRIN		35

STATEMENT LABELS			DEF LINE	REFERENCES		
0	1	INACTIVE	22			
21	5		32	29		
25	6		34	31		
57	10		52	163		
103	30		71	57	62	
0	40		75	72		
0	50		101	89	93	98
0	55		109	106		
0	60		120	116		
0	65		140	138		
0	70		142	134		
0	80		149	127		
324	90		167	79	121	
0	105	INACTIVE	170			
342	109		178	506		
0	110		191	188		
400	111		198	255		
0	112		222	220		
0	113		223	216		
0	114		224	206		
0	115		248	232		
522	116		257	225		

STATEMENT LABELS			DEF LINE	REFERENCES	
0	117		268	266	
0	118		289	283	285
677	119		334	462	
0	120		352	349	
0	121		313	304	311
0	122		299	298	
0	123		246	244	
0	124		247	240	
0	125		353	343	
626	126		300	297	
745	130		354	338	342
0	135		363	360	
0	140		364	359	
0	145		372	370	
1027	150		394	390	
1040	160		404	401	
1053	161		409	404	
1066	163		413	410	
0	165		424	421	
0	170		426	416	
1144	175		435	431	
0	180		438	436	
1156	190		439	399	434
1167	195		450	444	
1200	200		466	376	
0	210		482	479	
0	220		483	471	
0	230		495	492	
1265	290		506	497	
1266	295		507	176	
0	297		516	510	515
0	299		519	517	
0	304	INACTIVE	512		
0	1114	INACTIVE	211		
0	1115	INACTIVE	235		
615	1118		290	282	
0	9999	INACTIVE	529		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
105	40	IB	72 75	14B	EXT REFS
127	50	IB	89 101	34B	NOT INNER
134	50	IO	93 101	24B	NOT INNER
150	50	NF	98 101	3B	INSTACK
170	55	IB	106 109	14B	EXT REFS
210	60	IO	116 120	15B	EXT REFS
233	80	IO	127 149	60B	EXT REFS NOT INNER
245	70	IB	134 142	24B	NOT INNER
257	65	NN	138 140	3B	INSTACK
356	110	J	188 191	15B	EXT REFS
407	114	I	206 224	37B	EXT REFS NOT INNER
421	113	NPP	216 223	22B	NOT INNER
431	112	NN	220 222	4B	INSTACK
454	115	I	232 248	37B	EXT REFS NOT INNER
466	124	NPP	240 247	22B	NOT INNER
476	123	NN	244 246	4B	INSTACK
546	117	NPP	266 268	20B	EXT REFS NOT INNER
553		J	268 268	7B	EXT REFS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
575	118	I	283 289	20B	NOT INNER
605	118	J	285 289	3B	INSTACK
621	122	I	298 299	5B	EXT REFS
633	121	JCNT	304 313	30B	EXT REFS NOT INNER
654	121	NPP	311 313	3B	INSTACK
705	130	MN	338 354	43B	NOT INNER
714	125	IB	343 353	31B	NOT INNER
727	120	IO	349 352	7B	INSTACK
752	140	NN	359 364	16B	NOT INNER
757	135	MN	360 363	3B	INSTACK
775	145	MN	370 372	21B	EXT REFS NOT INNER
1003		IO	372 372	7B	EXT REFS
1032	190	IB	399 439	127B	EXT REFS NOT INNER
1075	170	MN	416 426	27B	NOT INNER
1107	165	IO	421 424	4B	INSTACK
1152	180	MN	436 438	3B	INSTACK
1205	220	IB	471 483	30B	EXT REFS NOT INNER
1214	210	IO	479 482	14B	EXT REFS
1244	230	IO	492 495	14B	EXT REFS
1274	297	I	510 516	15B	EXT REFS NOT INNER
1302	297	LREAD	515 516	5B	EXT REFS
1312	299	NROW	517 519	17B	EXT REFS

STATISTICS
PROGRAM LENGTH 11537B 4959
52000B CM USED

```
      SUBROUTINE SOFUT (ND,MD,KD,NI,MM,NO,NAT,NW,LTAPE,RHSTAP)
C
C   ***   THIS IS THE REAL VERSION OF FUTSOL
C
C
C          ****    ***/  *******  *****  *       ***/          *
C          *   *  *  /*     *     *      *      *  /*        ******
C     ****  ****   * / *     *     ***    *      * / *  ****     *  *
C          *      */  *     *     *      *      */  *             ***
C          *      /***      *     *      *****  /***             *  *
C
C            D I R E C T   M A T R I X   S O L U T I O N
C
C     WRITTEN BY J. L. HESS * PROGRAMMED BY C. D. SCHOOR
C*** ***LTAPE IS THE TAPE THE L(I,J) MATRIX WILL BE PUT ON
C*** ***RHSTAP IS THE TAPE THAT THE RIGHT HAND SIDES ARE INPUT ON
      INTEGER RHSTAP
C
      DIMENSION  A(4000)
C
      LOGICAL JPASS1
      LOGICAL  LASTRS
      LOGICAL  LAST
C
    1 CONTINUE
      NATAPE = NAT
      REWIND NATAPE
      REWIND NW
      N = ND
      KORE = KD
C***  *  RHSTAP = 0 IF THERE ARE NO RHS TO BE PROCESSED THIS RUN
      IF(RHSTAP .NE. 0 )GO TO 5
      MRHS = 0
      GO TO 6
    5 REWIND RHSTAP
      READ(RHSTAP)MRHS
    6 M = KORE/N -1
      MMAX = MINO(MRHS,M)
      NPM = N + MMAX
      IF (MAXO(3 * NPM, M * N) .GT. KORE) RETURN
      M = 0
      NPM = N
      MT = MM
      REWIND MT
      NIN = NI
      REWIND NIN
      NOUT = NO
      REWIND NOUT
      NN = N
      NEL = NPM
C
C - - CALCULATE THE MAXIMUM NO. OF ROWS, 'K'
C
C*** ***CALCULATE THE NUMBER OF COLUMNS TO BRING OFF OF THE RHS TAPE
      MTOTAL = 0
      M = MMAX
```

```
                IF(M .EQ. O)GO TO 295                                   SOFUT     59
              C*** ***MTOTALIS THE TOTAL NUMBER OF RHS COLUMNS ALREADY BROUGHT IN SOFUT     60
   60           109 MTOTAL = MTOTAL + M                                  SOFUT     61
                LASTRS = MTOTAL.GE. MRHS                                SOFUT     62
                MTOTAL = MTOTAL - M                                     SOFUT     63
                IF (LASTRS)M = MRHS - MTOTAL                            SOFUT     64
                MP1 = M + 1                                             SOFUT     65
   65           MM1 = M - 1                                             SOFUT     66
                MTOTAL = MTOTAL + M                                     SOFUT     67
              C*** ***BRING IN M COLUMNS OF RHS                         SOFUT     68
                KINIT = KORE - (M*N)                                    SOFUT     69
                IINIT = KINIT                                           SOFUT     70
   70           NBEG = KINIT + 1                                        SOFUT     71
                NEND = KINIT+ N                                         SOFUT     72
                DO 110 J =1,M                                           SOFUT     73
                READ (RHSTAP)( A(I),I=NBEG,NEND)                        SOFUT     74
                NBEG = NEND + 1                                         SOFUT     75
   75           110 NEND = NEND + N                                     SOFUT     76
              C*** ***BRING IN L(I,J) MATRIX AND APPLY IT TO RHS        SOFUT     77
                NBEG = 1 + KINIT                                        SOFUT     78
                NEND = 1 + (M-1) * N + KINIT                            SOFUT     79
                KSUM = O                                                SOFUT     80
   80           NLCNT = O                                               SOFUT     81
              C*** ***DO TRIANGULAR SECTION OF LMATRIX                  SOFUT     82
                111 READ (LTAPE)K                                       SOFUT     83
                NLCNT = NLCNT + 1                                       SOFUT     84
              C*** ***KSUM IS THE TOTAL NUMBER OF L ROWS THAT WILL      SOFUT     85
   85         C*** ***BE READ AFTER THIS TRIANGULAR SECTION IS FINISHED  SOFUT     86
                KSUM = KSUM + K                                         SOFUT     87
                KM1 = K - 1                                             SOFUT     88
              C***   ***NOTE THAT KM1 CAN'T BE O SINCE K CAN'T BE 1 AND STILL HAVE SOM SOFUT     89
              C***   ***ON THE LTAPE                                    SOFUT     90
   90           DO 114  I = 1,KM1                                       SOFUT     91
                NBEG = NBEG + 1                                         SOFUT     92
                NEND = NEND + 1                                         SOFUT     93
              C*** ***READ 1 ROW OF L(I,J) FROM LTAPE---K-1 TIMES---EACH TIME SOFUT     94
              C*** ***STARTING WITH L(1)                                SOFUT     95
   95           READ (LTAPE) ( A(NN),NN=1,I)                            SOFUT     96
                JCNT = -1                                               SOFUT     97
              C*** ***REDUCE THE RHS BY GOING ACROSS A SOLUTION ROW (WHICH SOFUT     98
              C*** ***ARE NOT IN CONSECUTIVE ORDER, BUT A(1), A(N+1), A(2N+1) ETC.) SOFUT     99
                DO 113 NPP = NBEG,NEND,N                                SOFUT    100
  100           JCNT = JCNT + 1                                         SOFUT    101
                SUM = O.O                                               SOFUT    102
                NROW = KINIT + ( JCNT * N )                             SOFUT    103
                DO 112 NN=1,I                                           SOFUT    104
                NROW = NROW + 1                                         SOFUT    105
  105           112 SUM = SUM + ( A(NN)*A(NROW))                        SOFUT    106
                113 A(NPP) = A(NPP) - SUM                               SOFUT    107
                114 CONTINUE                                            SOFUT    108
                IF (KSUM .EQ. N)GO TO 116                               SOFUT    109
              C*** ***KSUM = N IF YOU HAVE READ ENTIRE LMATRIX AND      SOFUT    110
  110         C*** ***THERE IS NO CONSTANT SECTION LEFT                 SOFUT    111
                NTBEG = NBEG                                            SOFUT    112
                NTEND = NEND                                            SOFUT    113
                KSUMP1 = KSUM + 1                                       SOFUT    114
              C*** ***READ REST OF LROWS 1 ROW AT A TIME FOR CONSTANT SECTION SOFUT    115
```

```
115               DO 115 I=KSUMP1,N                                          SOFUT     116
                  NTBEG = NTBEG + 1                                          SOFUT     117
                  NTEND = NTEND + 1                                          SOFUT     118
                  READ (LTAPE)( A(NN),NN=1,K)                                SOFUT     119
                  JCNT = -1                                                  SOFUT     120
120           C*** ***PARTIALLY  REDUCE A RHS ACROSS A RHS ROW BY APPLYING K NUMBER  SOFUT 121
              C*** ***OF L(I,J) S                                            SOFUT     122
                  DO 124 NPP = NTBEG,NTEND,N                                 SOFUT     123
                  JCNT = JCNT + 1                                            SOFUT     124
                  SUM = 0.0                                                  SOFUT     125
125               NROW = KINIT + ( JCNT * N )                                SOFUT     126
                  DO 123 NN = 1,K                                            SOFUT     127
                  NROW = NROW + 1                                            SOFUT     128
                123 SUM = SUM + ( A(NN) * A(NROW) )                          SOFUT     129
                124 A(NPP) = A(NPP) - SUM                                    SOFUT     130
130             115 CONTINUE                                                 SOFUT     131
                  NBEG = NBEG + 1                                            SOFUT     132
                  NEND = NEND + 1                                            SOFUT     133
              C*** ***KINIT IS HOW FAR DOWN A COLUMN OF RHS TO START MULTIPLYING BY  SOFUT 134
              C*** ***L(I,J) AT EACH PASS THROUGH                            SOFUT     135
135               KINIT = KINIT + K                                          SOFUT     136
              C*** ***IF KSUMP1 = N THERE ARE NO MORE L(I,J)'S LEFT          SOFUT     137
                  IF(KSUMP1 .LT. N)GO TO 111                                 SOFUT     138
              C*** ***WRITE OUT ALL BUT LAST K ROWS OF RHS IN ROW ORDER ON NATAPE  SOFUT 139
                116 B = 4*M + 3                                              SOFUT     140
140               C = -2 * KORE                                              SOFUT     141
                  K = (  -B  +  SQRT( B**2  -4.0*C )  )/2.0                  SOFUT     142
                  IF(K .GT. ND) K = ND                                       SOFUT     143
                  KF = K                                                     SOFUT     144
                  KM1 = K - 1                                                SOFUT     145
145               KLEFT = N - KF + IINIT                                     SOFUT     146
                  INITP1 = IINIT + 1                                         SOFUT     147
                  NEND = (M-1)*N + IINIT                                     SOFUT     148
                  DO 117 NPP = INITP1,KLEFT                                  SOFUT     149
                  NEND = NEND + 1                                            SOFUT     150
150             117 WRITE(NATAPE) ( A(J),J=NPP,NEND,N)                       SOFUT     151
                  REWIND NATAPE                                              SOFUT     152
              C*** ***JPASS1 IS TRUE ON 1ST PASS THRU BACK SOLUTION          SOFUT     153
                  JPASS1 = .TRUE.                                            SOFUT     154
              C                                                              SOFUT     155
155           C***   ***PUT REMAINING RHS IN CONTIGUOUS LOCATIONS BY COLUMNS SOFUT     156
              C***  FROM KORE - (M * KF) + 1  TO  KORE                       SOFUT     157
              C                                                              SOFUT     158
                  NNEW = KORE - KF + 1                                       SOFUT     159
              C                                                              SOFUT     160
160           C***   ***IF M = 1, THE ELTS OF THE 1 RHS COLUMN ARE ALREADY IN CONTIGUO SOFUT 161
              C***   ***LOCATIONS                                            SOFUT     162
              C                                                              SOFUT     163
                  IF (M.EQ.1)  GO TO 1118                                    SOFUT     164
                  DO 118 I = 1,MM1                                           SOFUT     165
165               NOLD = KORE - (I*N) + 1                                    SOFUT     166
                  DO 118 J = 1,KF                                            SOFUT     167
                  NNEW = NNEW - 1                                            SOFUT     168
                  NOLD = NOLD - 1                                            SOFUT     169
                  A(NNEW) = A(NOLD)                                          SOFUT     170
170               118 CONTINUE                                               SOFUT     171
                 1118 CONTINUE                                               SOFUT     172
```

```
                C                                                               SOFUT     173
                C***    ***NOW NNEW = KORE - (M*KF) + 1                         SOFUT     174
                C***    ***NOW NOLD = KORE - (M - 1) * N + 1 - KF               SOFUT     175
175             C   **   SKIP 1ST PART OF TRAPEZOIDAL MATRIX ON LTAPE            SOFUT     176
                C   **   READ IN LAST K ROWS OF TRAPEZOIDAL MATRIX AND          SOFUT     177
                C*** ***ATTAICH RHS TO IT SO THAT EVERYTHING IS IN CONSECUTIVE ORDER SOFUT 178
                      NREMAN = ND - K                                           SOFUT     179
                      IF( NREMAN .EQ. 0 )GO TO 126                              SOFUT     180
180                   DO 122 I=1,NREMAN                                         SOFUT     181
                  122 READ(LTAPE) IDUMMY                                        SOFUT     182
                  126 NEND = 0                                                  SOFUT     183
                      KCNT = K                                                  SOFUT     184
                      NNEW = NNEW - 1                                           SOFUT     185
185             C***    ***NOTE THAT K = KF WHICH IS ALREADY KNOWN IN CORE      SOFUT     186
                      DO 121 JCNT = 1,K                                         SOFUT     187
                      NBEG = NEND + 1                                           SOFUT     188
                      KCNT = KCNT - 1                                           SOFUT     189
                      NEND = NBEG + KCNT                                        SOFUT     190
190                   READ(LTAPE)IDUMMY,(A(J),J=NBEG,NEND)                      SOFUT     191
                      NNEW = NNEW + 1                                           SOFUT     192
                      KEND = (MM1 * KF) + NNEW                                  SOFUT     193
                      DO 121 NPP=NNEW,KEND,KF                                   SOFUT     194
                      NEND = NEND + 1                                           SOFUT     195
195                 121 A(NEND) = A(NPP)                                        SOFUT     196
                      REWIND LTAPE                                              SOFUT     197
                C                                                               SOFUT     198
                C   **  SKIP OVER L MATRIX ON LTAPE TO GET TO TRAPEZOIDAL MATRIX SOFUT     199
                C                                                               SOFUT     200
200                   KRED = 0                                                  SOFUT     201
                      DO 128 I=1,NLCNT                                          SOFUT     202
                      READ(LTAPE)KREAD                                          SOFUT     203
                      KRED = KRED + KREAD                                       SOFUT     204
                      KREAD = KREAD + ( N - KRED - 1)                           SOFUT     205
205                   DO 128 LREAD = 1,KREAD                                    SOFUT     206
                  128 READ(LTAPE)                                               SOFUT     207
                C                                                               SOFUT     208
                C - - THERE, NOW WE CAN START THE BACK-SOLUTION                 SOFUT     209
                C * * NOTE..THE FIRST AVAILABLE LOCATION FOR THE SOLUTIONS IS A(N1) SOFUT  210
210             C                                                               SOFUT     211
                C                                                               SOFUT     212
                C***    ***NL IS THE LAST SUBSCRIPT + 1 OF THE TRAPEZOIDAL A MATRIX THAT SOFUT 213
                C***    ***CORE                                                 SOFUT     214
                C                                                               SOFUT     215
215                   NL = NEND + 1                                             SOFUT     216
                      NREM = N                                                  SOFUT     217
                      NPM = N + M                                               SOFUT     218
                      NEL = NPM                                                 SOFUT     219
                      MP1 = M + 1                                               SOFUT     220
220                   LAST = K .EQ. N                                           SOFUT     221
                      NPASS = 0                                                 SOFUT     222
                C                                                               SOFUT     223
                C - - SOLVE FOR THE ANSWERS CORRESPONDING TO 'K' ROWS           SOFUT     224
                C                                                               SOFUT     225
225                 119 KM1 = K - 1                                             SOFUT     226
                      KP1 = K + 1                                               SOFUT     227
                      NS = NL - MP1                                             SOFUT     228
                      NPASS = NPASS + 1                                         SOFUT     229
```

```
                    DO 130 MN = 1, M                                        SOFUT     230
230                 NF = NS + MN                                            SOFUT     231
                    A(NF) = A(NF) / A(NS)                                   SOFUT     232
                    NT = NS                                                 SOFUT     233
                    IF (KM1 .EQ. 0) GO  TO 130                              SOFUT     234
                    DO 125 IB = 1, KM1                                      SOFUT     235
235                 NF = NF - IB - M                                        SOFUT     236
                    NT = NT - MP1 - IB                                      SOFUT     237
                    SUM = 0.0                                               SOFUT     238
                    NP = NF                                                 SOFUT     239
                    N2 = MP1 + IB                                           SOFUT     240
240                 DO 120 IO = 1, IB                                       SOFUT     241
                    NN = NT + IO                                            SOFUT     242
                    NP = NP + N2 - IO                                       SOFUT     243
                120 SUM = SUM + A(NN) * A(NP)                               SOFUT     244
                125 A(NF) = (A(NF) - SUM) / A(NT)                           SOFUT     245
245             130 CONTINUE                                                SOFUT     246
                C                                                           SOFUT     247
                C - - MOVE THE SOLUTIONS TO CONTIGUOUS LOCATIONS STARTING AT A(N1)  SOFUT  248
                C                                                           SOFUT     249
                    N1 = KORE + 1                                           SOFUT     250
250                 DO 140 NN = 1, K                                        SOFUT     251
                    DO 135 MN = 1, M                                        SOFUT     252
                    NL = NL - 1                                             SOFUT     253
                    N1 = N1 - 1                                             SOFUT     254
                135 A(N1) = A(NL)                                           SOFUT     255
255             140 NL = NL - NN                                            SOFUT     256
                C                                                           SOFUT     257
                C - - WRITE THE SOLUTIONS ON TAPE                           SOFUT     258
                C                                                           SOFUT     259
                    WRITE (NIN) K                                           SOFUT     260
260                 NS = N1 - 1                                             SOFUT     261
                    DO 145 MN = 1, M                                        SOFUT     262
                    NT = NS + MN                                            SOFUT     263
                145 WRITE ( NIN ) (A(IO), IO = NT, KORE, M)                 SOFUT     264
                C                                                           SOFUT     265
265             C - - TEST IF THIS IS THE LAST PASS                         SOFUT     266
                C                                                           SOFUT     267
                    IF (LAST) GO TO 200                                     SOFUT     268
                C                                                           SOFUT     269
                C - - WE MUST NOW MODIFY THE TRIANGULAR MATRIX TO REFLECT THE EFFECT OF  SOFUT  270
270             C     THE SOLUTIONS OBTAINED SO FAR  (EQ 21)                SOFUT     271
                C * * NOTE..LOCATIONS A(1) TO A(N1-1) ARE NOW FREE TO USE   SOFUT     272
                C                                                           SOFUT     273
                C - - CALCULATE THE NEXT VALUES OF 'NEL' AND 'NREM'         SOFUT     274
                C                                                           SOFUT     275
275                 NELOLD = NEL                                            SOFUT     276
                    KOLD = K                                                SOFUT     277
                    NEL = NEL - K                                           SOFUT     278
                    NREM = NREM - K                                         SOFUT     279
                C                                                           SOFUT     280
280                 NROW = NREM - K + 1                                     SOFUT     281
                    IF (K .LT. NREM) GO TO 150                              SOFUT     282
                    LAST = .TRUE.                                           SOFUT     283
                    NROW = 1                                                SOFUT     284
                    K = NREM                                                SOFUT     285
285             150 NS = 1                                                  SOFUT     286
```

```
                NT = NELOLD + 1                                                 SOFUT     287
              C                                                                 SOFUT     288
              C - - READ IN THE ROWS TO BE MODIFIED                             SOFUT     289
              C                                                                 SOFUT     290
  290             DO 190 IB = 1, NREM                                           SOFUT     291
                  NT = NT - 1                                                   SOFUT     292
                  IF (IB .LE. NROW) GO TO 160                                   SOFUT     293
                  NS = NS + NN                                                  SOFUT     294
                  NT = NT + NN                                                  SOFUT     295
  295           160 IF (.NOT. JPASS1)GO TO 161                                  SOFUT     296
                  NBEG = NT - M + 1                                             SOFUT     297
              C*** ***READ RHS FROM NATAPE                                      SOFUT     298
                  READ (NATAPE) ( A(IO),IO = NBEG,NT)                           SOFUT     299
                  NT = NT - M                                                   SOFUT     300
  300             READ(LTAPE)NN,(A(IO),IO=NS,NT)                                SOFUT     301
                  NT = NT + M                                                   SOFUT     302
                  NN = NN + M                                                   SOFUT     303
                  GO TO 163                                                     SOFUT     304
                161 READ(MT)NN,(A(IO),IO=NS,NT)                                 SOFUT     305
  305           163 NP = N1 - 1                                                 SOFUT     306
                  NF = NT - M - KM1                                             SOFUT     307
                  NN = NN - KOLD                                                SOFUT     308
                  DO 170 MN = 1, M                                              SOFUT     309
                  N2 = NF                                                       SOFUT     310
  310             NA = NP + MN                                                  SOFUT     311
                  NB = NA                                                       SOFUT     312
                  SUM = 0.0                                                     SOFUT     313
                  DO 165 IO = 1, KOLD                                           SOFUT     314
                  SUM = SUM + A(N2) * A(NA)                                     SOFUT     315
  315             N2 = N2 + 1                                                   SOFUT     316
                165 NA = NA + M                                                 SOFUT     317
                  N2 = N2 + MN - 1                                              SOFUT     318
                170 A(N2) = A(N2) - SUM                                         SOFUT     319
              C                                                                 SOFUT     320
  320         C - - WRITE THE MODIFIED ROW ON TAPE OR CONDENSE THE ROW          SOFUT     321
              C                                                                 SOFUT     322
                  NL = NT - M + 1                                               SOFUT     323
                  IF (IB .GE. NROW) GO TO 175                                   SOFUT     324
                  NF = NL - KP1                                                 SOFUT     325
  325             WRITE (NOUT) NN, (A(IO), IO = NS, NF), (A(IO), IO = NL, NT)   SOFUT     326
                  GO TO 190                                                     SOFUT     327
                175 NF = NL - KOLD                                              SOFUT     328
                  DO 180 MN = NL, NT                                            SOFUT     329
                  A(NF) = A(MN)                                                 SOFUT     330
  330             180 NF = NF + 1                                               SOFUT     331
                  190 CONTINUE                                                  SOFUT     332
                  IF( .NOT. JPASS1 ) GO TO 195                                  SOFUT     333
                  JPASS1= .FALSE.                                               SOFUT     334
                  REWIND NATAPE                                                 SOFUT     335
  335             195 REWIND MT                                                 SOFUT     336
                  REWIND NOUT                                                   SOFUT     337
              C                                                                 SOFUT     338
              C - - SWITCH THE TAPES                                            SOFUT     339
              C                                                                 SOFUT     340
  340             NT = MT                                                       SOFUT     341
                  MT = NOUT                                                     SOFUT     342
                  NOUT = NT                                                     SOFUT     343
```

```
                C                                                                SOFUT     344
                C - - LOOP BACK THRU THE SOLUTION                                SOFUT     345
345             C                                                                SOFUT     346
                      NL = NF                                                    SOFUT     347
                      GO TO 119                                                  SOFUT     348
                C                                                                SOFUT     349
                C - - START TO WRAP IT UP                                        SOFUT     350
350             C                                                                SOFUT     351
                  200 REWIND NIN                                                 SOFUT     352
                      N2 = N                                                     SOFUT     353
                C                                                                SOFUT     354
                C * * NOTE.. AT THIS POINT ALL LOCATIONS A(1) THRU A(KORE) ARE FREE SOFUT     355
355             C                                                                SOFUT     356
                      DO 220 IB = 1, NPASS                                       SOFUT     357
                      READ (NIN) K                                               SOFUT     358
                      N1 = N2 - K + 1                                            SOFUT     359
                      NS = N1                                                    SOFUT     360
360                   NT = N2                                                    SOFUT     361
                C                                                                SOFUT     362
                C - - READ IN THE SOLUTIONS                                      SOFUT     363
                C                                                                SOFUT     364
                      DO 210 IO = 1, M                                           SOFUT     365
365                   READ (NIN) (A(NN), NN = NS, NT)                            SOFUT     366
                      NT = NT + N                                                SOFUT     367
                  210 NS = NS + N                                                SOFUT     368
                  220 N2 = N1 - 1                                                SOFUT     369
                C                                                                SOFUT     370
370             C  ---  REWIND ALL INPUT TAPES                                   SOFUT     371
                      REWIND NIN                                                 SOFUT     372
                      REWIND MT                                                  SOFUT     373
                      REWIND NOUT                                                SOFUT     374
                C - - WRITE THE SOLUTIONS ON TAPE                                SOFUT     375
375             C                                                                SOFUT     376
                      NT = 0                                                     SOFUT     377
                      DO 230 IO = 1, M                                           SOFUT     378
                      NS = NT + 1                                                SOFUT     379
                      NT = NT + N                                                SOFUT     380
380               230 WRITE (NW) (A(NN), NN = NS, NT)                            SOFUT     381
                C                                                                SOFUT     382
                      IF(LASTRS) GO TO 295                                       SOFUT     383
                C*** ***IF THERE ARE MORE RHS TO BE GOTTEN FROM RHS TAPE, SWITCH TAPES SOFUT     384
                C*** ***BACK SO THAT  MT WILL CONAIN THE TRAPEZOIDAL MATRIX      SOFUT     385
385             C*** ***NATAPE WILL HAVE NOTHING USEFUL ON IT.                   SOFUT     386
                      NTEMP = NATAPE                                             SOFUT     387
                      NATAPE = MT                                                SOFUT     388
                      MT = NTEMP                                                 SOFUT     389
                      REWIND NATAPE                                              SOFUT     390
390                   REWIND LTAPE                                               SOFUT     391
                      GO TO 109                                                  SOFUT     392
                  295 CONTINUE                                                   SOFUT     393
                C                                                                SOFUT     394
                C   ***   REWIND ALL FILES EXCEPT THE OUTPUT FILE   NW          SOFUT     395
395             C                                                                SOFUT     396
                      REWIND NI                                                  SOFUT     397
                      REWIND MM                                                  SOFUT     398
                      REWIND NO                                                  SOFUT     399
                      REWIND NAT                                                 SOFUT     400
```

```
  400               REWIND RHSTAP                                    SOFUT     401
                    MD = MTOTAL                                      SOFUT     402
                 9999 CONTINUE                                       SOFUT     403
                    RETURN                                           SOFUT     404
                    END                                              SOFUT     405
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS DEF LINE REFERENCES

3	SOFUT	1	41 40

VARIABLES SN TYPE RELOCATION

1315	A	REAL	ARRAY	REFS	20	2*105	106	2*128	129	150	169
				195	2*231	2*243	2*244	254	263	2*314	318
				2*325	329	380	DEFINED	73	95	106	118
				129	169	190	195	231	244	254	298
				300	304	318	329	365			
1255	B	REAL		REFS	2*141	DEFINED	139				
1256	C	REAL		REFS	141	DEFINED	140				
1241	I	INTEGER		REFS	73	95	103	165	DEFINED	73	90
				115	164	180	201				
1303	IB	INTEGER		REFS	235	236	239	240	292	323	
				DEFINED	234	290	356				
1265	IDUMMY	INTEGER		DEFINED	181	190					
1235	IINIT	INTEGER		REFS	145	146	147	DEFINED	69		
1261	INITP1	INTEGER		REFS	148	DEFINED	146				
1306	IO	INTEGER		REFS	241	242	263	298	300	304	2*325
				DEFINED	240	263	298	300	304	313	2*325
				364	377						
1240	J	INTEGER		REFS	150	190	DEFINED	72	150	166	190
1246	JCNT	INTEGER		REFS	100	102	123	125	DEFINED	96	100
				119	123	186					
1212	JPASS1	LOGICAL		REFS	22	295	332	DEFINED	153	333	
1244	K	INTEGER		REFS	86	87	118	126	135	142	143
				144	178	183	186	220	225	226	250
				259	276	277	278	280	281	358	
				DEFINED	82	141	142	284	357		
1266	KCNT	INTEGER		REFS	188	189	DEFINED	183	188		
0	KD	INTEGER	F.P.	REFS	31	DEFINED	1				
1267	KEND	INTEGER		REFS	193	DEFINED	192				
1257	KF	INTEGER		REFS	145	158	166	192	193		
				DEFINED	143						
1234	KINIT	INTEGER		REFS	69	70	71	77	78	102	125
				135	DEFINED	68	135				
1260	KLEFT	INTEGER		REFS	148	DEFINED	145				
1245	KM1	INTEGER		REFS	90	233	234	306	DEFINED	87	144
				225							
1311	KOLD	INTEGER		REFS	307	313	327	DEFINED	276		
1217	KORE	INTEGER		REFS	38	41	68	140	158	165	249
				263	DEFINED	31					
1276	KP1	INTEGER		REFS	324	DEFINED	226				
1271	KREAD	INTEGER		REFS	203	204	205	DEFINED	202	204	
1270	KRED	INTEGER		REFS	203	204	DEFINED	200	203		

VARIABLES	SN	TYPE	RELOCATION							
1242	KSUM	INTEGER		REFS	86	108	113	DEFINED	79	86
1254	KSUMP1	INTEGER		REFS	115	137	DEFINED	113		
1214	LAST	LOGICAL		REFS	24	267	DEFINED	220	282	
1213	LASTRS	LOGICAL		REFS	23	63	382	DEFINED	61	
1272	LREAD	* INTEGER		DEFINED	205					
0	LTAPE	INTEGER	F.P.	DEFINED	1	I/O REFS	82	95	118	181
				196	202	206	300	390		190
1221	M	INTEGER		REFS	39	41	58	60	62	64
				66	68	72	78	139	147	163
				219	229	235	251	261	263	296
				301	302	306	308	316	322	364
				DEFINED	38	42	57	63		377
0	MD	INTEGER	F.P.	DEFINED	1	401				
0	MM	INTEGER	F.P.	REFS	44	DEFINED	1	I/O REFS	397	
1222	MMAX	INTEGER		REFS	40	57	DEFINED	39		
1233	MM1	INTEGER		REFS	164	192	DEFINED	65		
1300	MN	INTEGER		REFS	230	262	310	317	329	
				DEFINED	229	251	261	308	328	
1232	MP1	INTEGER		REFS	227	236	239	DEFINED	64	219
1220	MRHS	INTEGER		REFS	39	61	63	DEFINED	34	37
1224	MT	INTEGER		REFS	340	387	DEFINED	44	341	388
				I/O REFS	45	304	335	372		
1231	MTOTAL	INTEGER		REFS	60	61	62	63	66	401
				DEFINED	56	60	62	66		
1216	N	INTEGER		REFS	38	40	41	43	50	68
				75	78	99	102	108	115	122
				137	145	147	150	165	204	216
				220	352	366	367	379	DEFINED	30
1312	NA	INTEGER		REFS	311	314	316	DEFINED	310	316
0	NAT	INTEGER	F.P.	REFS	27	DEFINED	1	I/O REFS	399	
1215	NATAPE	INTEGER		REFS	386	DEFINED	27	387	I/O REFS	28
				151	298	334	389			150
1313	NB	* INTEGER		DEFINED	311					
1236	NBEG	INTEGER		REFS	73	91	99	111	131	189
				298	DEFINED	70	74	77	91	131
				296						187
0	ND	INTEGER	F.P.	REFS	30	2*142	178	DEFINED	1	
1230	NEL	INTEGER		REFS	275	277	DEFINED	51	218	277
1310	NELOLD	INTEGER		REFS	286	DEFINED	275			
1237	NEND	INTEGER		REFS	73	74	75	92	99	112
				149	150	187	190	194	195	132
				DEFINED	71	75	78	92	132	215
				182	189	194				147
1301	NF	INTEGER		REFS	2*231	235	238	2*244	309	149
				330	346	DEFINED	230	235	306	325
				330						329
0	NI	INTEGER	F.P.	REFS	46	DEFINED	1	I/O REFS	396	324
1225	NIN	INTEGER		DEFINED	16	I/O REFS	47	259	263	327
				365	371					351
1273	NL	INTEGER		REFS	227	252	254	255	324	357
				328	DEFINED	215	252	255	322	325
1243	NLCNT	INTEGER		REFS	83	201	DEFINED	80	83	327
1227	NN	INTEGER		REFS	95	105	118	128	243	346
				294	302	307	325	365	380	255
				DEFINED	50	95	103	118	126	293
				300	302	304	307	365	380	241
1262	NNEW	INTEGER		REFS	167	169	184	191	192	250
										193

