

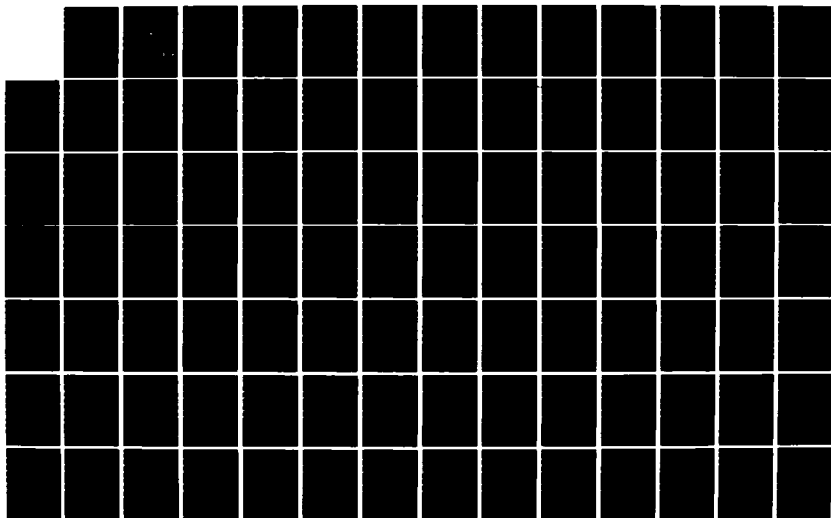
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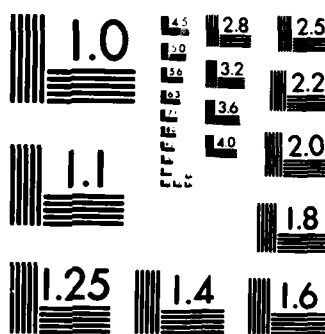
EASYPLOT: AN INTERACTIVE USER-FRIENDLY GRAPHICS PROGRAM 1/2
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NAVAL POSTGRADUATE SCHOOL

Monterey, California

AD-A150 779



THESIS

EASYPLOT: AN INTERACTIVE,
USER-FRIENDLY GRAPHICS PROGRAM

by

John C. Mainwaring

September 1984

Thesis Advisor:

Robert E. Ball

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three dimensional graphs. This program is available to any Naval Postgraduate School computer user.

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Easyplot: An Interactive,
User-Friendly Graphics Program

by

John C. Mainwaring
Captain, United States Army
B.S., United States Military Academy, 1974

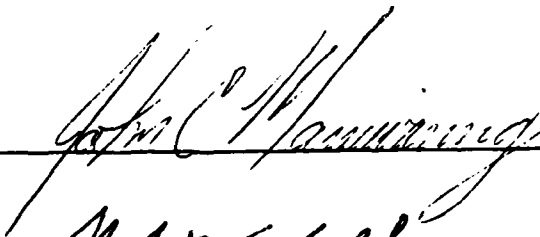
Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING

from the

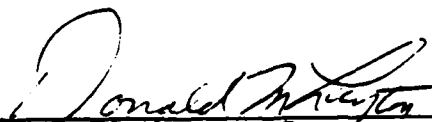
NAVAL POSTGRADUATE SCHOOL
September 1984

Author:



Approved by:


Thesis Advisor


Chairman, Department of Aeronautics


Dean of Science and Engineering

ABSTRACT

This thesis is an interactive Fortran program called Easyplot which allows a person to quickly access the NPS IBM 3033 graphics capabilities to produce a professional graph. No programming is required on the part of the user. Easyplot systematically asks the user questions, the responses to which are utilized by the Disspla software system to output two and three dimensional graphs. This program is available to any Naval Postgraduate School computer user.

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The author wishes to express his most grateful appreciation to his wife for all her support.

I. INTRODUCTION

A. BACKGROUND

The ability to clearly present data in some kind of easily interpreted, visual manner is of considerable importance within an educational-research environment such as the Naval Postgraduate School. In nearly all of the various departments, graphic representation of data is constantly employed as a means to illustrate and communicate significant findings. The digital computer is a potentially valuable aide in providing this graphic representation. Its capability to output data in a high-quality, publishable format can greatly enhance the clarity and visual appeal of the overall publication in which the graph appears. Prior to the completion of this project, however, only those individuals possessing the programming knowledge and the time to actually write a specific Fortran program for the graphic display of their data could take advantage of this capability. The need for a quick and easy method of inputting a graph's parameters and data into the computer was determined by the author to be a significant one for the students and faculty comprising this academic community. Such a method would eliminate the need for extensive programming time and skill and would allow a greater portion of the community to make use of the computer's graphics capability.

A graphics package developed by ISSCO graphics software (referred to as Disspla) was purchased by the Naval Postgraduate School to be used for graphic display in conjunction with a variety of programming schemes. However, there seemed to be a lack of a knowledge base in the use of Disspla, and few programs existed that employed the system. An interactive and user-friendly program in which the user

is sequentially stepped through the graph development process seemed to best meet the perceived need for a quick and easy method of inputting graph data. Such a program would eliminate the need for programming skill, would reduce the time required to obtain a graph, and would allow anyone the opportunity to develop a high-quality graphic display of his data. In addition, it would have the intrinsic benefit of illustrating the sequence and information requirements of Disspla, perhaps stimulating interest in future program use of Disspla as a vehicle for putting data in graphical form.

B. GOALS

The objective of this program was to develop an interactive user-friendly capability for any individual using the IBM 3033 computer for the purpose of graphic display. The name of the program is Easyplot. In order to maximize the assets available at the Naval Postgraduate School, Easyplot was designed for use in conjunction with any graphics terminal capable of direct tie-in to the IBM 3033. When used with Disspla, it is capable of providing the guidance needed for the user to develop a graphic representation of his/her data. The types of graphs available for data display are two-dimensional (standard, semi-log, log-log) and three-dimensional (standard). Graph correction and alteration are possible with a minimum of effort. The program was designed for the use of anyone wishing to make high-quality graphs quickly and easily, with no programming involved.

II. APPROACH TO THE PROBLEM

The basic approach was to write a single computer program utilizing the ISSCO software system, Disspla, in Fortran IV for use on the IBM 3033. The program consists of a series of separate subroutines for each phase of graph development. These subroutines are then called in a logical sequence, guiding the user through the design process to produce the desired graph. The program is completely interactive. It prompts the user for all the necessary information to depict the user's data in the form of two- or three-dimensional graphs on any of the graphical devices which can be connected to the IBM 3033. The user is given the option of either inputting the curve data at the terminal or entering the stored curve data from a file. A help menu is provided for definition and clarification of terms. Once the user has achieved the desired form for his graph, an electrostatic copy or a Versatec plot can easily be made. Due to the interactive nature of the program, detailed knowledge of Disspla programming requirements is not necessary on the part of the user. However, prior user preparation in terms of complete data and final desired graph form is helpful for quick execution of the program.

III. SOLUTION TO THE PROBLEM

A working knowledge of Disspla and the method for its use in a Fortran program was necessary prior to beginning the task of designing the program. Once that was obtained, the first requirement was that each phase of the graph development process be compartmentalized into separate subroutines. The second requirement was that each subroutine direct questions to the user, elicit responses, verify that the responses fall within established parameters and then condition the responses for proper use by Disspla. The third requirement was that the calls for each subroutine be logically sequenced in an order which would step the user through the design of a graph. Once all the user's responses to the subroutine questions were collected and the locations of the data determined, the fourth requirement was that a visual display of the user's graph be shown. With this visual picture before the user, the editing phase could be entered. The fifth requirement was that the editing phase also be compartmentalized utilizing as many of the initial subroutines as possible. The user could then make as many corrections and/or changes as needed on his graph, displaying the updated version as often as required. The final requirement was that the completed graph be either stored for later reference (optional) and/or produced in hard copy on any of the various output devices available.

IV. RESULTS AND CONCLUSIONS

This program has been very effective in meeting the need of the Naval Postgraduate School community for a quick and easy method of creating computer-generated graphs. Constant feedback from program users during an extensive testing phase allowed for correction of all problems and incorporation of many recommendations. In final form, the program has a high degree of flexibility while remaining simple to use. Its continued widespread use among students beyond the testing phase and its active promotion by the computer center staff attest to its acceptance as a viable interactive graphics system. The quality of its output in two- and three-dimensional graphic format is excellent (see Appendix C). The time required for graphic production is minimal when compared to the time required for writing a separate and complete program for each desired graph.

The capability of the program could be enhanced in several ways. First, an improved method of filing the graphics data would lessen the amount of space taken on the user's A disk. Second, the choice of having more than one subplot area on a page could be added to allow for dual scales, graphs, etc. Third, the three-dimensional portion of the program could be expanded to include semi-log, log-log, and the ability to alter the perspective of viewing the graph.

APPENDIX A
USERS GUIDE TO THE EASYPLOT PROGRAM.

This program has been written with the user in mind. It is completely interactive and once the program has been loaded the user need only answer the questions presented to him.

Use the following procedure to invoke Easyplot:

1. Logon any IBM 3033 terminal.
2. Obtain the use of temporary storage space by entering the following:
 DEFINE STORAGE 1M (ENTER)
3. When PSW '00020000 00000000'
 appears on the screen type in:
 I CMS (ENTER)
4. At this point you are ready to start, type in:
 EASYPLOT (ENTER)
5. Follow the instructions given using the example graphs provided as a guide to input the appropriate graph data.