```
      SUBROUTINE TRIXY(INA,INB,IOC,NROW,MM,NCOL,A,B,C,LENGTH,IRET)
C
C
C  ********************************************************************
C  *                                                                  *
C  *  COLUMN-SORT MATRIX MULTIPLIER.....  MULTIPLIES RECTANGULAR      *
C  *  MATRIX A (STORED IN COLUMN SORT ON INA) BY MATRIX B             *
C  *  (STORED IN COLUMN SORT ON INB) AND PUTS RESULTING MATRIX        *
C  *  C ONTO IOC IN COLUMN SORT.  OPERATIONS ARE DONE BY STORING      *
C  *  P COLUMNS OF A AND B IN CORE AT SAME TIME.  REQUIRES ONLY       *
C  *  P REWINDS OF INA.  (A IS NROW BY MM, B IS MM BY NCOL).          *
C  *                                                                  *
C  ********************************************************************
C
C***** INA    = INPUT UNIT CONTAINING MATRIX A
C***** INB    = INPUT UNIT CONTAINING MATRIX B
C***** IOC    = OUTPUT UNIT CONTAINING MATRIX C
C***** NROW   = NUMBER OF ROWS IN A AND C
C***** MM     = NUMBER OF COLUMNS IN A = NUMBER OF ROWS IN B
C***** NCOL   = NUMBER OF COLUMNS IN B AND C
C***** A      = BUFFER TO HOLD A PART OF A
C***** B      = BUFFER TO HOLD A PART OF B
C***** C      = BUFFER TO HOLD A PART OF C
C***** LENGTH = SIZE OF EACH BUFFER
C***** IRET   = 0 OUT-OF-CORE STORAGE NEEDED
C*****        = 1 ALL MATRICES CAN BE FIT IN CORE
C
      DIMENSION A(LENGTH), B(LENGTH), C(LENGTH)
CIBM
C     REAL*8 SUM
CIBM
      REWIND INA
   99 IRET=0
C
C COMPUTE P AS THE LARGEST NO. OF WHOLE
C COLUMNS THAT CAN FIT IN CORE STORAGE. IF ALL
C COLUMNS OF A CAN FIT DO MULTIPLICATION DIRECTLY.
C
      IP1= LENGTH/NROW
      IP2= LENGTH/MM
      IP = MINO(IP1,IP2)
      IF(IP1.LT.MM) GO TO 10
C
C READ IN ALL OF A
C
      DO 1 I= 1,MM
      II= (I-1)*NROW + 1
      CALL RNRW(-INA,A(II),NROW)
    1 CONTINUE
C
C READ A COLUMN OF B AND DOT
C WITH ROW OF A TO FORM ENTRY
C IN COL OF C.  WRITE OUT C
C WHEN COL IS FILLED.
C
      DO 2 J= 1,NCOL
      CALL RNRW(-INB,B(1),MM)
```

```
INLINE FUNCTIONS    TYPE    ARGS        DEF LINE  REFERENCES
       FLOAT       REAL        1  INTRIN               53
       IFIX        INTEGER     1  INTRIN               64        98        148        154

STATEMENT LABELS                DEF LINE    REFERENCES
   37  1                            54         49        51
  101  2                            78         62        74
   42  3                            55         46        48
    0  6                            73         66        69
   75  8                            75         72
    0  20                          100         95
  136  30                          102         99
  153  40                          108        101
    0  50                          109         91
    0  60                          135        133
    0  70                          125        124
    0  80                          127        121
    0  90                          150        146
  311  100                         158        144       152        155
    0  110                         168        165
    0  999           INACTIVE      169

LOOPS  LABEL     INDEX      FROM-TO     LENGTH    PROPERTIES
   24  3         I            46 55       21B               NOT INNER
   34  1         J            49 54        5B      INSTACK
   51  2         I            62 78       33B               NOT INNER
   57  6         L            66 73       16B                 EXITS   NOT INNER
   62  6         J            69 73       10B         OPT     EXITS
  113  50        I            91 109      46B               EXT REFS  NOT INNER
  124  20        J            95 100      11B         OPT     EXITS
  175  80        I           121 127      32B               EXT REFS  NOT INNER
  212  70        K           124 125       4B      INSTACK
  233  60        I           133 135      12B               EXT REFS
  254  100       I           144 158      40B               EXT REFS  NOT INNER
  264  90        J           146 150       5B      INSTACK
  320  110       I           165 168      12B               EXT REFS

COMMON BLOCKS    LENGTH     MEMBERS - BIAS NAME(LENGTH)
       STORES       457              0 NUMSTR (1)          1 KCONST (1)          2 ISTDOF (30)
                                    32 IDYDOF (30)        62 IDSTR  (5)        67 STRWI  (5)
                                    72 STRWO  (5)         77 STRWN  (5)        82 STRII  (15)
                                    97 STRIO  (15)       112 STRIN  (15)       127 STRRI  (15)
                                   142 STRRO  (15)       157 STRRN  (15)       172 STRWDO (5)
                                   177 STRWDN (5)        182 STRIDO (15)       197 STRIDN (15)
                                   212 STRRDO (15)       227 STRRDN (15)       242 SCALE  (65)
                                   307 STRFI  (30)       337 STRFO  (30)       367 STRFN  (30)
                                   397 STRFDO (30)       427 STRFDN (30)
       INVERT       125              0 INVERT (1)          1 IUA2   (1)          2 IFLEX  (1)
                                     3 AORD   (30)        33 IPERM  (30)        63 NSTOR  (60)
                                   123 IPREV  (1)        124 NDOFT  (1)
       CTAPES        50              0 ITAPES (50)

STATISTICS
  PROGRAM LENGTH                6527B     3415
  CM LABELED COMMON LENGTH      1170B      632
        520000B CM USED
```

VARIABLES		SN	TYPE	RELOCATION								
4531	NAME4		INTEGER	ARRAY		REFS	20	140	DEFINED	23		
4533	NAME5		INTEGER	ARRAY		REFS	20	163	DEFINED	24		
174	NDOFT		INTEGER		INVERT	REFS	15	62	95	140	146	151	152
						156	2*163	165	166	167	DEFINED	56	
77	NSTOR		INTEGER	ARRAY	INVERT	REFS	15	102	103	DEFINED	76	77	
0	NUMSTR		INTEGER		STORES	REFS	8						
546	N1	*	INTEGER			REFS	117	DEFINED	31	I/O REFS	119	122	141
						156	164	166					
557	N10		INTEGER			REFS	117	DEFINED	40	I/O REFS	82	93	116
547	N2		INTEGER			REFS	117	DEFINED	32	I/O REFS	120	123	
550	N3		INTEGER			REFS	117	DEFINED	33	I/O REFS	118	126	132
						134	142	145					
551	N4		INTEGER			REFS	117	DEFINED	34				
552	N5		INTEGER			REFS	117	DEFINED	35				
553	N6		INTEGER			REFS	117	DEFINED	36				
554	N7		INTEGER			REFS	117	DEFINED	37				
555	N8	*	INTEGER			DEFINED	38						
556	N9	*	INTEGER			DEFINED	39						
362	SCALE		REAL	ARRAY	STORES	REFS	8						
653	STRFDN		REAL	ARRAY	STORES	REFS	8						
615	STRFDO		REAL	ARRAY	STORES	REFS	8						
463	STRFI		REAL	ARRAY	STORES	REFS	8	104	106	DEFINED	105		
557	STRFN		REAL	ARRAY	STORES	REFS	8	107	DEFINED	106			
521	STRFO		REAL	ARRAY	STORES	REFS	8						
305	STRIDN		REAL	ARRAY	STORES	REFS	8						
266	STRIDO		REAL	ARRAY	STORES	REFS	8						
122	STRII		REAL	ARRAY	STORES	REFS	8						
160	STRIN		REAL	ARRAY	STORES	REFS	8						
141	STRIO		REAL	ARRAY	STORES	REFS	8						
343	STRRDN		REAL	ARRAY	STORES	REFS	8						
324	STRRDO		REAL	ARRAY	STORES	REFS	8						
177	STRRI		REAL	ARRAY	STORES	REFS	8						
235	STRRN		REAL	ARRAY	STORES	REFS	8						
216	STRRO		REAL	ARRAY	STORES	REFS	8						
261	STRWDN		REAL	ARRAY	STORES	REFS	8						
254	STRWDO		REAL	ARRAY	STORES	REFS	8						
103	STRWI		REAL	ARRAY	STORES	REFS	8						
115	STRWN		REAL	ARRAY	STORES	REFS	8						
110	STRWO		REAL	ARRAY	STORES	REFS	8						
601	VALUE		REAL			REFS	106	107	DEFINED	104			
607	VEC1		REAL	ARRAY		REFS	19	92	93	105	108	117	125
						135	149	167	DEFINED	107	122	134	145
						166							
2557	VEC2		REAL	ARRAY		REFS	19	117	125	151	156		
						DEFINED	123	149					
4535	VEC3		REAL	ARRAY		REFS	21	126	DEFINED	125			

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES				
AORDER		4	60				
DCLOSE		1	110	170			
GEDLAB		6	83				
GETROW		4	92				
INV		13	117				
PUDLAB		6	90	131	140	163	
PUTROW		4	108	135	151	167	
TIMEB		2	30	171			

```
                RETURN                                                  DYNSTF    173
                END                                                     DYNSTF    174
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
1	DYNSTF	1	172

VARIABLES

		SN	TYPE		RELOCATION							
3	AORD		REAL	ARRAY	INVERT	REFS	15	60	64	98	148	154	
						DEFINED	53						
561	I		INTEGER			REFS	47	63	76	77	99	105	107
						155	DEFINED	46	62	91	121	133	144
						165							
566	IC		INTEGER			REFS	67	71	76	DEFINED	65	67	
560	ICT		INTEGER			REFS	52	53	56	60	DEFINED	45	52
562	ID		INTEGER			REFS	48	50	72	99	149	155	
						DEFINED	47	64	98	148	154		
76	IDSTR		INTEGER	ARRAY	STORES	REFS	8	47	76				
40	IDYDOF		INTEGER	ARRAY	STORES	REFS	8	50	71				
571	ID2		INTEGER			REFS	72	DEFINED	71				
2	IFLEX		INTEGER		INVERT	REFS	15						
602	INUM		INTEGER			REFS	152	153	157	DEFINED	143	157	
0	INVERT		INTEGER		INVERT	REFS	15						
565	IP		INTEGER			REFS	64	98	148	154	DEFINED	63	97
						147	153						
41	IPERM		INTEGER	ARRAY	INVERT	REFS	15	60	63	97	147	153	
173	IPREV		INTEGER		INVERT	REFS	15						
564	IR		INTEGER			REFS	51	53	DEFINED	50			
2	ISTDOF		INTEGER	ARRAY	STORES	REFS	8						
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	17	31	32	33	34	35	36
						37	38	39	40				
574	IUA		INTEGER			REFS	90	108	110	DEFINED	88		
1	IUA2		INTEGER		INVERT	REFS	15	83	92	131	135	140	151
						163	167	170					
563	J		INTEGER			REFS	50	97	122	123	126	134	147
						149	DEFINED	49	69	95	122	123	126
						134	146						
570	JC		INTEGER			REFS	70	71	77	DEFINED	68	70	
600	JCOL		INTEGER			REFS	104	105	2*106	107	DEFINED	103	
576	JCT		INTEGER			REFS	96	102	103	DEFINED	94	96	
577	JSTORE		INTEGER			REFS	104	105	2*106	107	DEFINED	102	
575	K		INTEGER			REFS	93	3*125	145	156	166		
						DEFINED	93	124	145	156	166		
573	KCOL		INTEGER			REFS	83	90	92	93	108	122	123
						124	126	131	134	135	145		
1	KCONST		INTEGER		STORES	REFS	8						
572	KROW		INTEGER			REFS	83	90	91	117	121	131	133
						140	144						
567	L	*	INTEGER			DEFINED	66						
603	NAME		INTEGER	*UNDEF		REFS	19						
605	NAME2		INTEGER	ARRAY		REFS	19	131	DEFINED	25			
4527	NAME3		INTEGER	ARRAY		REFS	19	83	90	DEFINED	26		

```
115          C                                                                  DYNSTF   116
                   REWIND N10                                                   DYNSTF   117
                   CALL INV(KROW,N10,N2,N1,N3,N4,N5,N6,N7,1000,VEC1,VEC2,1)     DYNSTF   118
                   REWIND N3                                                    DYNSTF   119
                   REWIND N1                                                    DYNSTF   120
120                REWIND N2                                                    DYNSTF   121
                   DO 80 I = 1, KROW                                            DYNSTF   122
                   READ(N1) ( VEC1(J), J =1, KCOL )                             DYNSTF   123
                   READ(N2) ( VEC2(J), J = 1, KCOL )                            DYNSTF   124
                   DO 70 K = 1, KCOL                                            DYNSTF   125
125             70 VEC3(K) = .5 * ( VEC1(K) + VEC2(K) )                         DYNSTF   126
                   WRITE(N3) ( VEC3(J) , J = 1, KCOL )                          DYNSTF   127
                80 CONTINUE                                                     DYNSTF   128
             C                                                                  DYNSTF   129
             C     WRITE STIFFNESS MATRIX ON FILE 2 OF UNIT IUA2.               DYNSTF   130
130          C                                                                  DYNSTF   131
                   CALL PUDLAB (8HDYNSTF03,IUA2,NAME2,2,KROW,KCOL)              DYNSTF   132
                   REWIND N3                                                    DYNSTF   133
                   DO 60 I = 1, KROW                                            DYNSTF   134
                   READ(N3) ( VEC1(J), J = 1, KCOL )                            DYNSTF   135
135             60 CALL PUTROW(IUA2,2,VEC1,KCOL)                                DYNSTF   136
             C                                                                  DYNSTF   137
             C     WRITE FULL COLUMNS OF STIFNESS MATRIX CORRESPONDING          DYNSTF   138
             C     TO PYLON D.O.F. ON FILE 3 OF UNIT IUA2.                      DYNSTF   139
             C                                                                  DYNSTF   140
140                CALL PUDLAB (8HDYNSTF04,IUA2,NAME4,3,KROW,NDOFT)             DYNSTF   141
                   REWIND N1                                                    DYNSTF   142
                   REWIND N3                                                    DYNSTF   143
                   INUM = 1                                                     DYNSTF   144
                   DO 100 I = 1, KROW                                           DYNSTF   145
145                READ(N3) ( VEC1(K), K = 1, KCOL )                            DYNSTF   146
                   DO 90 J = 1, NDOFT                                           DYNSTF   147
                   IP = IPERM(J)                                                DYNSTF   148
                   ID = IFIX( AORD(IP) )                                        DYNSTF   149
                   VEC2(J) = VEC1( ID )                                         DYNSTF   150
150             90 CONTINUE                                                     DYNSTF   151
                   CALL PUTROW( IUA2, 2, VEC2, NDOFT )                          DYNSTF   152
                   IF( INUM .GT. NDOFT ) GO TO 100                              DYNSTF   153
                   IP = IPERM( INUM )                                           DYNSTF   154
                   ID = IFIX( AORD(IP) )                                        DYNSTF   155
155                IF( I .NE. ID ) GO TO 100                                    DYNSTF   156
                   WRITE(N1) ( VEC2(K), K = 1, NDOFT )                          DYNSTF   157
                   INUM = INUM + 1                                              DYNSTF   158
                100 CONTINUE                                                    DYNSTF   159
             C                                                                  DYNSTF   160
160          C     WRITE PARTITION OF STIFFNESS MATRIX CORRESPONDING            DYNSTF   161
             C     TO PYLON D.O.F. ON FILE 4 OF UNIT IUA2.                      DYNSTF   162
             C                                                                  DYNSTF   163
                   CALL PUDLAB (8HDYNSTF05,IUA2,NAME5,4,NDOFT,NDOFT)            DYNSTF   164
                   REWIND N1                                                    DYNSTF   165
165                DO 110 I = 1, NDOFT                                          DYNSTF   166
                   READ(N1) ( VEC1(K), K =1, NDOFT )                            DYNSTF   167
                   CALL PUTROW(IUA2,2,VEC1, NDOFT )                             DYNSTF   168
                110 CONTINUE                                                    DYNSTF   169
                999 CONTINUE                                                    DYNSTF   170
170                CALL DCLOSE(IUA2)                                            DYNSTF   171
                   CALL TIMEB(21,21H FROM DYNSTF, AT END )                      DYNSTF   172
```

```
      C     DETERMINE ASCENDING ORDER OF DY.DO.F. IN AORD.                    DYNSTF     59
      C                                                                       DYNSTF     60
60          CALL AORDER(AORD,ICT,IPERM,1)                                     DYNSTF     61
      C                                                                       DYNSTF     62
            DO 2 I = 1, NDOFT                                                 DYNSTF     63
            IP = IPERM(I)                                                     DYNSTF     64
            ID = IFIX( AORD(IP) )                                             DYNSTF     65
65          IC = 0                                                            DYNSTF     66
            DO 6 L = 1, 5                                                     DYNSTF     67
            IC = IC + 1                                                       DYNSTF     68
            JC = 0                                                            DYNSTF     69
            DO 6 J = 1, 6                                                     DYNSTF     70
70          JC = JC + 1                                                       DYNSTF     71
            ID2 = IDYDOF( IC, JC )                                            DYNSTF     72
            IF( ID2 .EQ. ID ) GO TO 8                                         DYNSTF     73
          6 CONTINUE                                                          DYNSTF     74
            GO TO 2                                                           DYNSTF     75
75          8 CONTINUE                                                        DYNSTF     76
            NSTOR(I,1) = IDSTR( IC )                                          DYNSTF     77
            NSTOR(I,2) = JC                                                   DYNSTF     78
          2 CONTINUE                                                          DYNSTF     79
      C                                                                       DYNSTF     80
80    C     READ DYNAMIC FLEXIBILITY MATRIX AND PLACE ON UNIT N10 AND 14.     DYNSTF     81
      C                                                                       DYNSTF     82
            REWIND N10                                                        DYNSTF     83
            CALL GEDLAB (8HDYNSTFO1,IUA2,NAME3,1,KROW,KCOL)                   DYNSTF     84
      CIBM                                                                    DYNSTF     85
85    C     IUA = 14                                                          DYNSTF     86
      CIBM                                                                    DYNSTF     87
      CCDC                                                                    DYNSTF     88
            IUA = 11                                                          DYNSTF     89
      CCDC                                                                    DYNSTF     90
90          CALL PUDLAB (8HDYNSTFO2,IUA,NAME3,1,KROW,KCOL)                    DYNSTF     91
            DO 50 I = 1, KROW                                                 DYNSTF     92
            CALL GETROW(IUA2,1,VEC1,KCOL)                                     DYNSTF     93
            WRITE(N10) ( VEC1(K), K = 1, KCOL )                               DYNSTF     94
            JCT = 0                                                           DYNSTF     95
95          DO 20 J = 1, NDOFT                                                DYNSTF     96
            JCT = JCT + 1                                                     DYNSTF     97
            IP = IPERM( J )                                                   DYNSTF     98
            ID = IFIX( AORD(IP) )                                             DYNSTF     99
            IF( ID .EQ. I ) GO TO 30                                          DYNSTF    100
100      20 CONTINUE                                                          DYNSTF    101
            GO TO 40                                                          DYNSTF    102
         30 JSTORE = NSTOR( JCT, 1 )                                          DYNSTF    103
            JCOL = NSTOR( JCT, 2 )                                            DYNSTF    104
            VALUE = STRFI( JSTORE, JCOL )                                     DYNSTF    105
105         STRFI( JSTORE, JCOL ) = VEC1(I)                                   DYNSTF    106
            IF( VALUE .EQ. 0.0 ) STRFN(JSTORE,JCOL) = STRFI(JSTORE,JCOL)      DYNSTF    107
            IF( VALUE .NE. 0.0 ) VEC1(I) = STRFN(JSTORE,JCOL )                DYNSTF    108
         40 CALL PUTROW (IUA,-1,VEC1,KCOL)                                    DYNSTF    109
         50 CONTINUE                                                          DYNSTF    110
110         CALL DCLOSE (IUA)                                                 DYNSTF    111
      C                                                                       DYNSTF    112
      C     INVERT MATRIX ON N10 TO FORM DYNAMIC STIFFNESS MATRIX.            DYNSTF    113
      C     THIS MATRIX IS IN COLUMN SORT ON UNIT N1.                         DYNSTF    114
      C     MATRIX IS ALSO ON N2 IN ROW SORT.                                 DYNSTF    115
```

```
      SUBROUTINE DYNSTF                                                 DYNSTF     2
C                                                                       DYNSTF     3
C     THIS SUBROUTINE READS THE DYNAMIC FLEXIBILITY MATRIX              DYNSTF     4
C     FROM UNIT IUA2, INVERTS SAME, AND WRITES THE RESULTING            DYNSTF     5
C     DYNAMIC STIFFNESS MATRIX INTO FILE 7 ON UNIT IUA2.                DYNSTF     6
C     THE DFM IS ALSO WRITTEN ON UNIT 14, FILE 1.                       DYNSTF     7
C                                                                       DYNSTF     8
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    DYNSTF     9
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)          DYNSTF    10
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)               DYNSTF    11
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)               DYNSTF    12
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                       DYNSTF    13
     E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                          DYNSTF    14
     F      ,STRFDO(5,6),STRFDN(5,6)                                   DYNSTF    15
      COMMON/ INVERT / INVERT,IUA2,IFLEX,AORD(30),IPERM(30),NSTOR(30,2) DYNSTF    16
     A,IPREV,NDOFT                                                      DYNSTF    17
      COMMON/ CTAPES / ITAPES(50)                                       DYNSTF    18
C                                                                       DYNSTF    19
      DIMENSION NAME(2),NAME2(2),VEC1(1000),VEC2(1000),NAME3(2)         DYNSTF    20
      DIMENSION NAME4(2), NAME5(2)                                      DYNSTF    21
      DIMENSION VEC3(1000)                                              DYNSTF    22
C                                                                       DYNSTF    23
      DATA NAME4/4HCOLS,4HTIFF/                                         DYNSTF    24
      DATA NAME5/4HPARS,4HTIFF/                                         DYNSTF    25
      DATA NAME2 /4HDYNS,4HTIFF/                                        DYNSTF    26
      DATA NAME3/4HDYNF,4HLEX /                                         DYNSTF    27
C                                                                       DYNSTF    28
C     SET UP I/O UNITS.                                                 DYNSTF    29
C                                                                       DYNSTF    30
      CALL TIMEB(23,23H FROM DYNSTF, AT START )                         DYNSTF    31
      N1 = ITAPES(21)                                                   DYNSTF    32
      N2 = ITAPES(22)                                                   DYNSTF    33
      N3 = ITAPES(23)                                                   DYNSTF    34
      N4 = ITAPES(28)                                                   DYNSTF    35
      N5 = ITAPES(29)                                                   DYNSTF    36
      N6 = ITAPES(30)                                                   DYNSTF    37
      N7 = ITAPES(32)                                                   DYNSTF    38
      N8 = ITAPES(33)                                                   DYNSTF    39
      N9 = ITAPES(36)                                                   DYNSTF    40
      N10 = ITAPES(50)                                                  DYNSTF    41
C                                                                       DYNSTF    42
C     AORD = ALL NON-ZERO DYNAMIC D.O.F.                                DYNSTF    43
C     ICT = TOTAL NUMBER OF NON-ZERO D.O.F.                             DYNSTF    44
C                                                                       DYNSTF    45
      ICT = 0                                                           DYNSTF    46
      DO 3 I = 1,5                                                      DYNSTF    47
      ID = IDSTR(I)                                                     DYNSTF    48
      IF (ID.EQ.0)  GO TO 3                                             DYNSTF    49
      DO 1 J = 1, 6                                                     DYNSTF    50
      IR = IDYDOF(ID,J)                                                 DYNSTF    51
      IF( IR.EQ.0 )  GO TO 1                                            DYNSTF    52
      ICT = ICT + 1                                                     DYNSTF    53
      AORD(ICT) = FLOAT(IR)                                             DYNSTF    54
    1 CONTINUE                                                          DYNSTF    55
    3 CONTINUE                                                          DYNSTF    56
      NDOFT = ICT                                                       DYNSTF    57
C                                                                       DYNSTF    58
```

VARIABLES	SN	TYPE		RELOCATION							
					DEFINED	1					
262	NSIZE	INTEGER			REFS	24	DEFINED	23			
272	NUM	INTEGER			REFS	56	57	58	DEFINED	55	
0	OUTPUT	INTEGER		F.P.	REFS	3	68	72	DEFINED	1	
					I/O REFS	33	38	40	46	126	
0	SCRTCH	INTEGER		F.P.	REFS	3	69	71	DEFINED	1	
					I/O REFS	47					
0	STORE	REAL	ARRAY	F.P.	REFS	4	113	DEFINED	1	105	111

VARIABLES USED AS FILE NAMES, SEE ABOVE

STATEMENT LABELS			DEF LINE	REFERENCES
0	10		32	28
0	20		39	35
62	30		42	24
110	40		73	70
0	50		92	88
163	70		106	104
0	80		112	109
0	90		114	103
0	99	INACTIVE	100	
0	100		125	82

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
16	10	I	28 32	23B	EXT REFS	NOT INNER	
26		J	31 31	7B	EXT REFS		
44	20	I	35 39	14B	EXT REFS		
11	100	I	82 125	106B	EXT REFS	NOT INNER	
125	50	J	88 92	23B	EXT REFS	NOT INNER	
135		K	91 91	7B	EXT REFS		
154	90	J	103 114	34B	EXT REFS	NOT INNER	
174	80	K	109 112	2B	INSTACK		

STATISTICS

PROGRAM LENGTH	331B	217
52000B CM USED		

```
                C                                                              TRPOSE    116
                C     UPDATE ROW COUNTER, (ISUMTP) , FOR OUT OF CORE STORAGE.  TRPOSE    117
                C     SWITCH UNITS FOR NEXT PARTITION.                         TRPOSE    118
                C                                                              TRPOSE    119
                      ISUMTP = IWRITE                                          TRPOSE    120
      120             ISAVE = IOLD                                             TRPOSE    121
                      IOLD = INEW                                              TRPOSE    122
                      INEW = ISAVE                                             TRPOSE    123
                      REWIND INEW                                              TRPOSE    124
                      REWIND IOLD                                              TRPOSE    125
      125           100 CONTINUE                                               TRPOSE    126
                      REWIND OUTPUT                                            TRPOSE    127
                      RETURN                                                   TRPOSE    128
                      END                                                      TRPOSE    129
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES	
3	TRPOSE	1	41	127

VARIABLES	SN	TYPE	RELOCATION									
0	BUFFER	REAL	ARRAY	F.P.	REFS	4	38	111	DEFINED	1	31	91
263	I	INTEGER			REFS	29	37	83	104	DEFINED	28	35
					82							
275	ICT	INTEGER			REFS	67	DEFINED	66				
274	ICYCLE	INTEGER			REFS	66	67	82	83	DEFINED	57	58
277	INEW	INTEGER			REFS	121	DEFINED	68	71	122		
					I/O REFS	113	123					
0	INPUT	INTEGER		F.P.	DEFINED	1	I/O REFS	22	31	91		
300	IOLD	INTEGER			REFS	120	DEFINED	69	72	121		
					I/O REFS	105	124					
303	IROWS	INTEGER			REFS	84	88	90	91	DEFINED	81	83
310	ISAVE	INTEGER			REFS	122	DEFINED	120				
0	ISIZE	INTEGER		F.P.	REFS	24	54	DEFINED	1			
301	ISUMBF	INTEGER			REFS	99	107	DEFINED	79	84		
302	ISUMTP	INTEGER			REFS	99	105	108	DEFINED	80	119	
276	ITEST	INTEGER			REFS	70	DEFINED	67				
305	IWRITE	INTEGER			REFS	113	119	DEFINED	99			
264	I1	INTEGER			REFS	30	31	90	91	DEFINED	29	89
265	I2	INTEGER			REFS	31	91	DEFINED	30	90		
266	J	INTEGER			REFS	31	38	89	DEFINED	31	38	88
					103							
270	J1	INTEGER			REFS	38	110	111	DEFINED	36	108	110
267	J2	INTEGER			REFS	36	38	DEFINED	34	37		
304	K	INTEGER			REFS	91	105	111	113	DEFINED	91	105
					109	113						
306	K1	INTEGER			REFS	109	DEFINED	101	106			
307	K2	INTEGER			REFS	106	107	109	DEFINED	102	107	
273	LAST	INTEGER			REFS	58	2*83	DEFINED	56			
271	MAXROW	INTEGER			REFS	55	56	81	DEFINED	54		
0	NCOLS	INTEGER		F.P.	REFS	23	30	35	54	90	103	
					DEFINED	1						
0	NROWS	INTEGER		F.P.	REFS	23	28	30	31	37	55	56