APPENDIX B

EXAMPLE DEMONSTRATION

```

LOGON and define storage 1m (enter)
CP ENTERED; DISABLED WAIT PSM '00020000 00000000'
I CMS (ENTER)
CMS SF VERSION 1.0 - 12/29/82
easyplot (ENTER)
B {120} R/O
C {121} R/O
EXECUTION BEGINS...

*** MESSAGE TO USER ***
SIMPLY ANSWER THE QUESTIONS AS PRESENTED!
A: ANY ERRORS MADE MAY BE CORRECTED LATER DURING EDITING.
B: TO USE YOUR OWN FILES FOR CURVE DATA INPUT, YOU MUST HAVE
C: A FIXED FILE 80 CHARACTERS IN LENGTH WITH A SPACE OR COMMA
   BETWEEN VALUES.
D: TO EXIT FROM THIS PROGRAM, ANSWER ANY QUESTION WITH -99.99.

*** DO YOU WISH TO CONTINUE WITH THIS PROGRAM? (Y OR N)

Y (ENTER)

WHICH TYPE GRAPH DO YOU WISH TO DEVELOP?

1. TWO-DIMENSIONAL GRAPH WITH STANDARD AXES
2. TWO-DIMENSIONAL SEMI-LOG GRAPH, WITH X AS THE LOG AXIS
3. TWO-DIMENSIONAL SEMI-LOG GRAPH, WITH Y AS THE LOG AXIS
4. TWO-DIMENSIONAL LOG-LOG GRAPH
5. THREE-DIMENSIONAL GRAPH WITH STANDARD AXES

? 1 (ENTER)

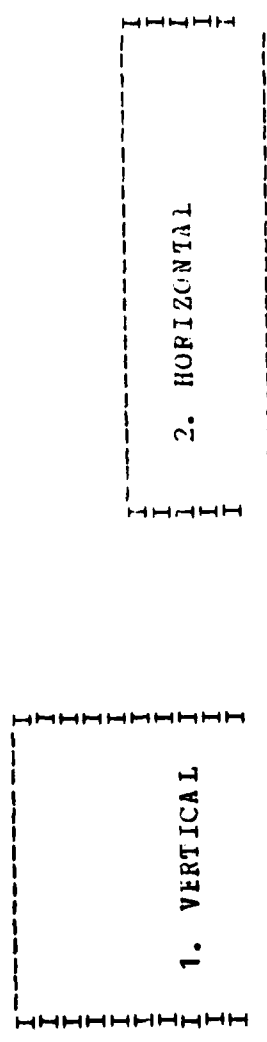
WHICH GRAPHICS DEVICE ARE YOU GOING TO BE USING?
1. TEK618, IBM 3277/TEC 618 DUAL-SCREEN
2. TEKTRONIX, ANY MODEL
3. COMPTON, USED WITH IBM 3278 TERMINAL, CUTPUT FROM THIS
4. PRINTER, USED WITH IBM 3278 TERMINAL, TO INPUT A GRAPH,
   DEVICE IS TRASH, BUT IT ALLOWS YOU WITH A GRAPHICS TERMINAL.
5. IBM 79, IBM 3279/COLOR IBM TERMINAL.

? 1 (ENTER)
>> USING A PRE-ALLOCATED DATASET FOR UNIT FT17F001.

```

IS THIS AN UPDATE OF AN OLD GRAPH? (Y OR N)

WHICH DIRECTION OF THE PAGE DO YOU DESIRE? (1 OR 2)



1 (ENTER)

DO YOU WANT AN EXAMPLE GRAPH TO LOOK AT? (Y OR N)

Y (ENTER)

(see Figure C.1)

LOOK AT THE DISPLAY SCREEN
ANSWER THE FOLLOWING QUESTIONS USING THE DISPLAY
AS REFERENCE. BOTH AXES ARE MARKED IN INCHES.
THE NORMAL PAGE SIZE IS EITHER (X BY Y):
8.5 X 11.0 FOR A VERTICAL PAGE
11.0 X 8.5 FOR A HORIZONTAL PAGE

DO YOU WISH TO CHANGE THE PAGE SIZE FROM THE ONE SHOWN? (Y OR N)

N (ENTER)

DISPLA WILL POSITION THE PLOT ON THE PAGE.
(ONE INCH BORDER IS NORMAL)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 6.00

WHAT IS THE LENGTH OF THE X-AXIS IN INCHES?

6 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 8.00

WHAT IS THE LENGTH OF THE Y-AXIS IN INCHES?

8 (ENTER)

WHAT IS THE TITLE OF THIS GRAPH?
(32 CHARACTERS MAX)

helicopter design (ENTER)

WHAT IS THE NAME OF THE X-AXIS?
(32 CHARACTERS MAX)

main rotor speed (rpm) (ENTER)

WHAT IS THE NAME OF THE Y-AXIS?
(32 CHARACTERS MAX)

load weight (lb) (ENTER)

DO YOU WISH TO HAVE A MESSAGE FOR THIS GRAPH? (Y OR N)
(I.E. SUBTITLE, FIGURE #, COMMENT,...)

Y (ENTER)

WHAT IS THE MESSAGE? (32 CHARACTERS MAX)

figure 1 (ENTER)

THE FOLLOWING QUESTIONS DETERMINE THE LOCATION OF THE MESSAGE
IN RELATION TO THE AXES ORIGIN.

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 5.00

WHAT IS THE X-LOCATION IN INCHES OF THE MESSAGE?

5 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS -0.70

WHAT IS THE Y-LOCATION IN INCHES OF THE MESSAGE?

-0.7 (ENTER)

DO YOU WISH TO HAVE A LEGEND FOR THIS GRAPH?
(Y OR N)

Y (ENTER)

THE FOLLOWING QUESTIONS DETERMINE THE LOCATION OF THE LOWER
LEFT CORNER OF THE LEGEND:

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 3.00

WHAT IS THE X-POINT IN INCHES OF THIS CORNER?

3 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 1.00

WHAT IS THE Y-POINT IN INCHES OF THIS CORNER?

?
5 (ENTER)

THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF THE X-AXIS:

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 0.0

WHAT IS THE VALUE OF X AT THE ORIGIN? (LEFT SIDE)

?
0 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 1.00000

WHAT IS THE X STEP INTERVAL IN YOUR UNITS?

?
100 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 6.00000

WHAT IS THE MAXIMUM VALUE OF THE X-AXIS? (RIGHT SIDE)
(ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)

?
500 (ENTER)

WHICH TYPE OF NUMBERS DO YOU WANT ON THE Y-AXIS?

1. REAL NUMBERS (I.E. 20.0)
2. INTEGER NUMBERS (I.E. 20)

?
1 (ENTER)

THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF THE Y-AXIS:

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 0.0

WHAT IS THE VALUE OF Y AT THE ORIGIN? (BOTTOM CORNER)

?
0 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 1.00000

WHAT IS THE Y STEP INTERVAL IN YOUR UNITS?

?
5 (ENTER)

** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS 8.00000

WHAT IS THE MAXIMUM VALUE OF THE Y-AXIS? (TCP CORNER)
(ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)

? 25 (ENTER)

WHICH TYPE OF NUMBERS DO YOU WANT ON THE Y-AXIS?

1. REAL NUMBERS (I.E: 20.0)
2. INTEGER NUMBERS (I.E: 20)

? 2 (ENTER)

THE FOLLOWING QUESTIONS PERTAIN TO THE GRID SYSTEM

DO YOU WANT THE GRAPH TO HAVE GRID LINES? (Y OR N)

Y (ENTER)

HOW MANY GRID LINES PER X-AXIS STEP INTERVAL?

? 1 (ENTER)

HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL?

? 2 (ENTER)

WHICH LINE PATTERN DO YOU DESIRE?

1. LINE, -----
2. DOT, ...
3. DASH, -----
4. CHNDCT, ...
5. CHNDSH, -----

? 2 (ENTER)

HOW MANY CURVES DO YOU WISH TO PLOT? (0 THRU 19)

? 1 (ENTER)

WHAT IS THE NAME OF CURVE 1?
(32 CHARACTERS MAX)

uh-1 (ENTER)

WHICH LINE PATTERN DO YOU DESIRE?

1. LINE, -----
2. DOT, ...
3. DASH, -----
4. CHNDOT, ...
5. CHNDSH, -----

? 1 (ENTER)

WHICH METHOD DO YOU WISH TO USE TO INPUT DATA FOR THIS CURVE?

1. TYPE IN DATA ONE PAIR AT A TIME.
2. USE DATA FILE INPUT.

? 1 (ENTER)

HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE? (100 MAX)

? 5 (ENTER)

MARKER SYMBOL INFORMATION

A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOLS DESIGNATED
(*)-----*-----*-----*
ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.

A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBOLS ONLY.
(*)-----*-----*-----*

EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND CONNECTED
BY A LINE)

HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DISPLAYED?

? 1 (ENTER)

X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
POINT 1 OF 5 POINTS.

? 499, 1 (ENTER)

X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
POINT 2 OF 5 POINTS.

? 400, 3 (ENTER)

X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
POINT 3 OF 5 POINTS.

? 300, 4 (ENTER)

X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
POINT 4 OF 5 POINTS.

200, 10 (ENTER)

X-COORDINATE, Y-COORDINATE IN YOUR UNITS,
POINT 5 OF 5 POINTS.

100, 24 (ENTER)

DO YOU WISH TO CHECK THE DATA INPUT FOR CURVE 1 ? (Y OR N)

Y (ENTER)

CURVE NUMBER 1

	X-VALUE	Y-VALUE
1	4.990000E+02	1.000000E+00
2	4.000000E+02	3.000000E+00
3	3.000000E+02	4.000000E+00
4	2.000000E+02	1.000000E+01
5	1.000000E+02	2.400000E+01

ARE THESE DATA POINTS CORRECT FOR CURVE 1? (Y OR N)

Y (ENTER)

DO YOU WANT THIS CURVE DATA FILED FOR YOU? (Y OR N)

Y (ENTER)

**REFERENCE - DATA FOR CURVE 1 HAS BEEN FILED UNDER
CURVE 01 DATA, THIS FILE WILL NOT NECESSARILY BE UPDATED
BUT COULD BE USED TO INPUT CURVE DATA LATER.

(see Figure C.7)

DO YOU WISH TO UPDATE THIS GRAPH? (Y OR N)

Y (ENTER)

WHICH AREA WOULD YOU LIKE TO UPDATE?

1. PAGE SIZE
2. PLOT AREA
3. GRAPH TITLE
4. X-AXIS TITLE
5. Y-AXIS TITLE
6. TYPE LETTERING
7. MESSAGE STATEMENT
8. MESSAGE LOCATION CHANGE
9. LEGEND LOCATION CHANGE
10. X-AXIS SCALE
11. Y-AXIS SCALE
12. GRID
13. CHANGE CURVES
14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURVES
15. HELP
16. PLCT THE UPDATED GRAPH
17. NO CHANGES

? 6 (ENTER)

(see Figure C.6)

WHAT IS THE NUMBER FOR THE TYPE LETTERING YOU DESIRE?

? 14 (ENTER)

WHICH AREA WOULD YOU LIKE TO UPDATE?

1. PAGE SIZE
2. PLOT AREA
3. GRAPH TITLE
4. X-AXIS TITLE
5. Y-AXIS TITLE
6. TYPE LETTERING
7. MESSAGE STATEMENT
8. MESSAGE LOCATION CHANGE
9. LEGEND LOCATION CHANGE
10. X-AXIS SCALE
11. Y-AXIS SCALE
12. GRID
13. CHANGE CURVES
14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURVES
15. HELP
16. PLCT THE UPDATED GRAPH
17. NO CHANGES

? 16 (ENTER)

(see Figure C.8)

WHICH AREA WOULD YOU LIKE TO UPDATE?

1. PAGE SIZE
2. SUBPLOT AREA
3. GRAPH TITLE
4. X-AXIS TITLE
5. Y-AXIS TITLE
6. TYPE LETTERING
7. MESSAGE STATEMENT
8. MESSAGE LOCATION CHANGE
9. LEGEND LOCATION
10. X-AXIS SCALE
11. Y-AXIS SCALE
12. GRID
13. CHANGE CURVES
14. INPUT A COMPLETE NEW SET OF CURVES, THIS CLEARS OLD CURVES
15. HELP
16. PLOT THE UPDATED GRAPH
17. NO CHANGES

? 17 (ENTER)

WOULD YOU LIKE THIS GRAPH DATA FILED? (Y OR N)
(GRAPH MUST BE FILED TO MAKE A HARD COPY)

Y (ENTER) UNDER WHAT NAME WOULD YOU LIKE THIS DATA FILED?

helodesn (ENTER)

THIS DATA HAS BEEN SAVED IN FILE NAMED "HELODESN" DATA.

DO YOU WISH TO DEVELOP ANOTHER GRAPH? (Y OR N)

N (ENTER)

END OF DISSELA 9.0 -- 22572 VECTORS GENERATED IN 3 PLOT FRAMES.

PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

5192 VIRTUAL STORAGE REFERENCES; 61 READS; 2 WRITES.

```

*****
DO YOU WANT A VRSTEC HARD COPY? (Y OR N)

** NCTE **

1. THIS WILL REQUIRE BETWEEN 2% TO 20% OF YOUR A DISK
   DEPENDING ON THE NUMBER OF SIZE OF YOUR GRAPH(S).
2. USE YOUR PROJECT NUMBER IF YOU HAVE ONE,
   IF NOT, USE YOUR USERID NUMBER WITH NO "P".
3. YOUR GRAPHS WILL BE SENT TO THE COMPUTER CENTER
   USING THE NAME "POP(USERID)"
*****

Y (ENTER)
EXECUTION BEGINS.
>> USING A PRE-ALLOCATED DATASET FOR UNIT FT17F001.

      WHAT IS THE FILE NAME OF YOUR GRAPH?

helodesh (ENTER)
>> USING A PRE-ALLOCATED DATASET FOR UNIT FT18F001.

      DO YOU WISH TO PLOT ANOTHER GRAPH? (Y OR N)

N (ENTER)

END OF DISSILA 9.0 -- 16086 VECTORS GENERATED IN 1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
7030 VIRTUAL STORAGE REFERENCES; 8 READS; 0 WRITES.

Please enter your project code.
1234 (ENTER)

CREATING NEW FILE:
CREATING NEW FILE:
DASD 122 DETACHED
*****

YOUR GRAPH CAN BE PICKED UP AT THE COMPUTER CENTER
UNDER THE FOLLOWING NAME "POP(YOUR USERID)".
*****

```

APPENDIX C

FIGURES

EXAMPLE GRAPH

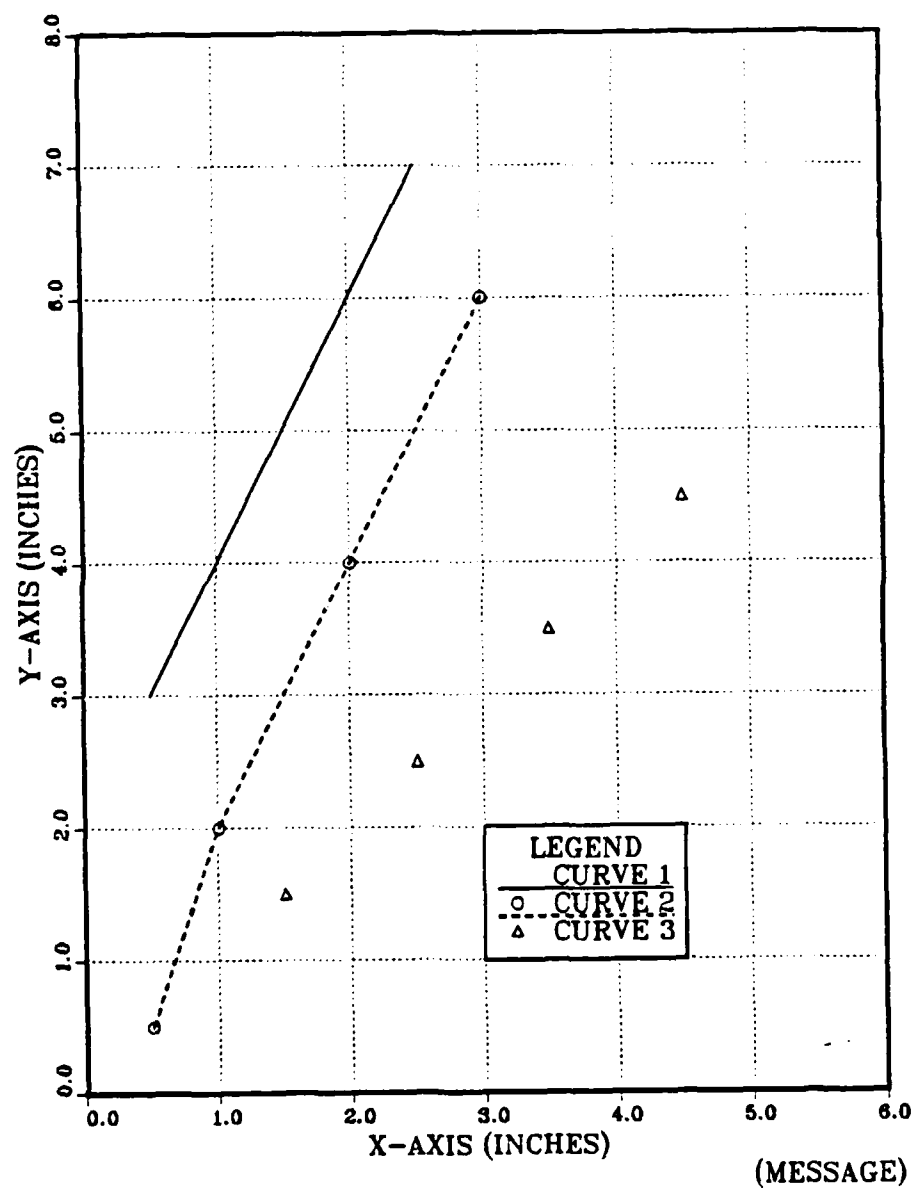


Figure C.1 Vertical Two-dimensional Standard Axes Example.