```
                IF( LAST .NE. 0 ) ICYCLE = NUM + 1                                TRPOSE     59
              C                                                                   TRPOSE     60
   60         C     OUT OF CORE STORAGE FOR EACH OF THE (ICYCLE) PARTITIONS SWITCHES  TRPOSE  61
              C     BETWEEN UNITS (OUTPUT) AND (SCRTCH). IF (ICYCLE) IS AN ODD NUMBER,  TRPOSE 62
              C     START WITH (OUTPUT). IF (ICYCLE) IS AN EVEN NUMBER, START WITH    TRPOSE  63
              C     (SCRTCH). THIS WILL INSURE THAT THE COMPLETE TRANSPOSE IS WRITTEN  TRPOSE  64
              C     ONTO UNIT (OUTPUT) DURING THE LAST PARTITION.                     TRPOSE  65
   65         C                                                                      TRPOSE  66
                ICT = ICYCLE / 2                                                    TRPOSE  67
                ITEST = ICYCLE - 2 * ICT                                            TRPOSE  68
                INEW = OUTPUT                                                       TRPOSE  69
                IOLD = SCRTCH                                                       TRPOSE  70
   70           IF( ITEST .NE. 0 ) GO TO 40                                        TRPOSE  71
                INEW = SCRTCH                                                       TRPOSE  72
                IOLD = OUTPUT                                                       TRPOSE  73
             40 CONTINUE                                                            TRPOSE  74
              C                                                                     TRPOSE  75
   75         C     THE COUNTER (ISUMBF) GIVES THE TOTAL NUMBER OF PARTITION ROWS     TRPOSE  76
              C     CURRENTLY IN THE BUFFER.  (ISUMTP) GIVES THE TOTAL NUMBER OF ROWS  TRPOSE 77
              C     WHICH HAVE BEEN WRITTEN TO OUT OF CORE STORAGE.                   TRPOSE  78
              C                                                                       TRPOSE  79
                ISUMBF = 0                                                          TRPOSE  80
   80           ISUMTP = 0                                                         TRPOSE  81
                IROWS = MAXROW                                                      TRPOSE  82
                DO 100 I = 1,ICYCLE                                                 TRPOSE  83
                IF( I .EQ. ICYCLE .AND. LAST .NE. 0 ) IROWS = LAST                  TRPOSE  84
                ISUMBF = IROWS                                                      TRPOSE  85
   85         C                                                                     TRPOSE  86
              C     FORM TRANSPOSE OF NEXT PARTITION AND STORE IN (BUFFER) BY ROWS.   TRPOSE  87
              C                                                                     TRPOSE  88
                DO 50 J = 1,IROWS                                                   TRPOSE  89
                I1 = J                                                              TRPOSE  90
   90           I2 = I1 + ( NCOLS - 1 ) * IROWS                                    TRPOSE  91
                READ(INPUT) ( BUFFER(K) , K = I1,I2,IROWS )                         TRPOSE  92
             50 CONTINUE                                                            TRPOSE  93
              C                                                                     TRPOSE  94
              C     READ FROM UNIT (IOLD) THE INTERMEDIATE TRANSPOSED MATRIX        TRPOSE  95
   95         C     BY ROWS, CONTAINING (ISUMTP) ELEMENTS, AND STORE IN             TRPOSE  96
              C     ARRAY (STORE). ADD NEW ELEMENTS FOR THE CURRENT PARTITION FROM  TRPOSE  97
              C     ARRAY (BUFFER), AND WRITE THIS NEW ROW WITH (IWRITE) ELEMENTS   TRPOSE  98
              C     ONTO NEW UNIT, (INEW).                                          TRPOSE  99
                IWRITE = ISUMTP + ISUMBF                                            TRPOSE 100
  100           99 CONTINUE                                                       TRPOSE 101
                K1 = 0                                                            TRPOSE 102
                K2 = 0                                                            TRPOSE 103
                DO 90 J = 1,NCOLS                                                 TRPOSE 104
                IF( I.EQ. 1 ) GO TO 70                                            TRPOSE 105
  105           READ(IOLD) ( STORE(K), K=1,ISUMTP)                                TRPOSE 106
             70 K1 = K2 + 1                                                       TRPOSE 107
                K2 = K2 + ISUMBF                                                  TRPOSE 108
                J1 = ISUMTP                                                       TRPOSE 109
                DO 80 K = K1,K2                                                   TRPOSE 110
  110           J1 = J1 + 1                                                       TRPOSE 111
                STORE(J1) = BUFFER(K)                                             TRPOSE 112
             80 CONTINUE                                                          TRPOSE 113
                WRITE(INEW) ( STORE(K) , K=1,IWRITE )                             TRPOSE 114
             90 CONTINUE                                                          TRPOSE 115
```

```
      SUBROUTINE TRPOSE(INPUT,BUFFER,STORE,NCOLS,NROWS,OUTPUT,SCRTCH,
     1ISIZE)
      INTEGER OUTPUT,SCRTCH
      DIMENSION BUFFER(1),STORE(1)
C
C  ***********************************************************************
C  *                                                                     *
C  *  FORMS THE TRANSPOSE OF A MATRIX, USING OUT-OF-CORE                 *
C  *  STORAGE WHERE NECESSARY                                            *
C  *                                                                     *
C  ***********************************************************************
C
C***** INPUT  = INPUT UNIT CONTAINING ORIGINAL MATRIX
C***** BUFFER = BUFFER TO HOLD PART OF MATRIX (SIZE=ISIZE)
C***** STORE  = BUFFER TO HOLD ROW OF TRANSPOSE (SIZE=NROWS)
C***** NCOLS  = NUMBER OF COLUMNS IN ORIGINAL MATRIX
C***** NROWS  = NUMBER OF ROWS IN ORIGINAL MATRIX
C***** OUTPUT = OUTPUT UNIT CONTAINING TRANSPOSED MATRIX
C***** SCRTCH = SCRATCH UNIT
C***** ISIZE  = SIZE OF BUFFER
C
      REWIND INPUT
      NSIZE = NROWS * NCOLS
      IF( NSIZE .GT. ISIZE ) GO TO 30
C
C     TRANSPOSE OF ORIGINAL MATRIX IS FORMED IN CORE.
C
      DO 10 I = 1,NROWS
      I1 = I
      I2 = I1 + ( NCOLS -   ) * NROWS
      READ(INPUT) ( BUFFER J) , J = I1,I2,NROWS )
   10 CONTINUE
      REWIND OUTPUT
      J2 = 0
      DO 20 I = 1,NCOLS
      J1 = J2 + 1
      J2 = I * NROWS
      WRITE(OUTPUT) ( BUFFER(J) , J = J1,J2 )
   20 CONTINUE
      REWIND OUTPUT
      RETURN
   30 CONTINUE
C
C     TRANSPOSE OF ORIGINAL MATRIX IS FORMED USING OUT OF CORE STORAGE.
C
      REWIND OUTPUT
      REWIND SCRTCH
C
C     DETERMINE MAXIMUM NUMBER OF ROWS,(MAXROW), WHICH WILL FIT WITHIN
C     CORE STORAGE,(ISIZE).(ICYCLE) GIVES TOTAL NUMBER OF ROW PARTITIONS
C     THAT ARE REQUIRED.  THERE ARE (NUM) PARTITIONS CONTAINING (MAXROW)
C     ROWS AND ONE PARTITION CONTAINING (LAST) ROWS.
C
      MAXROW = ISIZE / NCOLS
      NUM = NROWS / MAXROW
      LAST = NROWS - NUM * MAXROW
      ICYCLE = NUM
```

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
566	190	IB	290 331	134B	EXT REFS NOT INNER
636	170	MN	308 318	27B	NOT INNER
650	165	IO	313 316	4B	INSTACK
713	180	MN	328 330	3B	INSTACK
743	220	IB	356 368	30B	EXT REFS NOT INNER
752	210	IO	364 367	14B	EXT REFS
1002	230	IO	377 380	14B	EXT REFS

STATISTICS

PROGRAM LENGTH 11155B 4717

52000B CM USED

STATEMENT LABELS			DEF LINE	REFERENCES	
0	117		150	148	
0	118		170	164	166
433	119		225	347	
0	120		243	240	
0	121		195	186	193
0	122		181	180	
0	123		128	126	
0	124		129	122	
0	125		244	234	
345	126		182	179	
0	128		206	201	205
501	130		245	229	233
0	135		254	251	
0	140		255	250	
0	145		263	261	
563	150		285	281	
574	160		295	292	
620	161		304	295	
627	163		305	303	
0	165		316	313	
0	170		318	308	
705	175		327	323	
0	180		330	328	
717	190		331	290	326
725	195		335	332	
736	200		351	267	
0	210		367	364	
0	220		368	356	
0	230		380	377	
1026	295		392	58	382
334	1118		171	163	
0	9999	INACTIVE	402		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
75	110	J	72 75	15B		EXT REFS
126	114	I	90 107	37B		EXT REFS NOT INNER
140	113	NPP	99 106	22B		NOT INNER
150	112	NN	103 105	4B	INSTACK	
173	115	I	115 130	37B		EXT REFS NOT INNER
205	124	NPP	122 129	22B		NOT INNER
215	123	NN	126 128	4B	INSTACK	
265	117	NPP	148 150	20B		EXT REFS NOT INNER
272		J	150 150	7B		EXT REFS
314	118	I	164 170	20B		NOT INNER
324	118	J	166 170	3B	INSTACK	
340	122	I	180 181	5B		EXT REFS
352	121	JCNT	186 195	30B		EXT REFS NOT INNER
373	121	NPP	193 195	3B	INSTACK	
405	128	I	201 206	15B		EXT REFS NOT INNER
413	128	LREAD	205 206	5B		EXT REFS
441	130	MN	229 245	43B		NOT INNER
450	125	IB	234 244	31B		NOT INNER
463	120	IO	240 243	7B	INSTACK	
506	140	NN	250 255	16B		NOT INNER
513	135	MN	251 254	3B	INSTACK	
531	145	MN	261 263	21B		EXT REFS NOT INNER
537		IO	263 263	7B		EXT REFS

VARIABLES	SN	TYPE	RELOCATION								
				DEFINED	158	167	184	191			
0	NO	INTEGER	F.P.	REFS	48	DEFINED	1	I/O REFS	398		
1263	NOLD	INTEGER		REFS	168	169	DEFINED	165	168		
1226	NOUT	INTEGER		REFS	341	DEFINED	48	342	I/O REFS	49	325
				336	373						
1304	NP	INTEGER		REFS	242	243	310	DEFINED	238	242	305
1275	NPASS	INTEGER		REFS	228	356	DEFINED	221	228		
1223	NPM	INTEGER		REFS	41	51	218	DEFINED	40	43	217
1247	NPP	INTEGER		REFS	2*106	2*129	150	195	DEFINED	99	122
				148	193						
1274	NREM	INTEGER		REFS	278	280	281	284	290		
				DEFINED	216	278					
1264	NREMAN	INTEGER		REFS	179	180	DEFINED	178			
1251	NROW	INTEGER		REFS	104	105	127	128	292	323	
				DEFINED	102	104	125	127	280	283	
1277	NS	INTEGER		REFS	230	231	232	262	293	300	304
				325	365	367	380	DEFINED	227	260	285
				293	359	367	378				
1302	NT	INTEGER		REFS	236	241	244	263	291	294	296
				298	299	300	301	304	306	322	325
				328	342	365	366	378	379	380	
				DEFINED	232	236	262	286	291	294	299
				301	340	360	366	376	379		
1252	NTBEG	INTEGER		REFS	116	122	DEFINED	111	116		
1314	NTEMP	INTEGER		REFS	388	DEFINED	386				
1253	NTEND	INTEGER		REFS	117	122	DEFINED	112	117		
0	NW	INTEGER	F.P.	DEFINED	1	I/O REFS	29	380			
1307	N1	INTEGER		REFS	253	254	260	305	359	368	
				DEFINED	249	253	358				
1305	N2	INTEGER		REFS	242	314	315	317	2*318	358	360
				DEFINED	239	309	315	317	352	368	
0	RHSTAP	INTEGER	F.P.	REFS	18	33	DEFINED	1	I/O REFS	36	37
				73	400						
1250	SUM	REAL		REFS	105	106	128	129	243	244	314
				318	DEFINED	101	105	124	128	237	243
				312	314						

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES
SQRT	REAL	1	LIBRARY	141

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
MAXO	INTEGER	0	INTRIN		41
MINO	INTEGER	0	INTRIN		39

STATEMENT LABELS			DEF LINE	REFERENCES
0	1	INACTIVE	26	
20	5		36	33
24	6		38	35
57	109		60	391
0	110		75	72
117	111		82	137
0	112		105	103
0	113		106	99
0	114		107	90
0	115		130	115
241	116		139	108

```
            DO 3 I= 1,NROW                                          TRIXY     59
      CCDC                                                          TRIXY     60
60          SUM = 0.0                                               TRIXY     61
      CCDC                                                          TRIXY     62
      CIBM                                                          TRIXY     63
      C     SUM = 0.D0                                              TRIXY     64
      CIBM                                                          TRIXY     65
65        3 C(I)= SOSCAP(A,B,SUM,MM,NROW,1,I,1)                     TRIXY     66
          2 CALL RNRW(IOC,C(1),NROW)                                TRIXY     67
            IRET= 1                                                 TRIXY     68
            REWIND INA                                              TRIXY     69
            RETURN                                                  TRIXY     70
70    C                                                             TRIXY     71
      C IF NO COLUMNS WILL FIT, FLAG  ERROR                         TRIXY     72
      C                                                             TRIXY     73
         10 IF(IP1.GE.1 .AND. IP2.GE.1) GO TO 20                    TRIXY     74
            IRET=-1                                                 TRIXY     75
75          RETURN                                                  TRIXY     76
      C                                                             TRIXY     77
      C ONLY P COLUMNS WILL FIT AT A TIME                           TRIXY     78
      C                                                             TRIXY     79
         20 CONTINUE                                                TRIXY     80
80          NROFA = 0                                               TRIXY     81
            NROFB = 0                                               TRIXY     82
      C                                                             TRIXY     83
      C DO IP2 COLUMNS OF B REMAIN ?                                TRIXY     84
      C IF SO, READ THEM INTO CORE.                                 TRIXY     85
85    C OTHERWISE, READ WHAT IS LEFT.                               TRIXY     86
      C                                                             TRIXY     87
         21 CONTINUE                                                TRIXY     88
            ILEFT= NCOL - NROFB                                     TRIXY     89
            IB = MINO(IP,ILEFT)                                     TRIXY     90
90          DO 22 I= 1,IB                                           TRIXY     91
            II= (I-1)*MM + 1                                        TRIXY     92
         22 CALL RNRW(-INB,B(II),MM)                                TRIXY     93
      C                                                             TRIXY     94
      C ZERO OUT C TO HOLD                                          TRIXY     95
95    C NEXT PORTION OF A*B                                         TRIXY     96
      C                                                             TRIXY     97
            NRIB= NROW*IB                                           TRIXY     98
            DO 23 I= 1,NRIB                                         TRIXY     99
         23 C(I)= 0.                                                TRIXY    100
100   C                                                             TRIXY    101
      C DO IP1 COLUMNS OF A REMAIN?                                 TRIXY    102
      C IF SO, READ THEM INTO CORE.                                 TRIXY    103
      C OTHERWISE, READ WHAT IS LEFT.                               TRIXY    104
      C                                                             TRIXY    105
105      31 CONTINUE                                                TRIXY    106
            ILEFT= MM - NROFA                                       TRIXY    107
            IA = MINO(IP,ILEFT)                                     TRIXY    108
            DO 32 I= 1,IA                                           TRIXY    109
            II= (I-1)*NROW + 1                                      TRIXY    110
110      32 CALL RNRW(-INA,A(II),NROW)                              TRIXY    111
      C                                                             TRIXY    112
      C ACCUMULATE A(I,K)*B(K,J)                                    TRIXY    113
      C INTO C FOR I= ALL ROWS,                                     TRIXY    114
      C J= IB COLUMNS, AND K= 1                                     TRIXY    115
```

```
                C                                                       TRIXY   116
                      DO 41 J= 1,IB                                     TRIXY   117
                      DO 41 I= 1,NROW                                   TRIXY   118
                      IJ= I + (J-1)*NROW                                TRIXY   119
                      DO 42 K= 1,IA                                     TRIXY   120
      120             KJ= (J-1)*MM + NROFA + K                          TRIXY   121
                      IK= I + (K-1)*NROW                                TRIXY   122
                   42 C(IJ)= A(IK)*B(KJ) + C(IJ)                        TRIXY   123
                   41 CONTINUE                                          TRIXY   124
                      NROFA= NROFA + IA                                 TRIXY   125
      125             C                                                 TRIXY   126
                      C IF ANY COLUMNS OF A ARE LEFT,                   TRIXY   127
                      C GO TO BACK AND GET THEM.                        TRIXY   128
                      C OTHERWISE REWIND INA, WRITE C,                  TRIXY   129
                      C AND GO BACK FOR NEXT COLUMNS                    TRIXY   130
      130             C OF B, IF ANY.                                   TRIXY   131
                      C                                                 TRIXY   132
                      IF(NROFA.LT.MM) GO TO 31                          TRIXY   133
                      REWIND INA                                        TRIXY   134
                      NROFA= 0                                          TRIXY   135
      135             DO 24 I= 1,IB                                     TRIXY   136
                      II= (I-1)*NROW + 1                                TRIXY   137
                   24 CALL RNRW(IOC,C(II),NROW)                         TRIXY   138
                      NROFB= NROFB + IB                                 TRIXY   139
                      IF(NROFB.LT.NCOL) GO TO 21                        TRIXY   140
      140             RETURN                                            TRIXY   141
                      END                                               TRIXY   142
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES		
3	TRIXY	1	69	75	140

VARIABLES

		SN	TYPE		RELOCATION							
0	A		REAL	ARRAY	F.P.	REFS	28	48	65	110	122	
						DEFINED	1					
0	B		REAL	ARRAY	F.P.	REFS	28	57	65	92	122	
						DEFINED	1					
0	C		REAL	ARRAY	F.P.	REFS	28	66	122	137	DEFINED	1	65
						99	122					
274	I		INTEGER			REFS	47	2*65	91	99	109	118	121
						136	DEFINED	46	58	90	98	108	117
						135							
305	IA		INTEGER			REFS	108	119	124	DEFINED	107		
303	IB		INTEGER			REFS	90	97	116	135	138		
						DEFINED	89						
275	II		INTEGER			REFS	48	92	110	137	DEFINED	47	91
						109	136						
306	IJ		INTEGER			REFS	2*122	DEFINED	118				
311	IK		INTEGER			REFS	122	DEFINED	121				
302	ILEFT		INTEGER			REFS	89	107	DEFINED	88	106		
0	INA		INTEGER		F.P.	REFS	48	110	DEFINED	1	I/O REFS	32	68
						133							

VARIABLES	SN	TYPE	RELOCATION								
0	INB	INTEGER	F.P.	REFS	57	92	DEFINED	1			
0	INC	INTEGER	F.P.	REFS	66	137	DEFINED	1			
273	IP	INTEGER		REFS	89	107	DEFINED	41			
271	IP1	INTEGER		REFS	41	42	73	DEFINED	39		
272	IP2	INTEGER		REFS	41	73	DEFINED	40			
0	IRET	INTEGER	F.P.	DEFINED	1	33	67	74			
276	J	INTEGER		REFS	118	120	DEFINED	56	116		
307	K	INTEGER		REFS	120	121	DEFINED	119			
310	KJ	INTEGER		REFS	122	DEFINED	120				
0	LENGTH	INTEGER	F.P.	REFS	3*28	39	40	DEFINED	1		
0	MM	INTEGER	F.P.	REFS	40	42	46	57	65	91	92
					106	120	132	DEFINED	1		
0	NCOL	INTEGER	F.P.	REFS	56	88	139	DEFINED	1		
304	NRIB	INTEGER		REFS	98	DEFINED	97				
300	NROFA	INTEGER		REFS	106	120	124	132	DEFINED	80	124
					134						
301	NROFB	INTEGER		REFS	88	138	139	DEFINED	81	138	
0	NROW	INTEGER	F.P.	REFS	39	47	48	58	65	66	97
					109	110	117	118	121	136	137
				DEFINED	1						
277	SUM	REAL		REFS	65	DEFINED	60				

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES				
RNRW		3	48	57	66	92	110	137
SOSCAP	REAL	8	65					

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES		
MINO	INTEGER	0	INTRIN	41	89	107

STATEMENT LABELS			DEF LINE	REFERENCES	
0	1		49	46	
0	2		66	56	
0	3		65	58	
74	10		73	42	
101	20		79	73	
103	21		87	139	
0	22		92	90	
0	23		99	98	
0	24		137	135	
134	31		105	132	
0	32		110	108	
0	41		123	116	117
0	42		122	119	
0	99	INACTIVE	33		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
24	1	I	46 49	13B		EXT REFS	
40	2	J	56 66	30B		EXT REFS	NOT INNER
46	3	I	58 65	13B		EXT REFS	
111	22	I	90 92	13B		EXT REFS	
131	23	I	98 99	2B	INSTACK		
142	32	I	108 110	13B		EXT REFS	
156	41	J	116 123	33B		NOT INNER	
157	41	I	117 123	27B		NOT INNER	
174	42	K	119 122	7B	INSTACK		
220	24	I	135 137	13B		EXT REFS	