EXAMPLE GRAPH

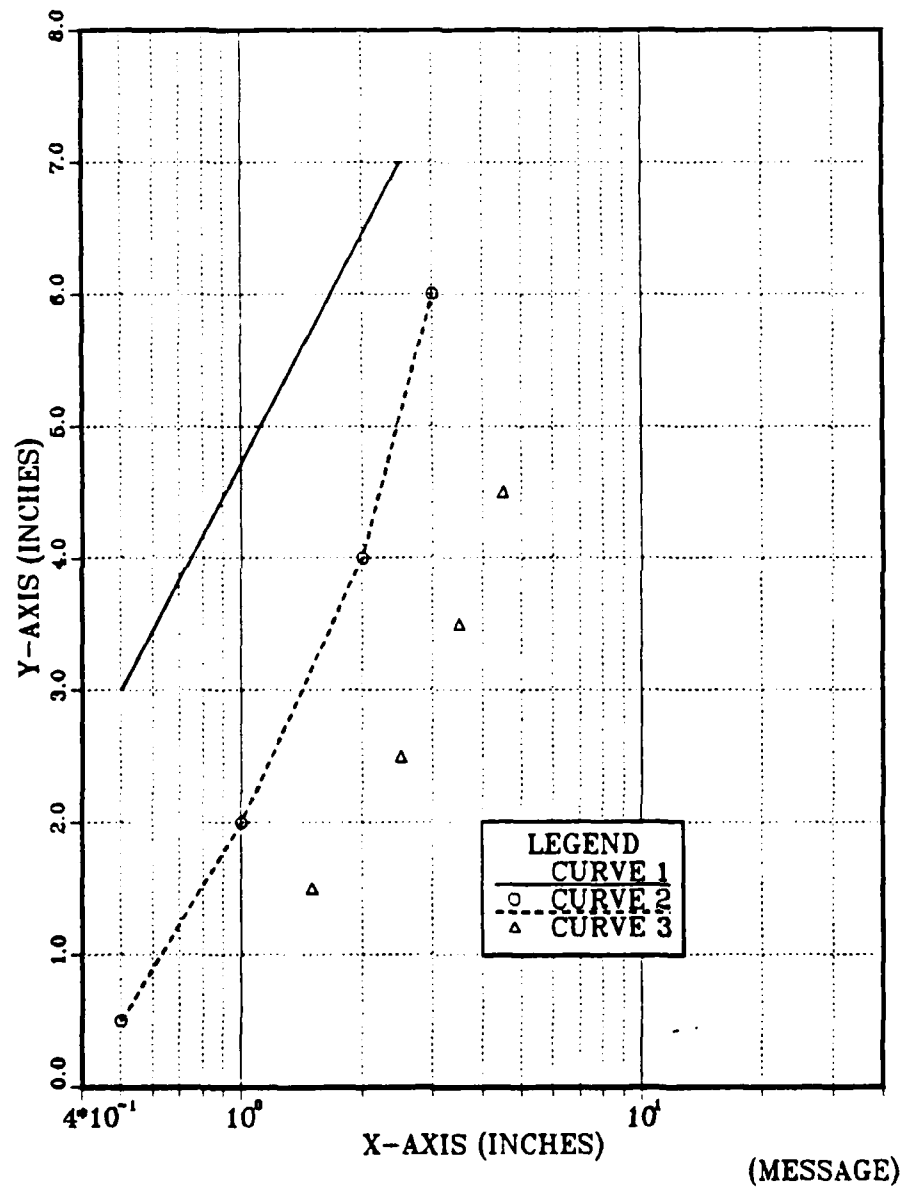


Figure C.2 Two-dimensional Semi-log Axes Example.

EXAMPLE GRAPH

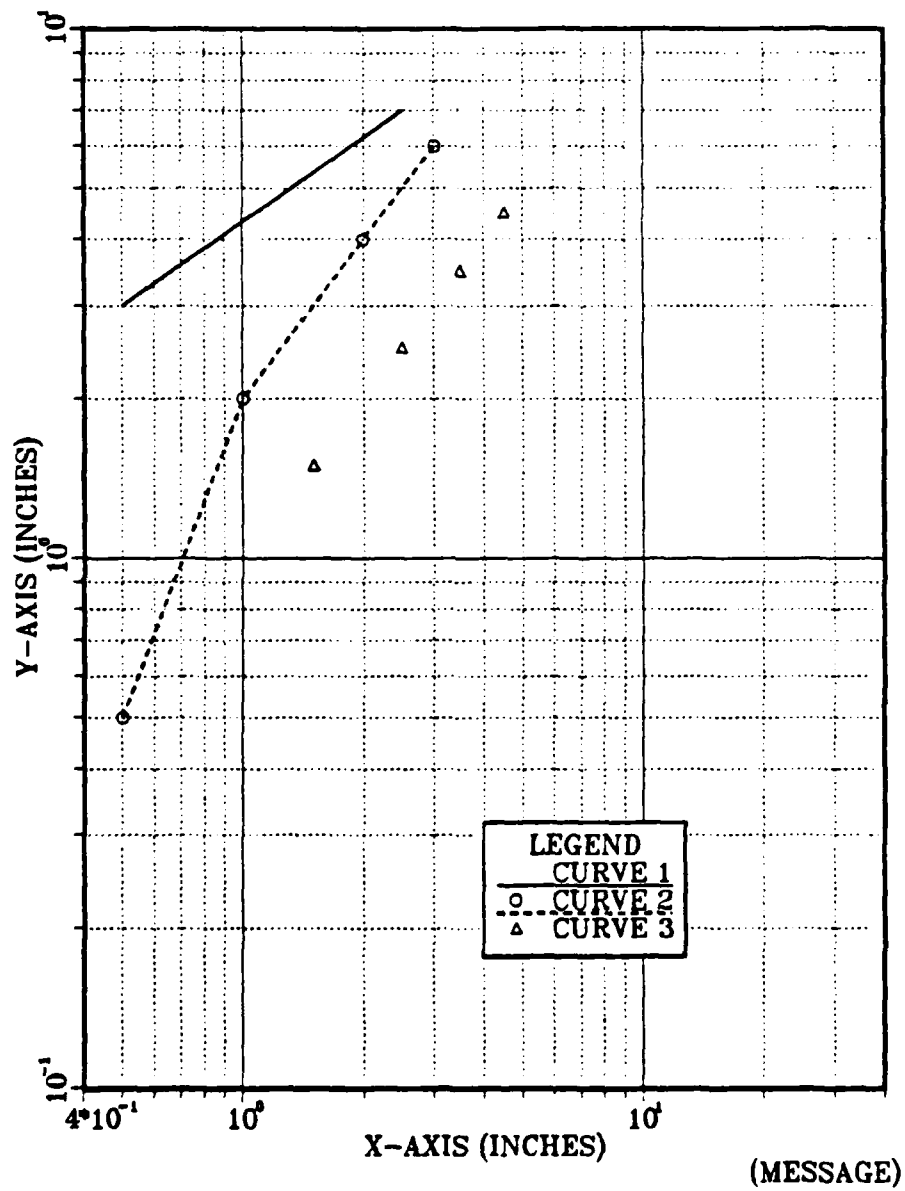
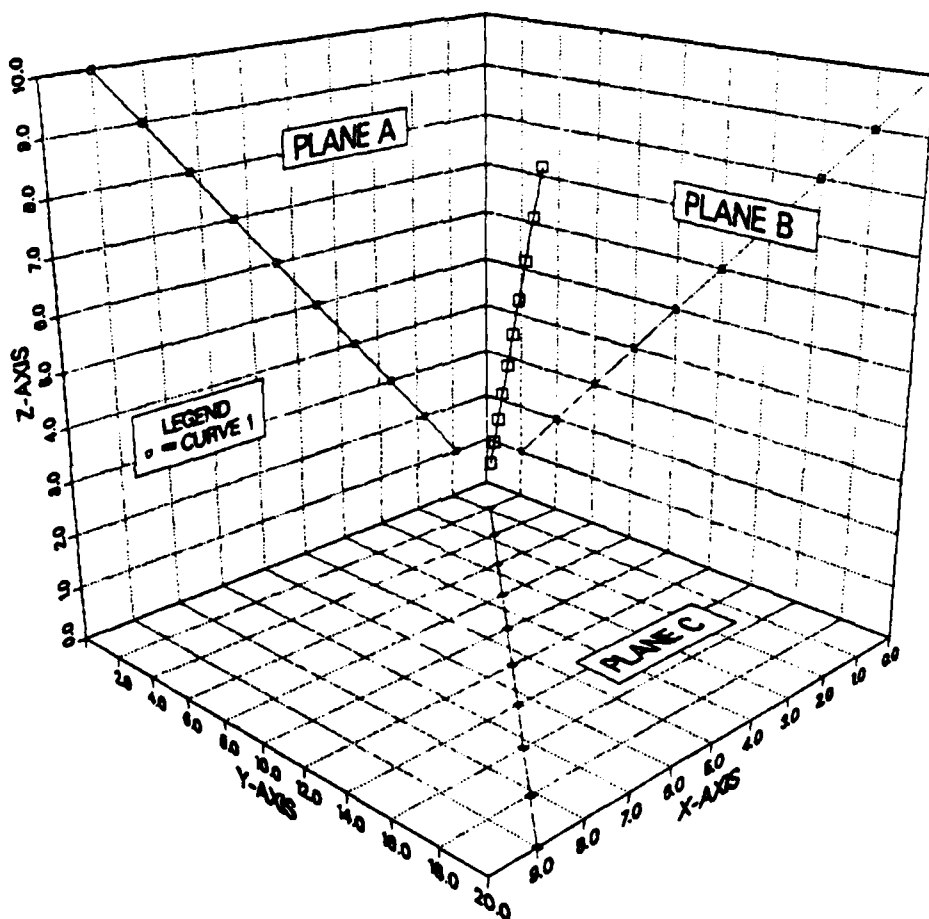


Figure C.3 Two-dimensional Log-log Axes Example.

3-D EXAMPLE GRAPH



(MESSAGE)

Figure C.4 Three-dimensional Standard Axes Example.