STATISTICS
PROGRAM LENGTH 3608 240
52000B CM USED

```
      SUBROUTINE UPDATE( IUNIT, IUPR, NCYC )                                    UPDATE     2
      COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)            UPDATE     3
     A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)                   UPDATE     4
     B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)                        UPDATE     5
     C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)                        UPDATE     6
     D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                                UPDATE     7
     F      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                                   UPDATE     8
     F      ,STRFDO(5,6),STRFDN(5,6)                                            UPDATE     9
      COMMON/ INVERT / INVERT,IUA2,IFLEX,AORD(30),IPERM(30),NSTOR(30,2)         UPDATE    10
     A,IPREV,NDOFT                                                              UPDATE    11
C                                                                               UPDATE    12
C     THIS SUBROUTINE REPLACES THE DIAGONAL ELEMENTS                            UPDATE    13
C     OF THE PYLON-PYLON PARTITION OF THE DYNAMIC FLEXIBILITY                   UPDATE    14
C     MATRIX WITH THE NEW VALUES FOUND IN ARRAY STRFN.                          UPDATE    15
C                                                                               UPDATE    16
      DIMENSION BUF(220), NAME1(2), NAME2(2)                                    UPDATE    17
      DIMENSION BUF2(220), DIF(220)                                             UPDATE    18
      DATA NAME2 /4HDYNF,4HLEX /                                                UPDATE    19
C                                                                               UPDATE    20
C     DYNAMIC FLEXIBILITY MATRIX IS ON UNIT IUNIT                               UPDATE    21
C     FROM PREVIOUS CYCLE. UPDATE AND PUT ON UNIT IFLEX - IOLD.                 UPDATE    22
C                                                                               UPDATE    23
CIBM                                                                            UPDATE    24
C     IUA = 14                                                                  UPDATE    25
C     IUA3 = 8                                                                  UPDATE    26
CIBM                                                                            UPDATE    27
C                                                                               UPDATE    28
CCDC                                                                            UPDATE    29
      IUA = 11                                                                  UPDATE    30
      IUA3 = 5                                                                  UPDATE    31
CCDC                                                                            UPDATE    32
C                                                                               UPDATE    33
      IF( NCYC .GT. 0 ) GO TO 5                                                 UPDATE    34
      IOLD = IUA2                                                               UPDATE    35
      IUNIT = IUA                                                               UPDATE    36
      IUA2 = IUNIT                                                              UPDATE    37
      GO TO 90                                                                  UPDATE    38
    5 CONTINUE                                                                  UPDATE    39
      IOLD = IUNIT                                                              UPDATE    40
C                                                                               UPDATE    41
CIBM                                                                            UPDATE    42
C     IUNIT = 29 - IOLD                                                         UPDATE    43
CIBM                                                                            UPDATE    44
C                                                                               UPDATE    45
CCDC                                                                            UPDATE    46
      IUNIT = 23 - IOLD                                                         UPDATE    47
CCDC                                                                            UPDATE    48
C                                                                               UPDATE    49
      IUA2 = IUNIT                                                              UPDATE    50
C                                                                               UPDATE    51
C                                                                               UPDATE    52
C     LOCATE ROW OF DYNAMIC FLEXIBILITY MATRIX                                  UPDATE    53
C      WHICH CORRESPONDS TO A DY.D.O.F. IN ARRAY AORD.                          UPDATE    54
C                                                                               UPDATE    55
C     ICHK = INDICATES CURRENT ROW OF D.F.M.                                    UPDATE    56
C     INUM = INDICATES CURRENT DY.D.O.F.                                        UPDATE    57
C                                                                               UPDATE    58
```

```
                  CALL GEDLAB(8HUPDATEO1,IOLD,NAME1,1,KROW,KCOL)                    UPDATE     59
                  CALL PUDLAB(8HUPDATEO2,IUNIT,NAME2,1,KROW,KCOL)                   UPDATE     60
60          C     WRITE(6,500)                                                      UPDATE     61
            C 500 FORMAT(1H1,5X,'****   D.F.M.   ****')                           UPDATE     62
            C 501 FORMAT(1H ,5X,'ROW NO. ',I3,/)                                  UPDATE     63
            C 502 FORMAT(1X,1P10E12.4)                                            UPDATE     64
                  INUM = 1                                                        UPDATE     65
65                ICHK = 0                                                        UPDATE     66
               20 ICHK = ICHK + 1                                                 UPDATE     67
                  IF( ICHK.GT.KROW) GO TO 90                                      UPDATE     68
                  CALL GETROW(IOLD,1,BUF,KCOL)                                    UPDATE     69
                  IF( INUM.GT.NDOFT ) GO TO 30                                    UPDATE     70
70                GO TO 50                                                        UPDATE     71
               30 CALL PUTROW( IUNIT,-1,BUF,KCOL )                                UPDATE     72
            C     WRITE(6,501) ICHK                                               UPDATE     73
            C     WRITE(6,502) ( BUF(J), J = 1, KCOL )                            UPDATE     74
                  GO TO 20                                                        UPDATE     75
75             40 CONTINUE                                                        UPDATE     76
            C                                                                     UPDATE     77
            C     REPLACE THE ELEMENT (ID,ID) OF D.F.M.WITH                       UPDATE     78
            C     NEW VALUE FOUND IN STRFN(ISTORE,JC).                            UPDATE     79
            C                                                                     UPDATE     80
80                BUF(ID) = STRFN( ISTORE, JC )                                   UPDATE     81
                  CALL PUTROW( IUNIT, -1, BUF, KCOL )                             UPDATE     82
            C     WRITE(6,501) ICHK                                               UPDATE     83
            C     WRITE(6,502) ( BUF(J), J = 1, KCOL )                            UPDATE     84
                  GO TO 20                                                        UPDATE     85
85          C                                                                     UPDATE     86
            C     DETERMINE IF ROW ICHK OF D.F.M. CORRESPONDS                     UPDATE     87
            C     TO A PYLON D.O.F.                                               UPDATE     88
            C                                                                     UPDATE     89
               50 CONTINUE                                                        UPDATE     90
90                IP = IPERM( INUM )                                              UPDATE     91
                  ID = IFIX( AORD(IP))                                            UPDATE     92
                  IF( ICHK .NE. ID ) GO TO 30                                     UPDATE     93
                  ISTORE = NSTOR(INUM,1)                                          UPDATE     94
                  JC = NSTOR(INUM,2)                                              UPDATE     95
95                INUM = INUM + 1                                                 UPDATE     96
                  GO TO 40                                                        UPDATE     97
               90 CONTINUE                                                        UPDATE     98
                  CALL DCLOSE(IOLD)                                               UPDATE     99
                  CALL DCLOSE(IUNIT)                                              UPDATE    100
100               WRITE(6,600)                                                    UPDATE    101
              600 FORMAT(1H1,5X,41H****   EQUIVALENCE CHECK FOR D.F.M.   ***)      UPDATE    102
                  CALL GEDLAB (8HUPDATEO8,IUA3,NAME1,1,KR1,KC1)                   UPDATE    103
                  CALL GEDLAB (8HUPDATE15,IUNIT,NAME1,1,KR2,KC2)                  UPDATE    104
                  DO 530 I = 1, KR1                                               UPDATE    105
105               CALL GETROW (IUA3,1,BUF,KC1)                                    UPDATE    106
                  CALL GETROW(IUNIT,1,BUF2,KC2)                                   UPDATE    107
                  IC = 0                                                          UPDATE    108
                  DO 510 J = 1, KC1                                               UPDATE    109
                  DIF(J) = 0.0                                                    UPDATE    110
110               DIF(J) = BUF2(J) - BUF(J)                                       UPDATE    111
                  IF( DIF(J) .EQ. 0.0 ) GO TO 510                                 UPDATE    112
                  IC = IC + 1                                                     UPDATE    113
              510 CONTINUE                                                        UPDATE    114
                  IF( IC .EQ. 0 ) GO TO 530                                       UPDATE    115
```

```
115                DO 520 J = 1, KC1                                          UPDATE   116
                   A = DIF(J)                                                 UPDATE   117
                   IF( A .EQ. 0.0 ) GO TO 520                                 UPDATE   118
                   WRITE (6,602) I,J,A                                        UPDATE   119
                602 FORMAT (1H ,5X,8HROW NO. ,I4,5X,11HCOLUMN NO. ,I4,5X,1PE20.8)  UPDATE   120
120                520 CONTINUE                                               UPDATE   121
                   530 CONTINUE                                               UPDATE   122
                   CALL DCLOSE (IUA3)                                         UPDATE   123
                   CALL DCLOSE (IUNIT)                                        UPDATE   124
                   RETURN                                                     UPDATE   125
125                END                                                        UPDATE   126
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY	POINTS	DEF LINE	REFERENCES
3	UPDATE	1	124

VARIABLES	SN	TYPE		RELOCATION								
303	A	REAL			REFS	117	118	DEFINED	116			
3	AORD	REAL	ARRAY	INVERT	REFS	9	91					
304	BUF	REAL	ARRAY		REFS	16	68	71	81	105	110	
					DEFINED	80						
644	BUF2	REAL	ARRAY		REFS	17	106	110				
1200	DIF	REAL	ARRAY		REFS	17	111	116	DEFINED	109	110	
300	I	INTEGER			REFS	118	DEFINED	104				
301	IC	INTEGER			REFS	112	114	DEFINED	107	112		
267	ICHK	INTEGER			REFS	66	67	92	DEFINED	65	66	
270	ID	INTEGER			REFS	80	92	DEFINED	91			
76	IDSTR	INTEGER	ARRAY	STORES	REFS	2						
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	2						
2	IFLEX	INTEGER		INVERT	REFS	9						
266	INUM	INTEGER			REFS	69	90	93	94	95		
					DEFINED	64	95					
0	INVERT	INTEGER		INVERT	REFS	9						
263	IOLD	INTEGER			REFS	46	58	68	98	DEFINED	34	39
273	IP	INTEGER			REFS	91	DEFINED	90				
41	IPERM	INTEGER	ARRAY	INVERT	REFS	9	90					
173	IPREV	INTEGER		INVERT	REFS	9						
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	2						
271	ISTORE	INTEGER			REFS	80	DEFINED	93				
261	IUA	INTEGER			REFS	35	DEFINED	29				
1	IUA2	INTEGER		INVERT	REFS	9	34	DEFINED	36	49		
262	IUA3	INTEGER			REFS	102	105	122	DEFINED	30		
0	IUNIT	INTEGER		F.P.	REFS	36	39	49	59	71	81	99
						103	106	123	DEFINED	1	35	46
0	IUPR	INTEGER	*UNUSED	F.P.	DEFINED	1						
302	J	INTEGER			REFS	109	3*110	111	116	118		
					DEFINED	108	115					
272	JC	INTEGER			REFS	80	DEFINED	94				
265	KCOL	INTEGER			REFS	58	59	68	71	81		
1	KCONST	INTEGER		STORES	REFS	2						
275	KC1	INTEGER			REFS	102	105	108	115			
277	KC2	INTEGER			REFS	103	106					

VARIABLES		SN	TYPE		RELOCATION					
264	KROW		INTEGER			REFS	58	59	67	
274	KR1		INTEGER			REFS	102	104		
276	KR2	*	INTEGER			REFS	103			
640	NAME1		INTEGER	ARRAY		REFS	16	58	102	103
642	NAME2		INTEGER	ARRAY		REFS	16	59	DEFINED	18
0	NCYC		INTEGER		F.P.	REFS	33	DEFINED	1	
174	NDOFT		INTEGER		INVERT	REFS	9	69		
77	NSTOR		INTEGER	ARRAY	INVERT	REFS	9	93	94	
0	NUMSTR		INTEGER		STORES	REFS	2			
362	SCALE		REAL	ARRAY	STORES	REFS	2			
653	STRFDN		REAL	ARRAY	STORES	REFS	2			
615	STRFDO		REAL	ARRAY	STORES	REFS	2			
463	STRFI		REAL	ARRAY	STORES	REFS	2			
557	STRFN		REAL	ARRAY	STORES	REFS	2	80		
521	STRFO		REAL	ARRAY	STORES	REFS	2			
305	STRIDN		REAL	ARRAY	STORES	REFS	2			
266	STRIDO		REAL	ARRAY	STORES	REFS	2			
122	STRII		REAL	ARRAY	STORES	REFS	2			
160	STRIN		REAL	ARRAY	STORES	REFS	2			
141	STRIO		REAL	ARRAY	STORES	REFS	2			
343	STRRDN		REAL	ARRAY	STORES	REFS	2			
324	STRRDO		REAL	ARRAY	STORES	REFS	2			
177	STRRI		REAL	ARRAY	STORES	REFS	2			
235	STRRN		REAL	ARRAY	STORES	REFS	2			
216	STRRO		REAL	ARRAY	STORES	REFS	2			
261	STRWDN		REAL	ARRAY	STORES	REFS	2			
254	STRWDO		REAL	ARRAY	STORES	REFS	2			
103	STRWI		REAL	ARRAY	STORES	REFS	2			
115	STRWN		REAL	ARRAY	STORES	REFS	2			
110	STRWO		REAL	ARRAY	STORES	REFS	2			

FILE NAMES	MODE				
TAPE6	FMT	WRITES	100	118	

EXTERNALS	TYPE	ARGS	REFERENCES			
DCLOSE		1	98	99	122	123
GEDLAB		6	58	102	103	
GETROW		4	68	105	106	
PUDLAB		6	59			
PUTROW		4	71	81		

INLINE FUNCTIONS	TYPE	ARGS	DEF LINE	REFERENCES
IFIX	INTEGER	1	INTRIN	91

STATEMENT LABELS		DEF LINE	REFERENCES		
15	5	38	33		
27	20	66	74	84	
37	30	71	69	92	
44	40	75	96		
55	50	89	70		
66	90	97	37	67	
120	510	113	108	111	
130	520	120	115	117	
133	530	121	104	114	
235	600 FMT	101	100		
252	602 FMT	119	118		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
103	530	I	104 121	338	EXT REFS NOT INNER
114	510	J	108 113	58	INSTACK
124	520	J	115 120	78	EXT REFS

COMMON BLOCKS LENGTH MEMBERS - BIAS NAME(LENGTH)

STORES 457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)	
	32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)	
	72 STRWO (5)	77 STRWN (5)	82 STRII (15)	
	97 STRIO (15)	112 STRIN (15)	127 STRRI (15)	
	142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)	
	177 STRWDN (5)	182 STRIDO (5)	197 STRIDN (15)	
	212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)	
	307 STRFI (30)	337 STRFO (30)	367 STRFN (30)	
	397 STRFDO (30)	427 STRFDN (30)		
INVERT 125	0 INVERT (1)	1 IUA2 (1)	2 IFLEX (1)	
	3 AORD (30)	33 IPERM (30)	63 NSTOR (60)	
	123 IPREV (1)	124 NDOFT (1)		

STATISTICS

PROGRAM LENGTH	1546B	870
CM LABELED COMMON LENGTH	1106B	582

52000B CM USED

```
      1              SUBROUTINE CHANGE( DELTA )                                        CHANGE      2
                     COMMON/ STORES /NUMSTR,KCONST,ISTDOF(5,6),IDYDOF(5,6),IDSTR(5)    CHANGE      3
                    A      ,STRWI(5),STRWO(5),STRWN(5),STRII(5,3),STRIO(5,3)         CHANGE      4
                    B      ,STRIN(5,3),STRRI(5,3),STRRO(5,3),STRRN(5,3)              CHANGE      5
      5             C      ,STRWDO(5),STRWDN(5),STRIDO(5,3),STRIDN(5,3)              CHANGE      6
                    D      ,STRRDO(5,3),STRRDN(5,3),SCALE(5,13)                      CHANGE      7
                    E      ,STRFI(5,6),STRFO(5,6),STRFN(5,6)                         CHANGE      8
                    F      ,STRFDO(5,6),STRFDN(5,6)                                  CHANGE      9
                     COMMON/ INVERT / INVERT,IUA2,IFLEX,AORD(30),IPERM(30),NSTOR(30,2) CHANGE     10
     10             A,IPREV,NDOFT                                                     CHANGE     11
                     DIMENSION DELTA(30)                                               CHANGE     12
                     DO 10 I = 1, NDOFT                                                CHANGE     13
                     I1 = NSTOR(I,1)                                                   CHANGE     14
                     I2 = NSTOR(I,2)                                                   CHANGE     15
     15              DELTA(I) = STRFN(I1,I2) - STRFI(I1,I2)                            CHANGE     16
                    10 CONTINUE                                                        CHANGE     17
                     RETURN                                                            CHANGE     18
                     END                                                               CHANGE     19
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	CHANGE	1	17

VARIABLES

	SN	TYPE		RELOCATION						
3	AORD	REAL	ARRAY	INVERT	REFS	9				
0	DELTA	REAL	ARRAY	F.P.	REFS	11	DEFINED	1	15	
21	I	INTEGER			REFS	13	14	15	DEFINED	12
76	IDSTR	INTEGER	ARRAY	STORES	REFS	2				
40	IDYDOF	INTEGER	ARRAY	STORES	REFS	2				
2	IFLEX	INTEGER		INVERT	REFS	9				
0	INVERT	INTEGER		INVERT	REFS	9				
41	IPERM	INTEGER	ARRAY	INVERT	REFS	9				
173	IPREV	INTEGER		INVERT	REFS	9				
2	ISTDOF	INTEGER	ARRAY	STORES	REFS	2				
1	IUA2	INTEGER		INVERT	REFS	9				
22	I1	INTEGER			REFS	2*15	DEFINED	13		
23	I2	INTEGER			REFS	2*15	DEFINED	14		
1	KCONST	INTEGER		STORES	REFS	2				
174	NDOFT	INTEGER		INVERT	REFS	9	12			
77	NSTOR	INTEGER	ARRAY	INVERT	REFS	9	13	14		
0	NUMSTR	INTEGER		STORES	REFS	2				
362	SCALE	REAL	ARRAY	STORES	REFS	2				
653	STRFDN	REAL	ARRAY	STORES	REFS	2				
615	STRFDO	REAL	ARRAY	STORES	REFS	2				
463	STRFI	REAL	ARRAY	STORES	REFS	2	15			
557	STRFN	REAL	ARRAY	STORES	REFS	2	15			
521	STRFO	REAL	ARRAY	STORES	REFS	2				
305	STRIDN	REAL	ARRAY	STORES	REFS	2				
266	STRIDO	REAL	ARRAY	STORES	REFS	2				
122	STRII	REAL	ARRAY	STORES	REFS	2				
160	STRIN	REAL	ARRAY	STORES	REFS	2				
141	STRIO	REAL	ARRAY	STORES	REFS	2				

VARIABLES	SN	TYPE	RELOCATION		
343	STRRDN	REAL	ARRAY	STORES	REFS 2
324	STRRDO	REAL	ARRAY	STORES	REFS 2
177	STRRI	REAL	ARRAY	STORES	REFS 2
235	STRRN	REAL	ARRAY	STORES	REFS 2
216	STRRO	REAL	ARRAY	STORES	REFS 2
261	STRWDN	REAL	ARRAY	STORES	REFS 2
254	STRWDO	REAL	ARRAY	STORES	REFS 2
103	STRWI	REAL	ARRAY	STORES	REFS 2
115	STRWN	REAL	ARRAY	STORES	REFS 2
110	STRWO	REAL	ARRAY	STORES	REFS 2

STATEMENT LABELS	DEF LINE	REFERENCES
0 10	16	12

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
11	10	I	12 16	7B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)		
STORES	457	0 NUMSTR (1)	1 KCONST (1)	2 ISTDOF (30)
		32 IDYDOF (30)	62 IDSTR (5)	67 STRWI (5)
		72 STRWO (5)	77 STRWN (5)	82 STRII (15)
		97 STRIO (15)	112 STRIN (15)	127 STRRI (15)
		142 STRRO (15)	157 STRRN (15)	172 STRWDO (5)
		177 STRWDN (5)	182 STRIDO (15)	197 STRIDN (15)
		212 STRRDO (15)	227 STRRDN (15)	242 SCALE (65)
		307 STRFI (30)	337 STRFO (30)	367 STRFN (30)
		397 STRFDO (30)	427 STRFDN (30)	
INVERT	125	0 INVERT (1)	1 IUA2 (1)	2 IFLEX (1)
		3 AORD (30)	33 IPERM (30)	63 NSTOR (60)
		123 IPREV (1)	124 NDOFT (1)	

STATISTICS

PROGRAM LENGTH	24B	20
CM LABELED COMMON LENGTH	1106B	582
52000B CM USED		

```
 1                SUBROUTINE MOVE(NU,SV,IS,TV,IT)                          MOVE        2
                C                                                         MOVE        3
                C***                                                      MOVE        4
                C                                                         MOVE        5
 5              C     CDC VERSION ONLY                                    MOVE        6
                C                                                         MOVE        7
                C***                                                      MOVE        8
                C                                                         MOVE        9
                      DIMENSION SV(1), TV(1)                              MOVE       10
10              NUM=NU                                                    MOVE       11
                ISPTR=IS                                                  MOVE       12
                ITPTR=IT                                                  MOVE       13
                  10  CONTINUE                                           MOVE       14
                      IMASK=77B                                           MOVE       15
15              CALL WDCHAR(ISPTR,IWD,ISHIFT)                             MOVE       16
                STEMP=SV(IWD)                                             MOVE       17
                ISCHAR=SHIFT(STEMP,-ISHIFT)                               MOVE       18
                ISCHAR =ISCHAR.AND.IMASK                                  MOVE       19
                CALL WDCHAR(ITPTR,IWD,ISHIFT)                             MOVE       20
20              ISCHAR=SHIFT(ISCHAR,ISHIFT)                               MOVE       21
                IMASK=SHIFT(IMASK,ISHIFT)                                 MOVE       22
                ISCHAR =ISCHAR.AND.IMASK                                  MOVE       23
                TV(IWD)=TV(IWD).AND.(.NOT.IMASK)                          MOVE       24
                TV(IWD)=TV(IWD).OR.ISCHAR                                 MOVE       25
25              ISPTR=ISPTR+1                                             MOVE       26
                ITPTR=ITPTR+1                                             MOVE       27
                NUM=NUM-1                                                 MOVE       28
                IF(NUM.GT.0) GO TO 10                                     MOVE       29
                RETURN                                                    MOVE       30
30              END                                                       MOVE       31
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	MOVE	1	29

VARIABLES

		SN	TYPE		RELOCATION								
53	IMASK		INTEGER			REFS	18	21	22	23	DEFINED	14	21
0	IS		INTEGER		F.P.	REFS	11	DEFINED	1				
57	ISCHAR		INTEGER			REFS	18	20	22	24	DEFINED	17	18
							20	22					
55	ISHIFT		INTEGER			REFS	15	17	19	20	21		
51	ISPTR		INTEGER			REFS	15	25	DEFINED	11	25		
0	IT		INTEGER		F.P.	REFS	12	DEFINED	1				
52	ITPTR		INTEGER			REFS	19	26	DEFINED	12	26		
54	IWD		INTEGER			REFS	15	16	19	2*23	2*24		
0	NU		INTEGER		F.P.	REFS	10	DEFINED	1				
50	NUM		INTEGER			REFS	27	28	DEFINED	10	27		
56	STEMP		REAL			REFS	17	DEFINED	16				
0	SV		REAL	ARRAY	F.P.	REFS	9	16	DEFINED	1			
0	TV		REAL	ARRAY	F.P.	REFS	9	23	24	DEFINED	1	23	24