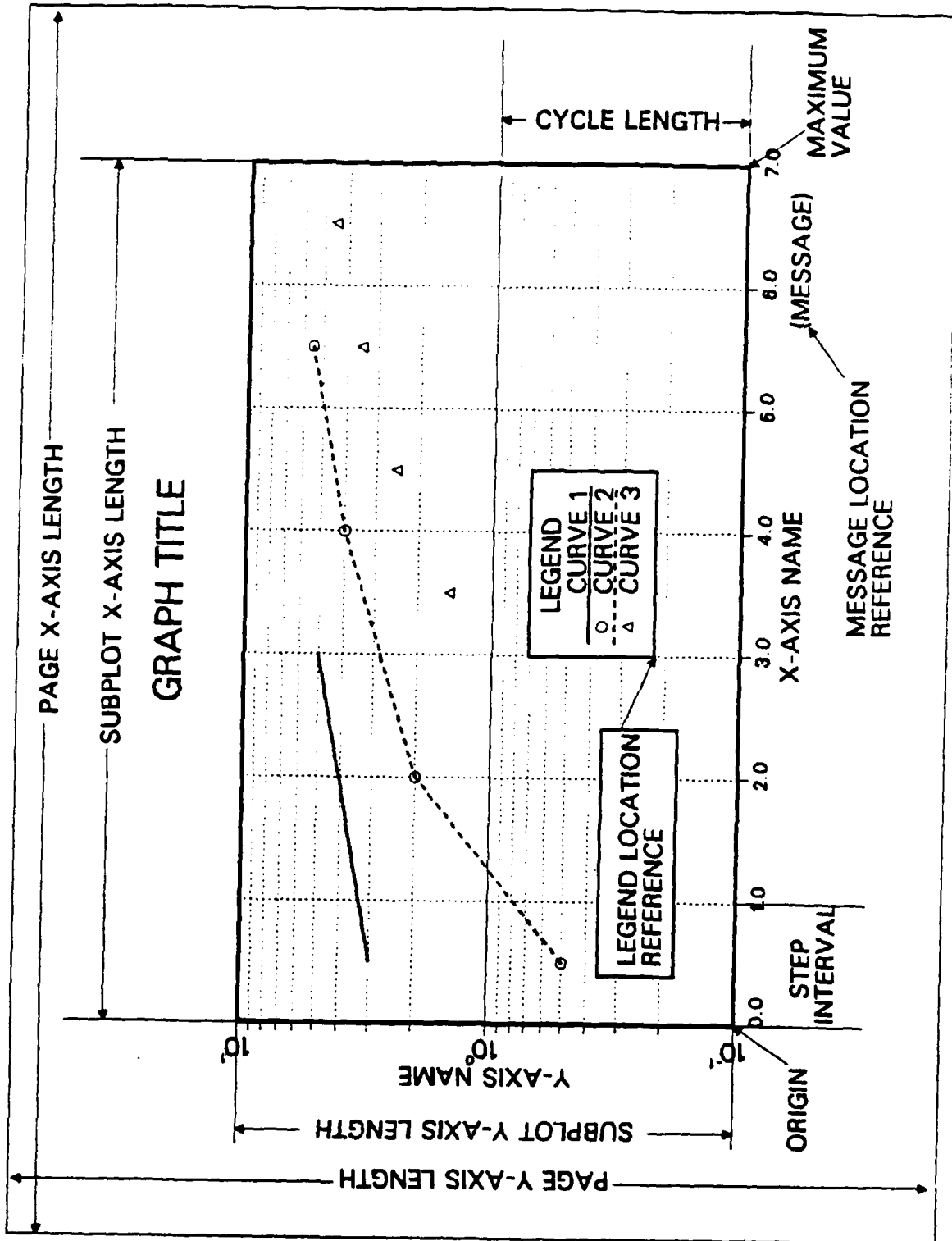


Figure C.5 Help File Example Graph.

EXAMPLES OF CHARACTER FONTS AVAILABLE:

1. STANDARD
2. CARTOG
3. SIMPLX
4. SCmplX
5. COMPLX
6. DUPLX
7. TRIPLX
8. GOTHIC
9. FUTURA
10. SERIF
11. LOGO
12. FASHON
13. SWISSL
14. SWISSM
15. SWISSB

Figure C.6 Lettering Style.

HELICOPTER DESIGN

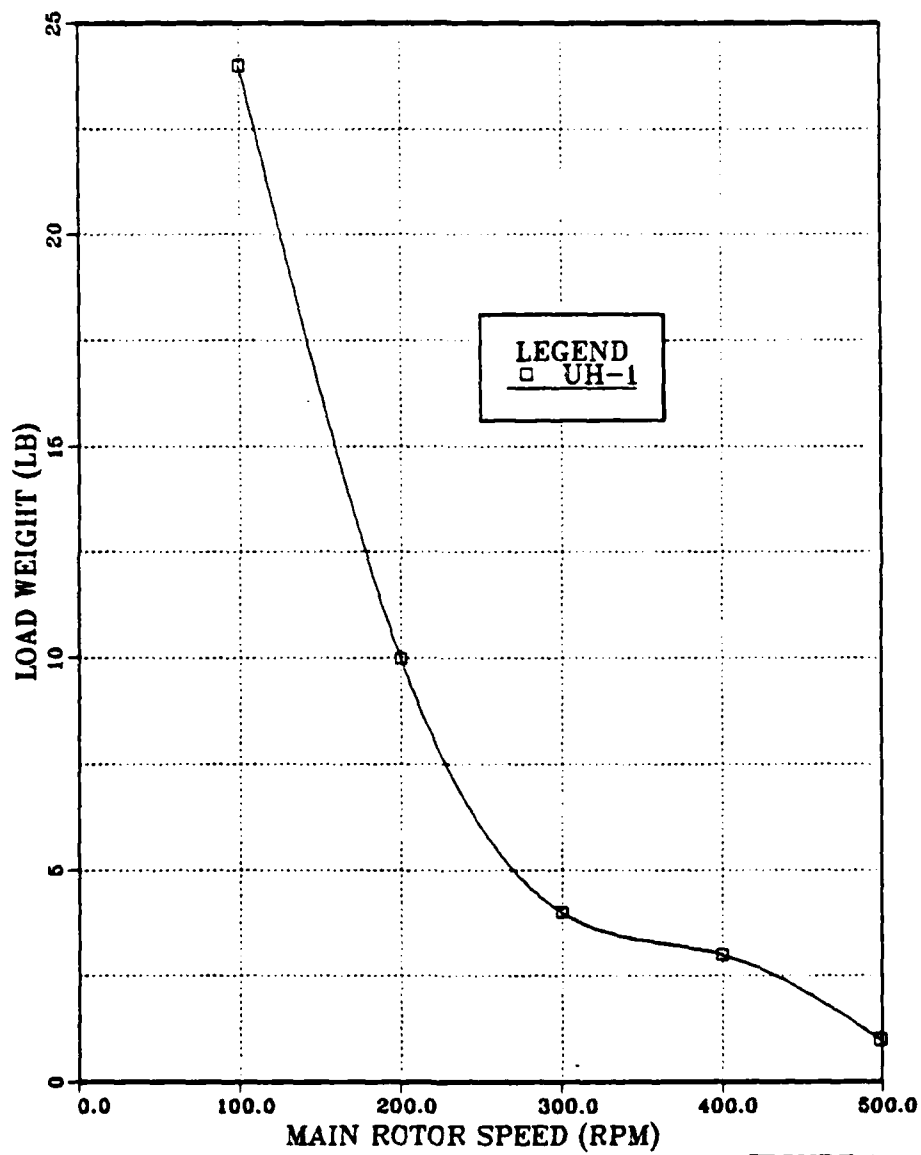


FIGURE 1

Figure C.7 Demonstration Graph Initial.

HELICOPTER DESIGN

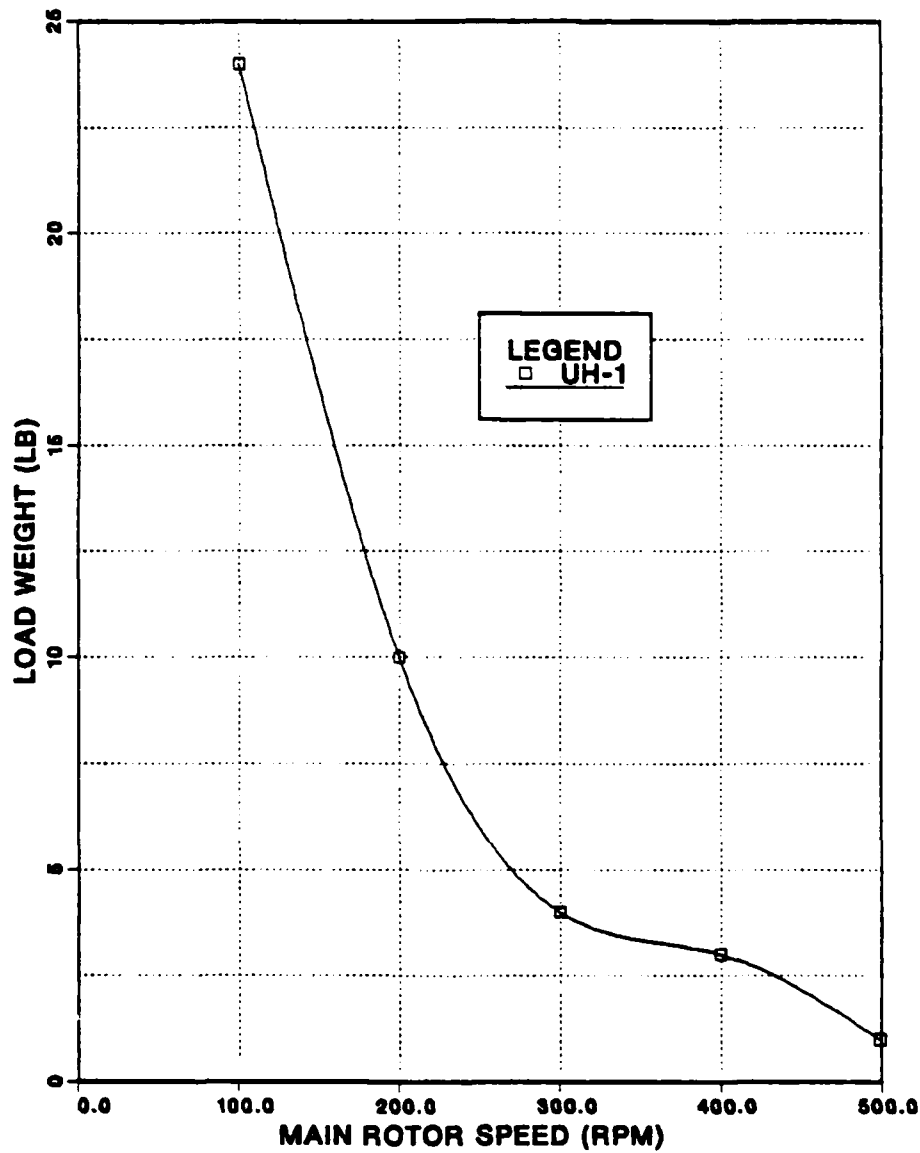


FIGURE 1

Figure C.8 Demonstration Graph Final.