```
      WDCHAR                3              15        19

INLINE FUNCTIONS    TYPE    ARGS        DEF LINE  REFERENCES
      SHIFT      NO TYPE     2  INTRIN                17        20        21

STATEMENT LABELS              DEF LINE    REFERENCES
   12  10                        13         28

STATISTICS
  PROGRAM LENGTH                  608       48
          520000B CM USED
```

```
      1                SUBROUTINE WDCHAR(IPTR,IWD,ISHIFT)                    WDCHAR      2
                       ICHAR=MOD(IPTR,10)                                    WDCHAR      3
                       IF(ICHAR.EQ.0) GO TO 10                               WDCHAR      4
                          IWD=(IPTR/10) + 1                                  WDCHAR      5
      5                   GO TO 20                                           WDCHAR      6
                   10  CONTINUE                                             WDCHAR      7
                          IWD=IPTR/10                                        WDCHAR      8
                           ICHAR=10                                          WDCHAR      9
                   20  CONTINUE                                             WDCHAR     10
     10                ISHIFT=(10-ICHAR)*6                                   WDCHAR     11
                       RETURN                                                WDCHAR     12
                       END                                                   WDCHAR     13
```

SYMBOLIC REFERENCE MAP (R=3)

```
ENTRY POINTS      DEF LINE      REFERENCES
    3  WDCHAR          1         11

VARIABLES     SN  TYPE            RELOCATION
   23  ICHAR      INTEGER                          REFS        3        10    DEFINED        2          8
    0  IPTR       INTEGER                F.P.      REFS        2         4          7    DEFINED        1
    0  ISHIFT     INTEGER                F.P.   DEFINED        1        10
    0  IWD        INTEGER                F.P.   DEFINED        1         4          7

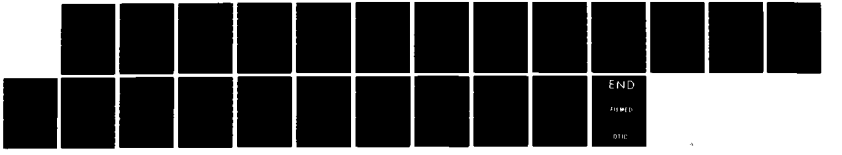
INLINE FUNCTIONS   TYPE    ARGS        DEF LINE  REFERENCES
       MOD        INTEGER    2  INTRIN                2

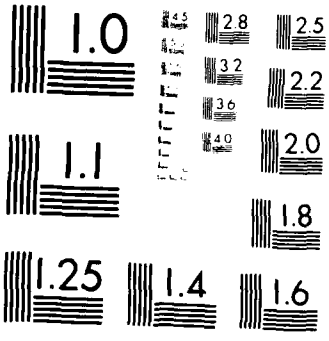
STATEMENT LABELS              DEF LINE   REFERENCES
   13  10                         6          3
   17  20                         9          5

STATISTICS
  PROGRAM LENGTH                  24B       20
         52000B CM USED
```

AD-A152 271 ESP (EXTERNAL-STORES PROGRAM) - A PILOT COMPUTER PROGRAM FOR DETERMINING..(U) GRUMMAN AEROSPACE CORP BETHPAGE NY J B SMEDFJELD FEB 85 ADCR-85-1-VOL-3-PT-2 8/8

UNCLASSIFIED N00019-81-C-0395 F/G 9/2 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

```
1                SUBROUTINE REDMOD (NLEFT)                                  REDMOD     2
          C                                                                  REDMOD     3
          C      REDUCTION IN NUMBER OF MODES  SED IN FLUTTER ANALYSIS       REDMOD     4
          C      BASED ON RATIOS OF ON-DIAGONAL GENERALIZED FORCES TO        REDMOD     5
5         C      GENERALIZED MASSES                                          REDMOD     6
          C                                                                  REDMOD     7
          C      TEST MADE AT 0.75, 1.0, AND 1.25 TIMES NOMINAL VELOCITY     REDMOD     8
          C                                                                  REDMOD     9
                 DIMENSION LC(40)                                            REDMOD    10
10               DIMENSION WW(40,40), OMM(40), OMG(40), NIND(40)             REDMOD    11
                 DIMENSION X(15), QQ(15,2), QTST(2,2)                        REDMOD    12
                 DIMENSION XK(15), QQK(15,2)                                 REDMOD    13
                 DIMENSION VQDW(3)                                           REDMOD    14
                 DIMENSION ITAPES(50)                                        REDMOD    15
15        C                                                                  REDMOD    16
                 COMPLEX   Q(40,40), DETAD(40,40), GK(40,40)                 REDMOD    17
                 COMPLEX   CQTST                                             REDMOD    18
          C                                                                  REDMOD    19
                 COMMON /KZERO/  KZ, XK                                      REDMOD    20
20               COMMON /QELIM/  QQDWW, VQQDWW, LC38                         REDMOD    21
                 COMMON /MODD/   Q, DETAD, WW, OMM, NC                       REDMOD    22
                 COMMON /FLEXT/  GK, OMG, RHO, VB                            REDMOD    23
                 COMMON /FITR/   NOMI, NIND                                  REDMOD    24
                 COMMON /CTAPES/ ITAPES                                      REDMOD    25
25               COMMON /COMA/   LC, BR                                      REDMOD    26
          C                                                                  REDMOD    27
                 DATA  DELYES /4HYES /                                       REDMOD    28
                 DATA  DELNO  /4H NO /                                       REDMOD    29
          C                                                                  REDMOD    30
30               ITAPEW = ITAPES(6)                                          REDMOD    31
                 ITAPE = ITAPES(50)                                          REDMOD    32
                 NQ = LC(2)                                                  REDMOD    33
                 NOMI = 0                                                    REDMOD    34
          C                                                                  REDMOD    35
35               REWIND ITAPE                                                REDMOD    36
                 READ (ITAPE) NX, NF, LL, X, NQR                             REDMOD    37
                 DO 10 K1=1,NX                                               REDMOD    38
                 K2 = NX - K1 + 1                                            REDMOD    39
                 XK(K2) = 1.0 / X(K1)                                        REDMOD    40
40            10 CONTINUE                                                    REDMOD    41
                 KZ = 1                                                      REDMOD    42
          C                                                                  REDMOD    43
                 VC = 0.5                                                    REDMOD    44
                 DO 20 I=1,3                                                 REDMOD    45
45               VC = VC + 0.25                                              REDMOD    46
                 VQDW(I) = VC * VQQDWW                                       REDMOD    47
              20 CONTINUE                                                    REDMOD    48
                 WRITE (ITAPEW,900) QQDWW, (VQDW(I),I=1,3)                   REDMOD    49
                 WRITE (ITAPEW,901)                                          REDMOD    50
50        C                                                                  REDMOD    51
                 DO 100 M=1,NQ                                               REDMOD    52
          C                                                                  REDMOD    53
          C      LOCATE AND READ ON-DIAGONAL GENERALIZED-FORCE TERMS         REDMOD    54
          C      FROM INTERMEDIATE I/O UNIT (CF. QINTP)                      REDMOD    55
55        C                                                                  REDMOD    56
                 IF (M.EQ.1)  GO TO 50                                       REDMOD    57
                 DO 40 I=1,NQ                                                REDMOD    58
```

```
                  DO 30 J=1,2                                                    REDMOD     59
                  READ (ITAPE) (QQ(K,J),K=1,NX)                                  REDMOD     60
60              30 CONTINUE                                                      REDMOD     61
                40 CONTINUE                                                      REDMOD     62
                50 DO 60 J=1,2                                                   REDMOD     63
                  READ (ITAPE) (QQ(K,J),K=1,NX)                                  REDMOD     64
                60 CONTINUE                                                      REDMOD     65
65          C                                                                    REDMOD     66
            C     INTERPOLATE FOR GENERALIZED FORCES AT DESIRED VELOCITIES       REDMOD     67
            C     (ASSUMING NO MODAL FREQUENCY SHIFT WITH AIRSPEED)              REDMOD     68
            C                                                                    REDMOD     69
                  DEL = DELYES                                                   REDMOD     70
70                DO 70 I=1,3                                                    REDMOD     71
                  N = I                                                          REDMOD     72
                  VBOTST = VQDW(I) * 1.69 / (BR * OMG(M))                        REDMOD     73
                  LLL = LL                                                       REDMOD     74
                  IF (VBOTST.LT.X(1).OR.VBOTST.GT.X(NX))                         REDMOD     75
75              1   LLL = MINO(3,LL)                                            REDMOD     76
                  IF (VBOTST.LT.10.0)  GO TO 65                                  REDMOD     77
                  DO 63 K1=1,NX                                                  REDMOD     78
                  K2 = NX - K1 + 1                                               REDMOD     79
                  DO 62 J=1,2                                                    REDMOD     80
80                QQK(K2,J) = QQ(K1,J) * XK(K2) * XK(K2)                         REDMOD     81
                62 CONTINUE                                                      REDMOD     82
                63 CONTINUE                                                      REDMOD     83
                  TSTK = 1.0 / VBOTST                                            REDMOD     84
                  CALL HELGX (TSTK,QTST,XK,QQK,NX,2,LLL,2,NF,0,0)                REDMOD     85
85                GO TO 68                                                       REDMOD     86
                65 CONTINUE                                                      REDMOD     87
                  CALL HELGX (VBOTST,QTST,X,QQ,NX,2,LLL,2,NF,0,0)                REDMOD     88
                68 CONTINUE                                                      REDMOD     89
            C                                                                    REDMOD     90
90          C     PERFORM TEST AND SET CLUES FOR ROUTINE CONV                    REDMOD     91
            C                                                                    REDMOD     92
                  CQTST = CMPLX (QTST(1,1),QTST(2,1))                            REDMOD     93
                  IF (VBOTST.LT.10.0)  GO TO 69                                  REDMOD     94
                  CQTST = CQTST * VBOTST * VBOTST                                REDMOD     95
95                69 CONTINUE                                                    REDMOD     96
                  AQTST = CABS(CQTST)*RHO                                        REDMOD     97
                  QDWTST = AQTST/WW(M,M)                                         REDMOD     98
                  IF (QDWTST.GT.QQDWW)  GO TO 75                                 REDMOD     99
                70 CONTINUE                                                      REDMOD    100
100               NOMI = NOMI + 1                                                REDMOD    101
                  NIND(NOMI) = M                                                 REDMOD    102
                  GO TO 80                                                       REDMOD    103
                75 DEL = DELNO                                                   REDMOD    104
                80 CONTINUE                                                      REDMOD    105
105         C                                                                    REDMOD    106
                  WRITE (ITAPEW,910) M, OMG(M), VQDW(N), AQTST, WW(M,M), QDWTST, DEL REDMOD 107
            C                                                                    REDMOD    108
              100 CONTINUE                                                       REDMOD    109
            C                                                                    REDMOD    110
110               REWIND ITAPE                                                   REDMOD    111
            C                                                                    REDMOD    112
                  NLEFT = NQ - NOMI                                              REDMOD    113
                  IF (NLEFT.GT.1)  GO TO 300                                     REDMOD    114
                  WRITE (ITAPEW,1000) NLEFT                                      REDMOD    115
```

```
                      STOP                                                    REDMOD     116
                C                                                             REDMOD     117
                  300 CONTINUE                                                REDMOD     118
                C                                                             REDMOD     119
                  900 FORMAT (1H1/10X,36HMODAL ELIMINATION BASED ON RATIO OF ,  REDMOD     120
     120             1        40HGENERALIZED FORCES TO GENERALIZED MASSES,/,10X,  REDMOD     121
                     2        76(1H-),///,10X,16HCUT-OFF RATIO = ,1PE10.3,//,10X,  REDMOD     122
                     3        32HVELOCITIES CHECKED (KNOTS, TAS): ,5(1PE11.3))  REDMOD     123
                  901 FORMAT (//,44X,32HDETERMINANT ELEMENT CONTRIBUTION,/,46X,  REDMOD     124
                     1        27HFOR MAXIMUM VELOCITY TESTED,/,30X,9HMAX. VEL.,/,10X,  REDMOD     125
     125             2        51HMODE    FREQUENCY     TESTED      GEN. FORCE   GEN. ,  REDMOD     126
                     3        29HMASS       RATIO      DELETED?,/)              REDMOD     127
                  910 FORMAT (10X,I3,1P5E13.3,6X,A4)                          REDMOD     128
                 1000 FORMAT (1H1,5HONLY ,I2,28H MODES LEFT AFTER AUTOMATIC ,  REDMOD     129
                     1        48HREDUCTION OF NUMBER OF MODES BASED ON RATIOS OF /  REDMOD     130
     130             2        1X,40HGENERALIZED FORCES TO GENERALIZED MASSES)  REDMOD     131
                C                                                             REDMOD     132
                      RETURN                                                  REDMOD     133
                      END                                                     REDMOD     134
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	REDMOD	1	132

VARIABLES

		SN	TYPE		RELOCATION								
457	AQTST		REAL			REFS	97	106	DEFINED	96			
50	BR		REAL		COMA	REFS	25	72					
432	CQTST		COMPLEX			REFS	17	94	96	DEFINED	92	94	
452	DEL		REAL			REFS	106	DEFINED	69	103			
256	DELNO		REAL			REFS	103	DEFINED	28				
255	DELYES		REAL			REFS	69	DEFINED	27				
6200	DETAD		COMPLEX	ARRAY	MODD	REFS	16	21					
0	GK		COMPLEX	ARRAY	FLEXT	REFS	16	22					
446	I		INTEGER			REFS	46	48	71	72	DEFINED	44	48
							57	70					
435	ITAPE		INTEGER			DEFINED	31	I/O REFS	35	36	59	63	110
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	14	24	30	31			
434	ITAPEW		INTEGER			DEFINED	30	I/O REFS	48	49	106	114	
450	J		INTEGER			REFS	59	63	2*80	DEFINED	58	62	79
451	K		INTEGER			REFS	59	63	DEFINED	59	63		
0	KZ		INTEGER		KZERO	REFS	19	DEFINED	41				
443	K1		INTEGER			REFS	38	39	78	80	DEFINED	37	77
444	K2		INTEGER			REFS	39	3*80	DEFINED	38	78		
0	LC		INTEGER	ARRAY	COMA	REFS	9	25	32				
2	LC38		INTEGER		QELIM	REFS	20						
441	LL		INTEGER			REFS	73	74	DEFINED	36			
455	LLL		INTEGER			REFS	84	87	DEFINED	73	74		
447	M		INTEGER			REFS	56	72	2*97	101	4*106		
						DEFINED	51						
453	N		INTEGER			REFS	106	DEFINED	71				
17550	NC		INTEGER		MODD	REFS	21						
440	NF		INTEGER			REFS	84	87	DEFINED	36			

VARIABLES	SN	TYPE		RELOCATION								
1	NIND	INTEGER	ARRAY	FITR	REFS	10	23	DEFINED	101			
0	NLEFT	INTEGER		F.P.	REFS	113	114	DEFINED	1	112		
0	NOMI	INTEGER		FITR	REFS	23	100	101	112	DEFINED	33	100
436	NQ	INTEGER			REFS	51	57	112	DEFINED	32		
442	NQR *	INTEGER			DEFINED	36						
437	Nx	INTEGER			REFS	37	38	59	63	74	77	78
						84	87	DEFINED	36			
6200	OMG	REAL	ARRAY	FLEXT	REFS	10	22	72	106			
17500	OMM	REAL	ARRAY	MODD	REFS	10	21					
0	Q	COMPLEX	ARRAY	MODD	REFS	16	21					
460	QDWTST	REAL			REFS	98	106	DEFINED	97			
500	QQ	REAL	ARRAY		REFS	11	80	87	DEFINED	59	63	
0	QQDWW	REAL		QELIM	REFS	20	48	98				
542	QQK	REAL	ARRAY		REFS	12	84	DEFINED	80			
536	QTST	REAL	ARRAY		REFS	11	84	87	2*92			
6250	RHO	REAL		FLEXT	REFS	22	96					
456	TSTK	REAL			REFS	84	DEFINED	83				
6251	VB	REAL		FLEXT	REFS	22						
454	VBOTST	REAL			REFS	2*74	76	83	87	93	2*94	
					DEFINED	72						
445	VC	REAL			REFS	45	46	DEFINED	43	45		
600	VQDW	REAL	ARRAY		REFS	13	48	72	106	DEFINED	46	
1	VQQDWW	REAL		QELIM	REFS	20	46					
14400	WW	REAL	ARRAY	MODD	REFS	10	21	97	106			
461	X	REAL	ARRAY		REFS	11	39	2*74	87	DEFINED	36	
1	XK	REAL	ARRAY	KZERO	REFS	12	19	2*80	84	DEFINED	39	

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS		REFERENCES	
CABS	REAL	1	LIBRARY	96	
HELGX		11		84	87

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
CMPLX	COMPLEX	2	INTRIN		92
MINO	INTEGER	0	INTRIN		74

STATEMENT LABELS			DEF LINE	REFERENCES
0	10		40	37
0	20		47	44
0	30		60	58
0	40		61	57
65	50		62	56
0	60		64	62
0	62		81	79
0	63		82	77
147	65		86	76
151	68		88	85
160	69		95	93
0	70		99	70
176	75		103	98
200	80		104	102
0	100		108	51
223	300		117	113
327	900	FMT	119	48
353	901	FMT	123	49
377	910	FMT	127	106
403	1000	FMT	128	114

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21	10	K1	37 40	5B	INSTACK
33	20	I	44 47	4B	INSTACK
45	100	M	51 108	147B	EXT REFS NOT INNER
50	40	I	57 61	15B	EXT REFS NOT INNER
51	30	J	58 60	12B	EXT REFS
66	60	J	62 64	12B	EXT REFS
102	70	I	70 99	70B	EXT REFS EXITS NOT INNER
121	63	K1	77 82	21B	NOT INNER
134	62	J	79 81	3B	INSTACK

COMMON BLOCKS	LENGTH	MEMBERS - BIAS	NAME	(LENGTH)							
KZERO	16	0	KZ	(1)	1	XK	(15)				
QELIM	3	0	QQDWW	(1)	1	VQQDWW	(1)	2	LC38	(1)	
MODD	8041	0	Q	(3200)	3200	DETAD	(3200)	6400	WW	(1600)	
		8000	OMM	(40)	8040	NC	(1)				
FLEXT	3242	0	GK	(3200)	3200	OMG	(40)	3240	RHO	(1)	
		3241	VB	(1)							
FITR	41	0	NOMI	(1)	1	NIND	(40)				
CTAPES	50	0	ITAPES	(50)							
COMA	41	0	LC	(40)	40	BR	(1)				

STATISTICS

PROGRAM LENGTH	603B	387
CM LABELED COMMON LENGTH	26252B	11434
52000B CM USED		

```
      SUBROUTINE REDVEC (VEC,IVEC)                                      REDVEC     2
C                                                                       REDVEC     3
C     REDUCES NUMBER OF ELEMENTS IN A VECTOR BASED ON                   REDVEC     4
C     NUMBER OF ELEMENTS TO BE ELIMINATED (NOMI)                        REDVEC     5
C     AND THEIR NUMERICAL DESIGNATIONS (NIND)                           REDVEC     6
C                                                                       REDVEC     7
      DIMENSION VEC(IVEC)                                               REDVEC     8
C                                                                       REDVEC     9
      COMMON /FITR/ NOMI,NIND(40)                                       REDVEC    10
C                                                                       REDVEC    11
      NELIM = 0                                                         REDVEC    12
      NEND = IVEC - 1                                                   REDVEC    13
      DO 100 I=1,IVEC                                                   REDVEC    14
      DO 90 J=1,NOMI                                                    REDVEC    15
      IF (NIND(J).NE.I)  GO TO 90                                       REDVEC    16
      NSTART = I - NELIM                                                REDVEC    17
      DO 80 N=NSTART,NEND                                               REDVEC    18
      VEC(N) = VEC(N+1)                                                 REDVEC    19
   80 CONTINUE                                                          REDVEC    20
      NELIM = NELIM + 1                                                 REDVEC    21
      NEND = NEND - 1                                                   REDVEC    22
      GO TO 100                                                         REDVEC    23
   90 CONTINUE                                                          REDVEC    24
  100 CONTINUE                                                          REDVEC    25
      RETURN                                                            REDVEC    26
      END                                                               REDVEC    27
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

3	REDVEC	1 25

VARIABLES

		SN	TYPE		RELOCATION							
40	I		INTEGER			REFS	15	16	DEFINED	13		
0	IVEC		INTEGER		F.P.	REFS	7	12	13	DEFINED	1	
41	J		INTEGER			REFS	15	DEFINED	14			
43	N		INTEGER			REFS	2*18	DEFINED	17			
36	NELIM		INTEGER			REFS	16	20	DEFINED	11	20	
37	NEND		INTEGER			REFS	17	21	DEFINED	12	21	
1	NIND		INTEGER	ARRAY	FITR	REFS	9	15				
0	NOMI		INTEGER		FITR	REFS	9	14				
42	NSTART		INTEGER			REFS	17	DEFINED	16			
0	VEC		REAL	ARRAY	F.P.	REFS	7	18	DEFINED	1	18	

STATEMENT LABELS

		DEF LINE	REFERENCES	
0	80	19	17	
30	90	23	14	15
33	100	24	13	22

LOOPS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
12	100	I	13 24	24B		NOT INNER	
13	90	J	14 23	20B		EXITS	NOT INNER
22	80	N	17 19	2B	INSTACK		

```
COMMON BLOCKS    LENGTH      MEMBERS - BIAS NAME(LENGTH)
      FITR          41              0 NOMI   (1)              1 NIND   (40)

STATISTICS
  PROGRAM LENGTH                  508       40
  CM LABELED COMMON LENGTH        518       41
          520000B CM USED
```

```
      1              SUBROUTINE NRM2(X,VAL,N)                          NRM2      2
                     DIMENSION X(1)                                    NRM2      3
                     VAL=0.                                            NRM2      4
                     DO 1 I=1,N                                        NRM2      5
      5           1  VAL=VAL+X(I)*X(I)                                NRM2      6
                     VAL=SQRT(VAL)                                     NRM2      7
                C    WRITE(6,11)(X(I),I=1,N),VAL                       NRM2      8
                C 11 FORMAT('  NRM2 ',/,(6E16.6))                      NRM2      9
                     RETURN                                            NRM2     10
     10              END                                               NRM2     11
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	NRM2	1	9

VARIABLES

		SN	TYPE		RELOCATION								
22	I		INTEGER			REFS	2*5	DEFINED	4				
0	N		INTEGER		F.P.	REFS	4	DEFINED	1				
0	VAL		REAL		F.P.	REFS	5	6	DEFINED	1	3	5	6
0	X		REAL	ARRAY	F.P.	REFS	2	2*5	DEFINED	1			

EXTERNALS

	TYPE	ARGS		REFERENCES
SQRT	REAL	1	LIBRARY	6

STATEMENT LABELS

		DEF LINE	REFERENCES
0	1	5	4

LOOPS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
13	1	I	4 5	38	INSTACK

STATISTICS

PROGRAM LENGTH 258 21

520008 CM USED

```
      SUBROUTINE SREVNI(A,M,LOC,MID,NIX)                                SREVNI     2
      REAL A(MID,1)                                                     SREVNI     3
      INTEGER LOC(1)                                                    SREVNI     4
  100 N = M                                                             SREVNI     5
      DO 190  K = 1,N                                                   SREVNI     6
      PIVOT = 0.                                                        SREVNI     7
      DO 120  I = K,N                                                   SREVNI     8
      IF (PIVOT - ABS(A(I,K))) 110,110,120                              SREVNI     9
  110 PIVOT = ABS(A(I,K))                                               SREVNI    10
      L = I                                                             SREVNI    11
  120 CONTINUE                                                          SREVNI    12
      IF (PIVOT) 140,130,140                                            SREVNI    13
  130 NIX = -1                                                          SREVNI    14
      GO TO 210                                                         SREVNI    15
  140 LOC(K) = L                                                        SREVNI    16
      DO 150  J = 1,N                                                   SREVNI    17
      TEMP1 = A(K,J)                                                    SREVNI    18
      A(K,J) = A(L,J)                                                   SREVNI    19
  150 A(L,J) = TEMP1                                                    SREVNI    20
      TEMP1 = A(K,K)                                                    SREVNI    21
      A(K,K) = 1.                                                       SREVNI    22
      DO 160  J = 1,N                                                   SREVNI    23
  160 A(K,J) = A(K,J)/TEMP1                                             SREVNI    24
      DO 190  I = 1,N                                                   SREVNI    25
      IF (I - K) 170,190,170                                            SREVNI    26
  170 TEMP1 = -A(I,K)                                                   SREVNI    27
      A(I,K) = 0.                                                       SREVNI    28
      DO 180   J = 1,N                                                  SREVNI    29
  180 A(I,J) = A(I,J) + TEMP1*A(K,J)                                    SREVNI    30
  190 CONTINUE                                                          SREVNI    31
      DO 200  K = 1,N                                                   SREVNI    32
      NK = N - K                                                        SREVNI    33
      L = LOC(NK+1)                                                     SREVNI    34
      DO 200  I = 1,N                                                   SREVNI    35
      TEMP1 = A(I,NK+1)                                                 SREVNI    36
      A(I,NK+1) = A(I,L)                                                SREVNI    37
  200 A(I,L) = TEMP1                                                    SREVNI    38
      NIX = 0                                                           SREVNI    39
  210 RETURN                                                            SREVNI    40
      END                                                               SREVNI    41
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	SREVNI	1	39

VARIABLES

SN		TYPE	RELOCATION						
0	A	REAL	ARRAY	F.P.	REFS	2	8	9	17	18	20	23
						26	2*29	35	36	DEFINED	1	18	19
						21	23	27	29	36	37		
147	I	INTEGER			REFS	8	9	10	25	26	27	2*29	
						35	2*36	37	DEFINED	7	24	34	
151	J	INTEGER			REFS	17	2*18	19	2*23	3*29			

VARIABLES	SN	TYPE		RELOCATION								
					DEFINED	16	22	28				
145	K	INTEGER			REFS	7	8	9	15	17	18	2*20
					2*21	2*23	25	26	27	29	32	
					DEFINED	5	31					
150	L	INTEGER			REFS	15	18	19	36	37		
					DEFINED	10	33					
0	LOC	INTEGER	ARRAY	F.P.	REFS	3	33	DEFINED	1	15		
0	M	INTEGER		F.P.	REFS	4	DEFINED	1				
0	MID	INTEGER		F.P.	REFS	2	DEFINED	1				
144	N	INTEGER			REFS	5	7	16	22	24	28	31
					32	34	DEFINED	4				
0	NIX	INTEGER		F.P.	DEFINED	1	13	38				
153	NK	INTEGER			REFS	33	35	36	DEFINED	32		
146	PIVOT	REAL			REFS	8	12	DEFINED	6	9		
152	TEMP1	REAL			REFS	19	23	29	37	DEFINED	17	20
					26	35						

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
ABS	REAL	1	INTRIN		8 9

STATEMENT LABELS			DEF LINE	REFERENCES		
0	100	INACTIVE	4			
0	110	INACTIVE	9	2*8		
26	120		11	7	8	
0	130	INACTIVE	13	12		
33	140		15	2*12		
0	150		19	16		
0	160		23	22		
0	170	INACTIVE	26	2*25		
0	180		29	28		
110	190		30	5	24	25
0	200		37	31	34	
141	210		39	14		

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES		
13	190	K	5 30	102B		EXITS	NOT INNER
22	120	I	7 11	5B	INSTACK		
44	150	J	16 19	4B	INSTACK		
62	160	J	22 23	3B	INSTACK		
67	190	I	24 30	24B		NOT INNER	
103	180	J	28 29	4B	INSTACK		
116	200	K	31 37	22B		NOT INNER	
131	200	I	34 37	3B	INSTACK		

STATISTICS

PROGRAM LENGTH 167B 119

52000B CM USED

```
      SUBROUTINE QINTP(ITAPE,NQ,NOVBO,VVBO,NRVBO,AM,VBO)                QINTP      2
C                                                                       QINTP      3
C     ***************************************************               QINTP      4
C     *       IN THIS VERSION OF ESP, NO GENERALIZED-     *             QINTP      5
C     *       FORCE INTERPOLATION TEST IS PERFORMED TO    *             QINTP      6
C     *       DETERMINE WHEN A SUFFICIENT NUMBER OF       *             QINTP      7
C     *       REFERENCE REDUCED VELOCITIES HAVE BEEN      *             QINTP      8
C     *       ESTABLISHED.  INSTEAD, THE NUMBER OF        *             QINTP      9
C     *       REFERENCE VELOCITIES IS ALWAYS NRVBO.       *             QINTP     10
C     ***************************************************               QINTP     11
C                                                                       QINTP     12
      DIMENSION X(15), VVBO(1), VBO(1)                                  QINTP     13
      DIMENSION LC(40), ITAPES(50)                                      QINTP     14
      DIMENSION QWORK1(3200), QWORK2(3200), QRS(2,2), Q(15,2)           QINTP     15
      DIMENSION QK(15,2), XK(15)                                        QINTP     16
C                                                                       QINTP     17
      COMPLEX QBA(40,40)                                                QINTP     18
C                                                                       QINTP     19
      EQUIVALENCE (QWORK1(1),QBA(1,1))                                  QINTP     20
C                                                                       QINTP     21
      COMMON /COMA  / LC,BR                                             QINTP     22
      COMMON / CTAPES/ ITAPES                                           QINTP     23
C                                                                       QINTP     24
      ITAPEW = ITAPES(6)                                                QINTP     25
      ITAPQ1 = 57                                                       QINTP     26
      ITAPQ2 = 58                                                       QINTP     27
      ITAPQ3 = 59                                                       QINTP     28
      ISIZE = 3200                                                      QINTP     29
      NX = NRVBO                                                        QINTP     30
      NXMAX = 15                                                        QINTP     31
      LL = 4                                                            QINTP     32
      NQ2 = 2 * NQ                                                      QINTP     33
      NQQ = NQ * NQ                                                     QINTP     34
      NQQ2 = 2 * NQQ                                                    QINTP     35
      KONS = NQ + NQ/3 - 3*(NQ/3) + 1                                   QINTP     36
C                                                                       QINTP     37
C     GET ALL ELEMENTS OF GENERALIZED FORCE MATRIX FOR ONE REDUCED      QINTP     38
C     VELOCITY INTO ONE RECORD (COLUMN) IN PREPARATION FOR FORMING      QINTP     39
C     TRANPOSE AND THEN DOING INTERPOLATION.                            QINTP     40
C                                                                       QINTP     41
      REWIND ITAPE                                                      QINTP     42
      REWIND ITAPQ1                                                     QINTP     43
      DO 60 K1=1,NX                                                     QINTP     44
      DO 59 N=1,NQ                                                      QINTP     45
      I1 = (N-1)*NQ2 + 1                                                QINTP     46
      I2 = N*NQ2                                                        QINTP     47
      READ (ITAPE) (QWORK1(I),I=I1,I2)                                  QINTP     48
   59 CONTINUE                                                          QINTP     49
      WRITE (ITAPQ1) (QWORK1(I),I=1,NQQ2)                               QINTP     50
   60 CONTINUE                                                          QINTP     51
      REWIND ITAPE                                                      QINTP     52
      REWIND ITAPQ1                                                     QINTP     53
C                                                                       QINTP     54
C     FORM TRANPOSE.  STORE TEMPORARILY ON ITAPQ2.                      QINTP     55
C                                                                       QINTP     56
      CALL TRPOSE (ITAPQ1,QWORK1,QWORK2,NQQ2,NX,ITAPQ2,ITAPQ3,ISIZE)    QINTP     57
C                                                                       QINTP     58
```

```
      C     PREPARE FINAL OUTPUT ON ORIGINAL INPUT TAPE, ITAPE.                QINTP      59
      C                                                                        QINTP      60
60          REWIND ITAPQ2                                                      QINTP      61
            REWIND ITAPE                                                       QINTP      62
            DO 70 I=1,NX                                                       QINTP      63
            X(I) = VVBO(I)                                                     QINTP      64
         70 CONTINUE                                                           QINTP      65
65          IF (LC(1) EQ.-1)  GO TO 90                                         QINTP      66
      C                                                                        QINTP      67
      C     K METHOD                                                           QINTP      68
      C                                                                        QINTP      69
            DO 171 I=1,NX                                                      QINTP      70
70          J = NX - I + 1                                                     QINTP      71
            XK(J) = 1.0 / X(I)                                                 QINTP      72
        171 CONTINUE                                                           QINTP      73
            DO 80 II=1,NOVBO                                                   QINTP      74
            ARG = VBO(II)                                                      QINTP      75
75          LLL = LL                                                           QINTP      76
            IF (ARG.LT.X(1).OR.ARG.GT.X(NX)) LLL=MINO(3,LL)                    QINTP      77
            DO 74 K=1,NQQ                                                      QINTP      78
            DO 72 I=1,2                                                        QINTP      79
            READ (ITAPQ2) (Q(K1,I),K1=1,NX)                                    QINTP      80
80          IF (ARG.LT.10.0)  GO TO 72                                         QINTP      81
            DO 172 K1=1,NX                                                     QINTP      82
            K2 = NX - K1 + 1                                                   QINTP      83
            QK(K2,I) = Q(K1,I) * XK(K2) * XK(K2)                               QINTP      84
        172 CONTINUE                                                           QINTP      85
85       72 CONTINUE                                                           QINTP      86
            IF (ARG.LT.10.0)  GO TO 173                                        QINTP      87
            ARGK = 1.0 / ARG                                                   QINTP      88
            CALL HELGX (ARGK,QRS,XK,QK,NX,2,LLL,2,NXMAX,0,0)                   QINTP      89
            GO TO 174                                                          QINTP      90
90      173 CONTINUE                                                           QINTP      91
            CALL HELGX (ARG,QRS,X,Q,NX,2,LLL,2,NXMAX,0,0)                      QINTP      92
        174 CONTINUE                                                           QINTP      93
            I = (K-1)/NQ + 1                                                   QINTP      94
            J = K - (I-1)*NQ                                                   QINTP      95
95          QBA(I,J) = CMPLX (QRS(1,1),QRS(2,1))                               QINTP      96
            IF (ARG.LT.10.0)  GO TO 74                                         QINTP      97
            QBA(I,J) = QBA(I,J) * ARG * ARG                                    QINTP      98
         74 CONTINUE                                                           QINTP      99
            WRITE (ITAPE) QBA                                                  QINTP     100
100         IF (LC(10).EQ.0) GO TO 78                                          QINTP     101
            LINE = 8                                                           QINTP     102
            WRITE (ITAPEW,52) AM, VBO(II)                                      QINTP     103
            DO 76 I=1,NQ                                                       QINTP     104
            LINE = LINE + KONS                                                 QINTP     105
105         IF (LINE.LE.62)  GO TO 76                                          QINTP     106
            LINE = 8 + KONS                                                    QINTP     107
            WRITE (ITAPEW,52) AM, VBO(II)                                      QINTP     108
            WRITE (ITAPEW,34) (QBA(I,J),J=1,NQ)                                QINTP     109
         76 CONTINUE                                                           QINTP     110
110      78 CONTINUE                                                           QINTP     111
            REWIND ITAPQ2                                                      QINTP     112
         80 CONTINUE                                                           QINTP     113
            RETURN                                                             QINTP     114
      C                                                                        QINTP     115
```

```
115          C     P-K METHOD                                                    QINTP     116
             C                                                                   QINTP     117
                90 WRITE (ITAPE) NX,NXMAX,LL,X,NQQ                               QINTP     118
                   DO 94 K=1,NQQ                                                 QINTP     119
                   DO 92 I=1,2                                                   QINTP     120
120                READ (ITAPQ2) (Q(K1,I),K1=1,NX)                               QINTP     121
                   WRITE (ITAPE) (Q(K1,I),K1=1,NX)                               QINTP     122
                92 CONTINUE                                                      QINTP     123
                94 CONTINUE                                                      QINTP     124
                   RETURN                                                        QINTP     125
125          C                                                                   QINTP     126
                34 FORMAT(/( T3,1PE10.3,T15,1PE10.3, T1,2H (,T13,2H, , T25,2H) ,  QINTP     127
                  1         T29,1PE10.3,T41,1PE10.3,T27,2H (,T39,2H, , T51,2H) ,  QINTP     128
                  2         T55,1PE10.3,T67,1PE10.3,T53,2H (,T65,2H, , T77,2H) ))  QINTP     129
                52 FORMAT (1H1,5X, 24HSUM OF QRS FOR MACH NO =,F10.3/5X,6HVBO = ,  QINTP     130
130               1        F10.3/15X,7HBY ROWS,10X,16H(REAL,IMAGINARY),//)       QINTP     131
             C                                                                   QINTP     132
                   END                                                           QINTP     133
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS

		DEF LINE	REFERENCES
3	QINTP	1	113 124

VARIABLES

		SN	TYPE		RELOCATION								
0	AM		REAL		F.P.	REFS	102	107	DEFINED	1			
520	ARG		REAL			REFS	2*76	80	86	87	91	96	2*97
						DEFINED	74						
524	ARGK		REAL			REFS	88	DEFINED	87				
50	BR		REAL		COMA	REFS	21						
515	I		INTEGER			REFS	47	49	2*63	70	71	79	2*83
							94	95	2*97	108	120	121	
						DEFINED	47	49	62	69	78	93	103
							119						
517	II		INTEGER			REFS	74	102	107	DEFINED	73		
501	ISIZE		INTEGER			REFS	56	DEFINED	28				
0	ITAPE		INTEGER		F.P.	DEFINED	1	I/O REFS	41	47	51	61	99
							117	121					
0	ITAPES		INTEGER	ARRAY	CTAPES	REFS	13	22	24				
475	ITAPEW		INTEGER			DEFINED	24	I/O REFS	102	107	108		
476	ITAPQ1		INTEGER			REFS	56	DEFINED	25	I/O REFS	42	49	52
477	ITAPQ2		INTEGER			REFS	56	DEFINED	26	I/O REFS	60	79	111
							120						
500	ITAPQ3		INTEGER			REFS	56	DEFINED	27				
513	I1		INTEGER			REFS	47	DEFINED	45				
514	I2		INTEGER			REFS	47	DEFINED	46				
516	J		INTEGER			REFS	71	95	2*97	108	DEFINED	70	94
							108						
522	K		INTEGER			REFS	93	94	DEFINED	77	118		
510	KONS		INTEGER			REFS	104	106	DEFINED	35			
511	K1		INTEGER			REFS	79	82	83	120	121		
						DEFINED	43	79	81	120	121		
523	K2		INTEGER			REFS	3*83	DEFINED	82				

VARIABLES	SN	TYPE	RELOCATION								
0	LC	INTEGER	ARRAY	COMA	REFS	13	21	65	100		
525	LINE	INTEGER			REFS	104	105	DEFINED	101	104	106
504	LL	INTEGER			REFS	75	76	117	DEFINED	31	
521	LLL	INTEGER			REFS	88	91	DEFINED	75	76	
512	N	INTEGER			REFS	45	46	DEFINED	44		
0	NOVBO	INTEGER		F.P.	REFS	73	DEFINED	1			
0	NQ	INTEGER		F.P.	REFS	32	2*33	3*35	44	93	94	103
					108	DEFINED	1				
506	NQQ	INTEGER			REFS	34	77	117	118	DEFINED	33	
507	NQQ2	INTEGER			REFS	49	56	DEFINED	34		
505	NQ2	INTEGER			REFS	45	46	DEFINED	32		
0	NRVBO	INTEGER		F.P.	REFS	29	DEFINED	1			
502	NX	INTEGER			REFS	43	56	62	69	70	76	79
					81	82	88	91	117	120	121	
					DEFINED	29						
503	NXMAX	INTEGER			REFS	88	91	117	DEFINED	30		
15151	Q	REAL	ARRAY		REFS	14	83	91	121	DEFINED	79	120
526	QBA	COMPLEX	ARRAY		REFS	17	19	97	99	108		
					DEFINED	95	97					
15207	QK	REAL	ARRAY		REFS	15	88	DEFINED	83			
15145	QRS	REAL	ARRAY		REFS	14	88	91	2*95			
526	QWORK1	REAL	ARRAY		REFS	14	19	49	56	DEFINED	47	
6745	QWORK2	REAL	ARRAY		REFS	14	56					
0	VBO	REAL	ARRAY	F.P.	REFS	12	74	102	107	DEFINED	1	
0	VVBO	REAL	ARRAY	F.P.	REFS	12	63	DEFINED	1			
6726	X	REAL	ARRAY		REFS	12	71	2*76	91	117		
					DEFINED	63						
15245	XK	REAL	ARRAY		REFS	15	2*83	88	DEFINED	71		

VARIABLES USED AS FILE NAMES, SEE ABOVE

EXTERNALS	TYPE	ARGS	REFERENCES	
HELGX		11	88	91
TRPOSE		8	56	

INLINE FUNCTIONS	TYPE	ARGS		DEF LINE	REFERENCES
CMPLX	COMPLEX	2	INTRIN		95
MINO	INTEGER	0	INTRIN		76

STATEMENT LABELS			DEF LINE	REFERENCES	
436	34	FMT	126	108	
456	52	FMT	129	102	107
0	59		48	44	
0	60		50	43	
0	70		64	62	
157	72		85	78	80
210	74		98	77	96
252	76		109	103	105
255	78		110	100	
0	80		112	73	
262	90		117	65	
0	92		122	119	
0	94		123	118	
0	171		72	69	
0	172		84	81	
170	173		90	86	
172	174		92	89	