FORTTRAN PROGRAM

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C**** ZVALUE      SUBROUTINE SETTING THE SCALE ON THE Z-AXIS.
C**** GRJDD     SUBROUTINE DETERMINING THE GRID LINE PATTERN.
C**** CRVS      SUBROUTINE DETERMINING CURVE PLOTS.
C**** VERT      SUBROUTINE DISPLAYING THE VERTICAL GRAPH EXAMPLE
C****          FOR TWO DIMENSIONS.
C**** HORT      SUBROUTINE DISPLAYING THE HORIZONTAL GRAPH EXAMPLE
C****          FOR TWO DIMENSIONS.
C**** LETEXM    SUBROUTINE DISPLAYING TYPE OF LETTERING AVAILABLE.
C**** PLOT2D    SUBROUTINE FOR A GRAPH IN TWO DIMENSIONAL
C****          COORDINATES.
C**** LETTEE    SUBROUTINE WHICH COUNTS THE NUMBER OF LETTERS AND
C****          ADDS THE $ FOR CENTERING CHARACTER STRINGS PER
C****          DISSEA REQUIREMENTS.
C**** CHANGE    SUBROUTINE WHICH CONVERTS CHARACTER ARRAYS FROM
C****          TWO TO ONE DIMENSIONS PER FORTRAN CONSFANTS.
C**** SWITCH    SUBROUTINE WHICH CONVERTS NUMBER ARRAYS FROM
C****          TWO TO ONE DIMENSIONS PER FORTRAN CONSTRAINTS.
C**** USPFIL    SUBROUTINE TO GET FILE FOR USER TO PLOT A CURVE.
C**** FILE      SUBROUTINE DEFINING FILE FOR USER.
C**** REED      SUBROUTINE TO READ THE STORED GRAPH'S DATA FILE.
C**** REEDRE    SUBROUTINE TO READ REAL VALUES.
C**** REEDIN    SUBROUTINE TO READ INTEGER VALUES.
C**** ZERO      SUBROUTINE TO SET ALL ARRAYS TO INITIAL VALUES.
C**** YOPN      SUBROUTINE WHICH CHECKS THE ANSWER YES OR NO
C****          THEN ASSIGNS YES = 1, NO = 2, ERROR = 3.
C**** REVISE    SUBROUTINE TO REVISE OLD GRAPHS.
C**** UPCRVS    SUBROUTINE TO UPDATE DECISIONS ON CURVES AND DATA.
C**** DATCHK    SUBROUTINE TO VERIFY DATA FOR EACH CURVE.
C****

```



```

C
C      INTEGER NN, IDIC
C      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C      X(18,100), Y(18,100), LINE(72), XPLCT(100), YPLCT(100), FILPLT(2)
C      E, ZPLCT(100), Z(18,100), JCOLOR(25)
C
C      DECISION OF WHICH TYPE GRAPH THE USER WISHES TO DEVELOP.
C
C      CALL ZERO
C      CALL FRTCMS ('CIRSCRN ')
C      WRITE(6,610)
C
C      SUBROUTINE YORN DETERMINES YES, NO, OR ERROR(YES=1, NO=2, ERROR=3).
C
C      CALL YORN (IDIC)
C      GO TO (9,90,5) IDIC
C      CALL FRTCMS('CIRSCRN ')
C      WRITE(6,620)
C
C      SUBROUTINE REEDIN READS ANSWER.
C
C      CALL REEDIN (NN, E15)
C      IF (NN .GT. 0 .AND. NN .LT. 6) GO TO 20
C      CALL ERROR4 (1,5)
C      GO TO 10
C      IFRAY(5) = NN
C      GO TO (30,30,30,30,50), NN
C
C      DEVELOPS TWO-DIMENSIONAL GRAPHS.
C
C      CALL TDCON
C      GO TO 90
C
C      DEVELOPS THREE-DIMENSIONAL GRAPHS WITH STANDARD AXES.
C
C      CALL THREEED
C      GO TO 90
C      CCNTINUE
C      STOP
C
C      FORMAT STATEMENTS.
C
C      610      FORMAT(//15X, '**** MESSAGE TO USER ****',
C      E/10X, 'A. SIMPLY ANSWER THE QUESTIONS AS PRESENTED!',
C      E/10X, 'B. ANY ERRORS MADE MAY BE CORRECTED LATER DURING EDITING.',
C      E/10X, 'C. TO USE YOUR OWN FILES FOR CURVE DATA INPUT, YOU MUST HAVE
C      E/13X, 'A FIXED FILE, 80 CHARACTERS IN LENGTH WITH A SPACE OR COMMA',
C      E/13X, 'BETWEEN VALUES.'

```

[illegible]


```

C**** IFRAY(5) THE TYPE OF GRAPH USER DESIRES TO DEVELOP.
C*****
C*****
C***** SUEROUTINE TDCCN
C*****
C C DECLARATIONS.
C C
C INTEGER I, IDIC
C REAL RR
C COMMON RELRAY(6,18), INGRAY(7,13), LETRAY(10,24), IFRAY(11)
C &,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
C &,ZPICT(100),Z(18,100),JGLOBAL(25)
C C SUBROUTINE EX2D DETERMINES WHICH GRAPHICS DEVICE IS BEING USED.
C C
C CALL FRTCMS ('CIRSCRN ')
C CALL EX2D
C CALL FRTCMS ('CIRSCRN ')
C C DECISION TO INPUT A NEW GRAPH OR EDIT AN OLD ONE.
C C
C WRITE(6,610)
C C SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C C
C CALL YOEN(IDIC)
C GO TO (30,20,10),IDIC
C C SUBROUTINE TWOD INPUTS DATA FOR A NEW GRAPH.
C C
C CALL TWOD
C GO TO 70
C C DETERMINES FILE NAME OF GRAPH USER WISHES TO EDIT.
C C
C WRITE(6,620)
C READ(5,END=35) (FILPLT(I),I=1,2)
C CALL FRTCMS('EXEC ',CHECK,FILPLT ,NN)
C READ(5*,) NN
C CALL FRTCMS ('CIRSCRN ')
C IF (NN.EQ. 0) GO TO 34
C WRITE(6,660)
C CALL REEDIN(NN,832)
C IF (NN.GT. C.AND. NN .LT. 3) GC TO 33
C CALL ERROR4 (1,2)
C GO TO 31
C GC TO (30,20),NN

```

```

34 CALL FRTCMS('FILEDET','3
CALL FRTCMS('CIRSCRN',')
GO TO 40
35 CALL ERROR8
GC TO 30
C SUBROUTINE REED INEUTS GRAFH DATA FROM USER'S FILE.
C
40 NN = IFRAY(5)
CALL REED
IFRAY(5) = NN
C SUBROUTINE PLCT2D PLOTS USER'S 2-D GRAFH.
C
C NN = IFRAY(5)
GO TO (50,50,50,50,60),NN
50 CALL FLOT2D
GC TO 70
C SUBROUTINE PLOT3D PLOTS USER'S 3-D GRAFH.
C
60 CALL FLOT3D
CALL REV3D
GO TO 70
C DECISION FOR USER TO CONTINUE EDITING GRAFH.
70 WRITE (6,630)
C SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
C CALL YORN(IDIC)
GC TO (80,90,70),IDIC
C SUBROUTINE REVISE EDITS USER'S GRAFH.
C
80 CALL REVISE
90 CCNTINUE
C SUBROUTINE FILE FILES GRAFH DATA UNDER USER'S DEFINED FILE NAME
C FOR FURTHER USE.
C
C CALL FRTCMS('CIRSCRN',')
CALL FILE
C DECISION FOR USER TO CONTINUE WORKING ON A NEW GRAFH.
C
100 WRITE (6,640)
C

```



```

*****
C***** SUROUTINE EX2D *****
C
C DECLARATIONS.
C
      INTEGERNN IDIC
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
      & ,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLCT(100),FILPLT(2)
      & ,ZPLOT(100),Z(18,100),JCOLOR(25)
      CALL FRCHMS(,CIRSCRN)
C
C DETERMINES THE SIZE OF THE BUFFER TO BE USED.
C
      CALL IRGBUF
C
C DETERMINES THE TYPE OF GRAPHICS DEVICE BEING USED AND IMPLEMENTS
C APPROPRIATE DISSPIA CALL.
C
      IFRAY(11) = 2
      WRITE(6,610)
      CALL FLEDIN(NN,815)
      IFRAY(2) = NN
      IF (NN.GT. C.AND. NN.LT. 6) GO TO 20
      GO TO 10
      CALL ERRCH4(1,5)
      GO TO 30
      CALL PTK4
      GO TO 40
      CALL COMPRES
      GO TO 35
      CALL PRTPLT(72,6)
      GO TO 90
      CALL PRTPLT(72,6)
      CALL IBM79
      GO TO 90
      CONTINUE
      RETURN
C
      10
      15
      20
      30
      35
      40
      50
      60
      70
      C70
      90
C

```