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
34	60	K1	43 50	25B	EXT REFS NOT INNER
35	59	N	44 48	14B	EXT REFS
76	70	I	62 64	2B	INSTACK
106	171	I	69 72	5B	INSTACK
115	80	II	73 112	145B	EXT REFS NOT INNER
127	74	K	77 98	64B	EXT REFS NOT INNER
130	72	I	78 85	32B	EXT REFS NOT INNER
152	172	K1	81 84	4B	INSTACK
224	76	I	103 109	31B	EXT REFS NOT INNER
240		J	108 108	1B	EXT REFS
265	94	K	118 123	24B	EXT REFS NOT INNER
266	92	I	119 122	21B	EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
COMA	41	0 LC (40)	40 BR (1)
CTAPES	50	0 ITAPES (50)	

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
QWORK1	3200	0 QBA (3200)

STATISTICS

PROGRAM LENGTH	15275B	6845
CM LABELED COMMON LENGTH	133B	91

520008 CM USED

```
      SUBROUTINE NASTRD(IVERS,IUNIT,IMAT1,IMAT2,IPASS,NDYDOF,NPGDOF,     NASTRD      2
     1                  BUFFER)                                          NASTRD      3
C                                                                       NASTRD      4
C     ROUTINE TO READ MATRICES WRITTEN BY:                              NASTRD      5
C       - MSC NASTRAN WITH EITHER THE SPARSE OR NONSPARSE OPTION,       NASTRD      6
C         OR                                                            NASTRD      7
C       - COSMIC NASTRAN, ASSUMING ALL MATRICES ARE WRITTEN ON SAME     NASTRD      8
C         I/O UNIT, PRECEDED BY FILE REWIND.                            NASTRD      9
C                                                                       NASTRD     10
C     SINGLE-PRECISION INPUT ASSUMED.                                   NASTRD     11
C                                                                       NASTRD     12
C     INPUT CLUES:                                                      NASTRD     13
C       - IVERS - MSC (1) OR COSMIC (2) VERSION OF NASTRAN              NASTRD     14
C       - IUNIT - I/O UNIT CONTAINING MATRIX TO BE READ                 NASTRD     15
C       - IMAT1 - FIRST MATRIX ON I/O UNIT (1), OR SUBSEQUENT           NASTRD     16
C                 MATRIX (2)                                            NASTRD     17
C       - IMAT2 - DYNAMIC FLEXIBILITY MATRIX (1), DYNAMIC MASS          NASTRD     18
C                 MATRIX (2), TRANSFORMATION MATRIX (3), OR PLUG        NASTRD     19
C                 MASS MATRIX (4)                                       NASTRD     20
C       - IPASS - FIRST PASS TO READ HEADER INFORMATION (1), OR         NASTRD     21
C                 SUBSEQUENT PASS TO READ COLUMN OF MATRIX (2).         NASTRD     22
C                                                                       NASTRD     23
      COMMON /CLUEV/ LKLUEV,KLUEV(20)                                   NASTRD     24
C                                                                       NASTRD     25
      DIMENSION  DMAPNM(2), BUFFER(1)                                   NASTRD     26
      DIMENSION  TEMP(220), ITEMP(220)                                  NASTRD     27
C                                                                       NASTRD     28
      EQUIVALENCE (TEMP(1), ITEMP(1))                                   NASTRD     29
C                                                                       NASTRD     30
      IKLUEM = IMAT2 + 6                                                NASTRD     31
      IF (IMAT2.EQ.1.OR.IMAT2.EQ.2)  KLUEMP = KLUEV(IKLUEM)             NASTRD     32
      IF (IMAT2.EQ.3.OR.IMAT2.EQ.4)  KLUEMP = 2                         NASTRD     33
C                                                                       NASTRD     34
C     MSC NASTRAN                                                       NASTRD     35
C                                                                       NASTRD     36
      IF (IVERS.EQ.2)  GO TO 200                                        NASTRD     37
      IF (IPASS.EQ.2)  GO TO 50                                         NASTRD     38
      IF (IPASS.EQ.3)  GO TO 450                                        NASTRD     39
C     READ HEADER INFORMATION                                           NASTRD     40
      IF (IMAT2.NE.4)  REWIND IUNIT                                     NASTRD     41
      READ (IUNIT) NCOL, NROW, IFORM, ITYPE, (DMAPNM(I),I=1,2)          NASTRD     42
      WRITE (6,500) (DMAPNM(I),I=1,2), ITYPE                            NASTRD     43
      WRITE (6,510) NCOL, NROW                                          NASTRD     44
      IF (ITYPE.EQ.1)  GO TO 10                                         NASTRD     45
      WRITE (6,520)                                                     NASTRD     46
      STOP                                                              NASTRD     47
   10 IF (IMAT2.EQ.3.OR.IMAT2.EQ.4)  GO TO 20                           NASTRD     48
      IF (NCOL.EQ.NDYDOF)  GO TO 30                                     NASTRD     49
      WRITE (6,530) NCOL, NDYDOF                                        NASTRD     50
      STOP                                                              NASTRD     51
   20 IF (NCOL.EQ.NPGDOF.AND.IMAT2.EQ.3)  GO TO 30                      NASTRD     52
      IF (NCOL.EQ.NPGDOF.AND.IMAT2.EQ.4)  GO TO 25                      NASTRD     53
      WRITE (6,530) NCOL, NPGDOF                                        NASTRD     54
      STOP                                                              NASTRD     55
   25 IF (NROW.EQ.NPGDOF)  GO TO 40                                     NASTRD     56
      WRITE (6,540) NROW, NPGDOF                                        NASTRD     57
      STOP                                                              NASTRD     58
```

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                30 IF (NROW.EQ.NDYDOF)  GO TO 40                                NASTRD     59
                   WRITE (6,540) NROW, NDYDOF                                   NASTRD     60
60                 STOP                                                         NASTRD     61
                40 RETURN                                                       NASTRD     62
             C     READ MATRIX BY COLUMNS                                       NASTRD     63
                50 DO 60 I=1,NROW                                               NASTRD     64
                60 BUFFER(I) = 0.0                                              NASTRD     65
65                 IF (IMAT2.EQ.2)  GO TO 100                                   NASTRD     66
             C     NONSPARSE OUTPUT4 OPTION                                     NASTRD     67
                   READ (IUNIT) ICOL, IROWNZ, NW, (TEMP(I),I=1,NW)              NASTRD     68
                   IF (IROWNZ.NE.0)  GO TO 70                                   NASTRD     69
                   WRITE (6,550)                                                NASTRD     70
70                 STOP                                                         NASTRD     71
                70 DO 80 I=1,NW                                                 NASTRD     72
                   K = IROWNZ - 1 + I                                           NASTRD     73
                   BUFFER(K) = TEMP(I)                                          NASTRD     74
                80 CONTINUE                                                     NASTRD     75
75                 NROWRD = NW                                                  NASTRD     76
                   IF (KLUEMP.EQ.2)  GO TO 150                                  NASTRD     77
                   RETURN                                                       NASTRD     78
             C     SPARSE OUTPUT4 OPTION                                        NASTRD     79
               100 READ (IUNIT) ICOL, ZERO, NW, (TEMP(I),I=1,NW)                NASTRD     80
80                 IF (IZERO.EQ.0)  GO TO 110                                   NASTRD     81
                   WRITE (6,560)                                                NASTRD     82
                   STOP                                                         NASTRD     83
               110 NROWRD = 0                                                   NASTRD     84
                   IROWL = 1                                                    NASTRD     85
85             120 LENGTH = ITEMP(IROWL) / 65536                                NASTRD     86
                   IROWNZ = ITEMP(IROWL) - LENGTH*65536                         NASTRD     87
                   NROWNZ = LENGTH - 1                                          NASTRD     88
                   NROWRD = NROWRD + NROWNZ                                     NASTRD     89
                   DO 130 I=1,NROWNZ                                            NASTRD     90
90                 K = IROWNZ - 1 + I                                           NASTRD     91
                   BUFFER(K) = TEMP(IROWL+I)                                    NASTRD     92
               130 CONTINUE                                                     NASTRD     93
                   IROWL = IROWL + LENGTH                                       NASTRD     94
                   IF (IROWL.LT.NW)  GO TO 120                                  NASTRD     95
95                 IF (KLUEMP.EQ.1)  RETURN                                     NASTRD     96
             C     FIRST NONZERO ROW                                            NASTRD     97
                   LENGTH = ITEMP(1) / 65536                                    NASTRD     98
                   IROWNZ = ITEMP(1) - LENGTH*65536                             NASTRD     99
             C     PRINT COLUMN                                                 NASTRD    100
100            150 WRITE (6,570) ICOL                                           NASTRD    101
                   WRITE (6,580) IROWNZ                                         NASTRD    102
                   WRITE (6,590) NROWRD                                         NASTRD    103
                   WRITE (6,600) (BUFFER(K),K=1,NROW)                           NASTRD    104
                   RETURN                                                       NASTRD    105
105          C                                                                  NASTRD    106
             C     COSMIC NASTRAN                                               NASTRD    107
             C                                                                  NASTRD    108
               200 IF (IPASS.EQ.2)  GO TO 300                                   NASTRD    109
                   IF (IPASS.EQ.3)  GO TO 400                                   NASTRD    110
110                IF (IMAT1.NE.1)  GO TO 220                                   NASTRD    111
             C     SKIP HEADER INFORMATION ASSOCIATED WITH FILE REWIND          NASTRD    112
                   DO 210 I=1,8                                                 NASTRD    113
               210 READ (IUNIT)                                                 NASTRD    114
             C     READ SELECTED VARIABLES FROM MATRIX HEADER INFORMATION       NASTRD    115
```

```
115          220 READ (IUNIT)                                                  NASTRD  116
                 READ (IUNIT) AMATNM                                           NASTRD  117
                 READ (IUNIT)                                                  NASTRD  118
                 READ (IUNIT)                                                  NASTRD  119
                 READ (IUNIT) NDUM, NCOL, NROW                                 NASTRD  120
120              DO 230 I=1,3                                                  NASTRD  121
             230 READ (IUNIT)                                                  NASTRD  122
                 WRITE (6,610) AMATNM                                          NASTRD  123
                 WRITE (6,510) NCOL, NROW                                      NASTRD  124
                 IF (IMAT2.EQ.3.OR.IMAT2.EQ.4)  GO TO 240                      NASTRD  125
125              IF (NCOL.EQ.NDYDOF)  GO TO 250                                NASTRD  126
                 WRITE (6,530) NCOL, NDYDOF                                    NASTRD  127
                 STOP                                                          NASTRD  128
             240 IF (NCOL.EQ.NPGDOF.AND.IMAT2.EQ.3)  GO TO 250                 NASTRD  129
                 IF (NCOL.EQ.NPGDOF.AND.IMAT2.EQ.4)  GO TO 245                 NASTRD  130
130              WRITE (6,530) NCOL, NDYDOF                                    NASTRD  131
                 STOP                                                          NASTRD  132
             245 IF (NROW.EQ.NPGDOF)  GO TO 260                                NASTRD  133
                 WRITE (6,540) NROW,NPGDOF                                     NASTRD  134
                 STOP                                                          NASTRD  135
135          250 IF (NROW.EQ.NDYDOF)  GO TO 260                                NASTRD  136
                 WRITE (6,540) NROW, NDYDOF                                    NASTRD  137
                 STOP                                                          NASTRD  138
             260 ICOL = 0                                                      NASTRD  139
                 RETURN                                                        NASTRD  140
140          C   READ MATRIX BY COLUMNS                                        NASTRD  141
             300 READ (IUNIT)                                                  NASTRD  142
                 READ (IUNIT) NROW                                             NASTRD  143
                 READ (IUNIT) (BUFFER(I),I=1,NROW)                             NASTRD  144
                 IF (KLUEMP.EQ.1)  RETURN                                      NASTRD  145
145          C   PRINT COLUMN                                                  NASTRD  146
                 ICOL = ICOL + 1                                               NASTRD  147
                 WRITE (6,570) ICOL                                            NASTRD  148
                 WRITE (6,590) NROW                                            NASTRD  149
                 WRITE (6,600) (BUFFER(I),I=1,NROW)                            NASTRD  150
150              RETURN                                                        NASTRD  151
             C                                                                 NASTRD  152
             C   SKIP MATRIX TRAILER INFORMATION                               NASTRD  153
             C                                                                 NASTRD  154
             400 READ (IUNIT)                                                  NASTRD  155
155          450 READ (IUNIT)                                                  NASTRD  156
                 RETURN                                                        NASTRD  157
             C                                                                 NASTRD  158
             500 FORMAT (1H1,9X,27HREADING MSC NASTRAN MATRIX ,2A4,            NASTRD  159
                1        /13X,6HTYPE =,I2)                                     NASTRD  160
160          510 FORMAT (13X,20HNUMBER OF COLUMNS = ,I3,                       NASTRD  161
                1        /13X,20HNUMBER OF ROWS    = ,I3)                     NASTRD  162
             520 FORMAT (1X,49HMATRIX TYPE IS INCONSISTENT WITH ESP REQUIREMENTS,  NASTRD  163
                1        //1X,35HTYPE MUST BE REAL, SINGLE-PRECISION)          NASTRD  164
             530 FORMAT (1X,37HNUMBER OF COLUMNS IN NASTRAN MATRIX (,I3,       NASTRD  165
165             1        22H) IS INCONSISTENT WITH/1X,21HNUMBER OF DEGREES OF ,  NASTRD  166
                2        37HFREEDOM SPECIFIED IN ESP INPUT DATA (,I3,1H))     NASTRD  167
             540 FORMAT (1X,34HNUMBER OF ROWS IN NASTRAN MATRIX (,I3,          NASTRD  168
                1        22H) IS INCONSISTENT WITH/1X,21HNUMBER OF DEGREES OF ,  NASTRD  169
                2        37HFREEDOM SPECIFIED IN ESP INPUT DATA (,I3,1H))     NASTRD  170
170          550 FORMAT (1X,44HMATRIX BEING READ WAS PREPARED USING SPARSE ,   NASTRD  171
                1        14HOUTPUT4 OPTION/1X,30HBUT SHOULD HAVE BEEN NONSPARSE)  NASTRD  172
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                  560 FORMAT (1X,47HMATRIX BEING READ WAS PREPARED USING NONSPARSE .      NASTRD    173
                     1        14HOUTPUT4 OPTION/1X,27HBUT SHOULD HAVE BEEN SPARSE)      NASTRD    174
                  570 FORMAT (//15X,15HREADING COLUMN ,I3)                               NASTRD    175
     175          580 FORMAT (15X,20HFIRST NONZERO ROW = ,I3)                            NASTRD    176
                  590 FORMAT (15X,22HNUMBER OF ROWS READ = ,I3/)                         NASTRD    177
                  600 FORMAT (1P10E12.4)                                                 NASTRD    178
                  610 FORMAT (1H1,9X,30HREADING COSMIC NASTRAN MATRIX ,A10)              NASTRD    179
                C                                                                        NASTRD    180
     180          END                                                                    NASTRD    181
```

SYMBOLIC REFERENCE MAP (R=3)

ENTRY POINTS		DEF LINE	REFERENCES							
3	NASTRD	1	61	77	95	104	139	144	150	156

VARIABLES	SN	TYPE		RELOCATION								
1011	AMATNM	REAL			REFS	122	DEFINED	116				
0	BUFFER	REAL	ARRAY	F.P.	REFS	25	103	149	DEFINED	1	64	73
					91	143						
1347	DMAPNM	REAL	ARRAY		REFS	25	42	DEFINED	41			
776	I	INTEGER			REFS	41	42	64	67	72	73	79
					90	91	143	149	DEFINED	41	42	63
					67	71	79	89	112	120	143	149
777	ICOL	INTEGER			REFS	100	146	147	DEFINED	67	79	138
					146							
774	IFORM	* INTEGER			DEFINED	41						
770	IKLUEM	INTEGER			REFS	31	DEFINED	30				
0	IMAT1	INTEGER		F.P.	REFS	110	DEFINED	1				
0	IMAT2	INTEGER		F.P.	REFS	30	2*31	2*32	40	2*47	51	52
					65	2*124	128	129	DEFINED	1		
0	IPASS	INTEGER		F.P.	REFS	37	38	108	109	DEFINED	1	
1006	IROWL	INTEGER			REFS	85	86	91	93	94		
					DEFINED	84	93					
1000	IROWNZ	INTEGER			REFS	68	72	90	101	DEFINED	67	86
					98							
1013	ITEMP	INTEGER	ARRAY		REFS	26	28	85	86	97	98	
775	ITYPE	INTEGER			REFS	42	44	DEFINED	41			
0	IUNIT	INTEGER		F.P.	DEFINED	1	I/O REFS	40	41	67	79	113
					115	116	117	118	119	121	141	142
					143	154	155					
0	IVERS	INTEGER		F.P.	REFS	36	DEFINED	1				
1005	IZERO	* INTEGER	*UNDEF		REFS	80						
1002	K	INTEGER			REFS	73	91	103	DEFINED	72	90	103
771	KLUEMP	INTEGER			REFS	76	95	144	DEFINED	31	32	
1	KLUEV	INTEGER	ARRAY	CLUEV	REFS	23	31					
1007	LENGTH	INTEGER			REFS	86	87	93	98	DEFINED	85	97
0	LKLUEV	INTEGER		CLUEV	REFS	23						
772	NCOL	INTEGER			REFS	43	48	49	51	52	53	123
					125	126	128	129	130	DEFINED	41	119
1012	NDUM	* INTEGER			DEFINED	119						
0	NDYDOF	INTEGER		F.P.	REFS	48	49	58	59	125	126	130
					135	136	DEFINED	1				
0	NPGDOF	INTEGER		F.P.	REFS	51	52	53	55	56	128	129

VARIABLES	SN	TYPE	RELOCATION							
				132	133	DEFINED	1			
773	NROW	INTEGER		REFS	43	55	56	58	59	63	103
				123	132	133	135	136	143	148	149
				DEFINED	41	119	142				
1010	NROWNZ	INTEGER		REFS	88	89	DEFINED	87			
1003	NROWRD	INTEGER		REFS	88	102	DEFINED	75	83	88	
1001	NW	INTEGER		REFS	67	71	75	79	94		
				DEFINED	67	79					
1013	TEMP	REAL	ARRAY	REFS	26	28	73	91	DEFINED	67	79
1004	ZERO	* REAL		DEFINED	79						

FILE NAMES	MODE								
TAPE6	FMT	WRITES	42	43	45	49	53	56	59	69
		81	100	101	102	103	122	123	126	130
		133	136	147	148	149				

VARIABLES USED AS FILE NAMES, SEE ABOVE

STATEMENT LABELS			DEF LINE	REFERENCES			
45	10		47	44			
56	20		51	47			
70	25		55	52			
75	30		58	48	51		
102	40		61	55	58		
103	50		63	37			
0	60		64	63			
126	70		71	68			
0	80		74	71			
143	100		79	65			
156	110		83	80			
160	120		85	94			
0	130		92	89			
211	150		100	76			
225	200		108	36			
0	210		113	112			
240	220		115	110			
0	230		121	120			
274	240		128	124			
306	245		132	129			
313	250		135	125	128		
320	260		138	132	135		
322	300		141	108			
350	400		154	109			
352	450		155	38			
620	500	FMT	158	42			
627	510	FMT	160	43	123		
636	520	FMT	162	45			
651	530	FMT	164	49	53	126	130
671	540	FMT	167	56	59	133	136
711	550	FMT	170	69			
725	560	FMT	172	81			
741	570	FMT	174	100	147		
745	580	FMT	175	101			
751	590	FMT	176	102	148		
756	600	FMT	177	103	149		
761	610	FMT	178	122			

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	
107	60	I	63 64	2B	INSTACK	
134	80	I	71 74	3B	INSTACK	
175	130	I	89 92	3B	INSTACK	
233	210	I	112 113	5B		EXT REFS
253	230	I	120 121	5B		EXT REFS

COMMON BLOCKS	LENGTH	MEMBERS - BIAS NAME(LENGTH)	
CLUEV	21	0 LKLUEV (1)	1 KLUEV (20)

EQUIV CLASSES	LENGTH	MEMBERS - BIAS NAME(LENGTH)
TEMP	220	0 ITEMP (220)

STATISTICS

PROGRAM LENGTH	13518	745
CM LABELED COMMON LENGTH	25B	21

520000B CM USED

6 - REFERENCES

1. Wilkinson, K. et al., "An Automated Procedure for Flutter and Strength Analysis and Optimization of Aerospace Vehicles", AFFDL-TR-75-137, Vols. I and II, December 1975. (Final report for Air Force Flight Dynamics Laboratory contract F33615-72-C-1101)

2. Chipman, R. R., and Malone, J. B., "Study of a Method for Determining Critical Store Configurations for Wing-Store Flutter", Grumman Aerospace Corporation Report No. ADCR-76-1, September 1976. (Final report for Naval Air Systems Command contract N00019-76-C-0160).

3. Chipman, R. R., and Malone, J. B., "Application of Optimization Technology to Wing/Store Flutter Prediction", Journal of Aircraft, Vol. 15, No. 11, November 1978, pp. 786-793.

4. Chipman, R. R. and Laurie, E. J., "Demonstration of a Method for Determining Critical Store Configurations for Wing-Store Flutter", Grumman Aerospace Corporation Report No. ADCR-80-1, May 1980. (Final report for Naval Air Systems Command contract N00019-79-C-0062)

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