```

C  FORMAT STATEMENTS.
C 610  FORMAT(//10X,'WHICH GRAPHICS DEVICE ARE YOU GOING TO BE USING?',
      &/15X,'1. TEK618, IBM 3277/TEC 618 DUAL-SCREEN',
      &/15X,'2. TEKTRONIX, ANY MODEL',
      &/15X,'3. COMPRS, USED WITH IBM 3278 TERMINAL, CUTOUT FROM THIS',
      &/15X,'4. PRPLOT, USED WITH IBM 3278 TERMINAL, INPUT A GRAPH',
      &/18X,'5. DEVICE IS TRASH, BUT IT ALLOWS YOU TO INPUT A GRAPH',
      &/18X,'6. AND SAVE IT FOR LATER USE WITH A GRAPHICS TERMINAL',
      &/15X,'7. IBM 79, IBM 3279/COLOR IBM TERMINAL',
      &/15X,'8. ')
C 620  FORMAT(//10X,'DO YOU WANT THE COLOR FEATURE OF THIS DEVICE?',
      &/10X,'(Y OR N)')
C  ENCL
C *****
C ***** EXAMPL *****
C *****
C ***** SUBROUTINE TO DISPLAY CHOICES OF GRAPH ORIENTATION. *****
C *****
C ***** VARIABLES AND CONSTANTS *****
C *****
C ***** NN DETERMINES WHICH PAGE EXAMPLE USER DESIRES. *****
C *****
C ***** SUEROUTINE EXAMEL *****
C *****
C  DECLARATIONS.
C
C  INTEGER NN
C  COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C  &,X(18,100),Y(18,100),LINE(72),XELOT(100),YPIC(100),FILPLT(2)
C  &,ZPIC(100),Z(18,100),JCOLOR(25)
C  CALL FRICMS('CIRSCRN')
C
C  DETERMINES HOW THE USER WANTS THE GRAPH DISPLAYED ON THE PAGE.
C
C 10  WRITE (6,615)
C  CALL REEDIN(NN,820)
C  IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 30
C  CALL ERRCR4 (1,2)
C  GO TO 10
C
C 20
C
C  DETERMINES IF USER WISHES TO HAVE AN EXAMPLE PAGE.
C
C 30  WRITE (6,620)
C
C  SUEROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).

```

[illegible]

[illegible]

```

E/10X, 'ANSWER THE FOLLOWING QUESTIONS USING THE DISPLAY.
E/10X, 'AS REFERENCE. BOTH AXES ARE MARKED IN INCHES. //10X,
E/10X, 'THE NORMAL PAGE SIZE IS EITHER (X BY Y): //
E13X, '8.5 X 11.0 FOR A VERTICAL PAGE. //10X
E13X, '11.0 X 8.5 FOR A HORIZONTAL PAGE. //10X
E/10X, 'DO YOU WISH TO CHANGE THE PAGE SIZE FROM THE ONE SHOWN? (Y OR N).
E)
620 FORMAT(/10X, 'WHAT IS THE LENGTH OF YOUR PAGE PARALLEL TO THE X-
    AXIS IN INCHES?')
630 FORMAT(/10X, 'WHAT IS THE LENGTH OF YOUR PAGE PARALLEL TO THE Y-
    AXIS IN INCHES?')
640 FORMAT(/10X, '** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
    //F6.2)
    END

```

```

C*****
C***** SUBPLOT
C*****
C***** SUBROUTINE TO DETERMINE THE TWO-DIMENSIONAL
C***** SUBPLOT AREA.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** RELRAY(1,1) VALUE OF HORIZONTAL PAGE LENGTH.
C***** RELRAY(1,2) VALUE OF VERTICAL PAGE LENGTH.
C***** RELRAY(1,3) VALUE OF HORIZONTAL SUBPLOT LENGTH.
C***** RELRAY(1,4) VALUE OF VERTICAL SUBPLOT LENGTH.
C***** R DUMMY REAL VALUE.
C*****
C***** SUEROUTINE SUBPLOT
C*****

```

```

C C DECLARATIONS.
C C
C REAL R
C COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C E, X(18,100), Y(18,100), LINE(72), XPLCT(100), YPLCT(100), FILPLOT(2)
C E, ZPLCT(100), JCOLOR(25)
C C INSTRUCTS USER ON SUBPLOT AREA AND DETERMINES X-AXIS LENGTH.
C C
C 10 WRITE (6,610) RELRAY(1,3)
C WRITE (6,630)
C WRITE (6,615)

```

[illegible]


```

C ASKS USER TITLE OF Y-AXIS.
C
10 CALL CHANGE(4)
   WRITE(6,600) (LINE(I), I=1,9)
   WRITE(6,660)
   READ(5,510) END=15) (LETRAY(K,4), K=1,9)
   CALL LETTER(4, JJ)
   IF (JJ.LT.10) GO TO 20
   CALL ERFCR3
   GO TO 10
15 CALL ERRCR8
   GO TO 10
20 RETURN
C
C FORMAT STATEMENTS.
C
510 FORMAT (9A4)
600 FORMAT (16X, 9A4)
610 FORMAT (16X, WHAT IS THE NAME OF THE Y-AXIS?'/20X,
      & , (32 CHARACTERS MAX) ')
      END
C*****
C***** Z AXIS
C*****
C***** SUBROUTINE REQUESTING TITLE OF Z-AXIS.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** LETRAY(9,1) TITLE OF Z-AXIS.
C*****
C***** K INDEX.
C*****
C***** JJ NUMBER OF CHARACTERS IN CHARACTER STRING.
C*****
C***** SUEROUTINE ZAXIS
C*****
C C DECLARATIONS.
C
C INTEGER JJ, K
C COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C & , X(18,100), Y(18,100), LINE(72), XPLCT(100), YPLCT(100), FILPLT(2)
C & , ZPCT(100), Z(18,100), JCOLOR(25)
C
C ASKS USER TITLE OF Z-AXIS.
C
C CALL CHANGE(1)

```



```

30      GC TO 90
      CALL LASH
40      GO TO 90
      CALL CHNDOT
50      GO TO 90
      CALL CHNDSH
      GO TO 90
90      RETURN
      END
*****
C***** FITTYF
C*****
C***** SUBROUTINE REQUESTING THE TYPE OF CURVE FIT DESIRED
C***** IN DRAWING THE VARIOUS CURVES.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** INGRAY (4,LP) STORES THE TYPE OF CURVE FIT DESIRED
C***** BY THE USER.
C*****
C***** RELRAY (4,4) THE AMOUNT OF TENSION USED WITH DISSPLA
C***** CALL RASPLN.
C*****
C***** NN DUMMY VARIABLE FOR TYPE OF CURVE FIT.
C*****
C***** LE THE CURVE NUMBER.
C*****
C*****
C***** SUBROUTINE FITTYF (LP)
C*****
C C DECLARATIONS.
C C
      INTEGER NN, LP
      COMMON RELRAY (6,18), INGRAY (7,18), LETRAY (10,24), IFRAY (11)
      E, X (18,100), Y (18,100), ILINE (72), XPLCT (100), YPLCT (100), FILPLT (2)
      E, ZPLCT (100), Z (18,100), JCOLOR (25)
C C ASKS USER TYPE OF CURVE INTERPOLATION DESIRED.
C C
      CALL FRTCMS ('CIRSCRN ')
      WRITE (6,610)
      CALL REEDIN (NN, E50)
      IF (NN.GT. 6.AND. NN.LT. 9) GO TO 20
      CALL ERRCF4 (1,8)
      GO TO 10
15      GO TO 10
20      INGRAY (4,LP) = NN
      GO TO (40, 29, 40, 40, 40, 40), NN

```

[illegible]

```

      INTEGER NN, LP
      COMMON RELRAY (6,18), INGRAY (7,18), LETRAY (10,24), IFRAY (11)
      &, X (18,100), Y (18,100), LINE (72), XPLLOT (100), YPLCT (100), FILPLT (2)
      &, ZPLOT (100), Z (18,100), JCOLOR (25)

```

C EXECUTES THE TYPE OF CURVE SMOOTHING DESIRED.

```

      NN = INGRAY (4, IF)
      IF (NN.EQ.0) GO TO 10
      GO TO (10, 20, 30, 40, 50, 60, 70, 80), NN
      CALL SPLINE
      GO TO 90
      CALL LINEAR
      GO TO 90
      CALL RASPLN (REIFAY (5, LP))
      GO TO 90
      CALL FOLY3
      GO TO 90
      CALL FARA3
      GO TO 90
      CALL FOLY5
      GO TO 90
      CALL FARA5
      GO TO 90
      CALL STEP
      GO TO 90
      GO TO 90
      RETURN
      END

```

```

C*****
C***** COLOR
C*****
C***** SUBROUTINE THAT EXECUTES THE COLOR SELECTION DESIRED.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** NN DUMMY VARIABLE FOR COLOR BEING SELECTED.
C*****
C***** LP DUMMY VARIABLE FOR COLOR BEING SELECTED.
C*****
C*****
C***** SUROUTINE COLOR (ICOLOR)
C*****
C*****

```

C DECLARATIONS.

```

      INTEGER I, LP
      COMMON RELRAY (6,18), INGRAY (7,18), LETRAY (10,24), IFRAY (11)
      &, X (18,100), Y (18,100), LINE (72), XPLLOT (100), YPLCT (100), FILPLT (2)

```

```

      E, ZPICT(100), 2(18,100), JCOLOR(25)
      IF IP = 1
      IC = ICOLOR
      IF (ICOLOR.NE. 0) GO TO 10
      C ASKS USER THE COLOR HE WISHES TO USE.
      C 1
      WRITE(6,610)
      CALL REEDIN(NN,85)
      IF (NN.GT. 0) AND. NN.LT. 9) GO TO 8
      CALL ERRCF4 (1,8)
      GO TO 1
      5
      ICOLOR = 1
      RETURN
      8
      ICCCLR = NN
      CALL IRTCMS('CIRSCRN ')
      9
      RETURN
      10
      IP = ICOLOR
      C EXECUTES THE COLOR PEN DESIRED.
      C 11
      CALL RESET ('SETCLR')
      GO TO (15, 20, 30, 40, 50, 60, 70, 80), LP
      15
      CALL SETCLR ('BLACK')
      GO TO 90
      20
      CALL SETCLR ('BLUE')
      GO TO 90
      30
      CALL SETCLR ('RED')
      GO TO 90
      40
      CALL SETCLR ('YELLOW')
      GO TO 90
      50
      CALL SETCLR ('CYAN')
      GO TO 90
      60
      CALL SETCLR ('GREEN')
      GO TO 90
      70
      CALL SETCLR ('MAGENTA')
      GO TO 90
      80
      CALL SETCLR ('WHITE')
      GO TO 90
      90
      RETURN
      C FORMAT STATEMENTS.
      C 610
      FORMAT(//10X,'WHICH COLOR DO YOU WISH USED?')
      E/15X,'1. BLACK'
      E/15X,'2. BLUE'
      E/15X,'3. RED'
      E/15X,'4. YELLOW'
      E/15X,'5. CYAN'

```

[illegible]


```

C***** LETTAR
C***** SUBROUTINE THAT EXECUTES THE LETTERING SELECTED.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** INGRAY(5,1) VARIABLE CONTAINING THE TYPE OF LETTERING
C***** DESIRED BY THE USER.
C*****
C***** I DUMMY VARIABLE FOR TYPE OF CURVE FIT.
C*****
C*****
C***** SUBROUTINE LETTAR
C*****
C C DECLARATIONS.
C C
C C INTEGER I
C C COMMON BELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C C E,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLCT(100),FILPLT(2)
C C E,ZPLOT(100),Z(18,100),JCOLOR(25)
C C
C C EXECUTES THE LETTERING TYPE DESIRED, THE DEFAULT IS TRIPLEX.
C C
1 I = INGRAY(5,1)
2 IF(I.EQ.0) GO TO 7
3 GO TO 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15), I
4 CCNTINUE
5 GO TO 90
6 CALL CARTOG
7 GO TO 90
8 CALL SIMPLX
9 GO TO 90
10 CALL SCMPLEX
11 GO TO 90
12 CALL COMPLEX
13 GO TO 90
14 CALL DUPLX
15 GO TO 90
16 CALL TRIPLEX
17 GO TO 90
18 CALL GOTHIC
19 GO TO 90
20 CALL SHDCHR(90.,1,.005,1)
21 CALL FUTURA
22 GO TO 90
23 CALL SERIF
24 GO TO 90
25 CALL LOGO1

```

```

12      GO TO 90
      CALL FASHON
      GO TO 90
13      CALL SHDCHR(90.,1,.005,1)
      CALL SWISSI
      GO TO 90
14      CALL SHDCHR(90.,1,.005,1)
      CALL SWISSM
      GO TO 90
15      CALL SWISSB
      GO TO 90
90      RETURN
      FNC
*****
***** MESS
*****
***** SUBROUTINE THAT DETERMINES USER MESSAGE CONTENT AND LOCATION.
*****
***** VARIABLES AND CONSTANTS
*****
***** DETERMINES EDITING PHASE.
*****
***** RELAY(1,1) VALUE OF HORIZONTAL PAGE LENGTH.
*****
***** RELAY(1,2) VALUE OF VERTICAL PAGE LENGTH.
*****
***** RELAY(4,5) X-VALUE OF HORIZONTAL LOCATION OF MESSAGE.
*****
***** RELAY(4,6) Y-VALUE OF VERTICAL LOCATION OF MESSAGE.
*****
***** IFRAY(3) DETERMINES IF USER WANTS A MESSAGE.
*****
***** IDIC USED TO STORE YES OR NO ANSWERS.
*****
***** JJ THE NUMBER OF LETTERS IN THE MESSAGE.
*****
***** R DUMMY VARIABLE FOR MESSAGE LOCATION.
*****
***** SUBROUTINE MESS(II)
*****
***** DECLARATIONS.
*****
      REAL K
      INTEGER JJ,K,II,IDIC
      COMMON RELFAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
      &, X(18,100), Y(18,100), LINE(72), X2PLOT(100), Y2PLOT(100), FILPLT(2)

```

```

      E, ZFICT(100), 2(18,100), JCOLOR(25)
C
C   GC TO (10,10,50), II
C   DECISION ON WHETHER OR NOT TO HAVE A MESSAGE.
C
C   10   WHITE(6,610)
C
C   SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1, NO=2, ERROR=3).
C
C
C   20   CALL YORN(IDIC)
C   IFAY(3) = IIIC
C   GO TO (20,70,10), IDIC
C   CALL FATCHS('CLSCRN ')
C
C   ASKS USER FOR HIS MESSAGE CONTENT.
C
C
C   30   CALL CHANGE(5)
C   WRITE (6,600) (LINE(I), I=1,9)
C   WRITE (6,620)
C   READ (5,51C,END=35) (LETRAY(K,5), K=1,9)
C   CALL LETTER(5,JJ)
C   IF (JJ.LT.10) GO TO 40
C   CALL ERFCR3
C   GO TO 30
C   CALL ERFCR8
C   GO TO 30
C   GO TO (49,70), II
C
C   35   GO TO (49,70), II
C
C   DETERMINES THE LOWER LEFTHAND CORNER OF THE MESSAGE IN INCHES
C   HCFIZCNTAL.
C
C   49   CALL FRTCMS('CIRSCRN ')
C   WRITE (6,630)
C   50   WRITE (6,650) RELRAY(4,5)
C   WRITE (6,635)
C   CALL FEEDRE(R,855)
C   RELRAY(4,5) = R
C   IF (RELRAY(1,1).GT. RELRAY(4,5)) GO TO 59
C   CALL ERRCR1
C   GO TO 50
C   CALL ERRORF8
C   GO TO 50
C
C   55   GO TO 50
C
C   DETERMINES THE LOWER LEFTHAND CORNER OF THE MESSAGE IN INCHES
C   VFFICAL.
C
C   59   CALL FRTCMS('CIRSCRN ')
C   60   WRITE (6,650) RELRAY(4,6)
C   WRITE (6,640)

```

[illegible]

```

*****
C***** SUBROUTINE LOCLEG
C*****
C      DECLARATIONS.
C
C      REAL F
C      INTEGER IDIC
C      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C      &, X(18,100), YLINE(72), XPLLOT(100), YPLOT(100), FILPLT(2)
C      &, ZPICF(100), Z(18,100), JCOLOR(25)
C
C      DECISION ON THE LOCATION OF THE LEGEND.
C
C      WRITE(6,610)
C
C      SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
C      CALL YORN(IDIC)
C      IFRAY(1)=IDIC
C      GO TO (20,50,10),IDIC
C      CALL FRCHMS('CLRSCRN ')
C
C      DETERMINES THE LOWER LEFTHAND CORNER OF THE LEGEND IN INCHES
C      HCRIZCNTAL.
C
C      WRITE (6,620) REIRAY(1,5)
C      WRITE (6,625)
C      CALL FEEDRE(R,E35)
C      PEIRAY(1,5)=R
C      IF REIRAY(1,1)-GT. KELRAY(1,5)) GO TO 39
C      CALL ERRCHK1
C      GO TO 30
C      CALL ERRCHK8
C      GO TO 30
C
C      DETERMINES THE LOWER LEFTHAND CORNER OF THE LEGEND IN INCHES
C      VERTICAL.
C
C      CALL FRCHMS('CLRSCRN ')
C      WRITE (6,640) REIRAY(1,6)
C      WRITE (6,630)
C      CALL FEEDRE(R,E45)
C      REIRAY(1,6)=R
C      IF REIRAY(1,2)-GT. REIRAY(1,6)) GO TO 50
C      CALL ERRCHK2
C      GO TO 40
C      CALL ERRCHK8
C
C*****

```

```

50      GO TO 40
        CONTINUE
        RETURN
C      FORMAT STATEMENTS.
C
C10     FORMAT(/10X,'DO YOU WISH TO HAVE A LEGEND FOR THIS GRAPH?',
E/15X,'(Y OR N)')
C20     FORMAT(/10X,'THE FOLLOWING QUESTIONS DETERMINE THE LOCATION
E OF THE LOWER LEFT CORNER OF THE LEGEND: (1) THIS CORNER?',
C25     FORMAT(/10X,'WHAT IS THE X-POINT IN INCHES OF THIS CORNER?')
C30     FORMAT(/10X,'WHAT IS THE Y-POINT IN INCHES OF THIS CORNER?')
C40     FORMAT(/10X,'** NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS',
E,F6.2)
        END
C***** XVALUE
C*****
C***** SUBROUTINE SETTING THE SCALE ON THE X-AXIS.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** RELRAY(2,1) VALUE OF X AT ORIGIN.
C*****
C***** RELRAY(2,2) VALUE OF X STEP INTERVAL.
C*****
C***** RELRAY(2,3) MAXIMUM VALUE OF X.
C*****
C***** IFRAY(5) THE TYPE GRAPH TO BE DEVELOPED.
C*****
C***** ID DUMMY VARIABLE FOR THE TYPE GRAPH TO BE
C***** DEVELOPED.
C*****
C***** R DUMMY REAL VARIABLE.
C*****
C*****
C***** SJROUTINE XVALUE
C*****
C      DECLARATIONS.
C
C      REAL R
C      INTEGER ID
C      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
E, X(18,100), Y(18,100), LINE(72), XPLCT(100), YPLCT(100), FILPLT(2)
E, ZPLCT(100), JCOLOR(25)
C      ID = IFRAY(5)
C      GO TO (9,40, 5,40, 9),ID

```

```

C C DETERMINES THE VALUE OF X AT THE ORIGIN.
C
9 WRITE (6,605) REIRAY(2,1)
10 WRITE (6,640) REIRAY(2,1)
    CALL FEEDRE(R,815)
    REIRAY(2,1) = R
    GO TO 19
15 CALL ERROR8
    GO TO 10

C C DETERMINES THE VALUE OF THE X STEP.
C
19 CALL FETCMS('CIFSCRN ')
20 WRITE (6,640) REIRAY(2,2)
    CALL FEEDRE(R,825)
    REIRAY(2,2) = R
    GO TO 29
25 CALL ERROR8
    GO TO 20

C C DETERMINES THE MAXIMUM VALUE OF X.
C
29 CALL FRTCMS('CIFSCRN ')
30 WRITE (6,640) REIRAY(2,3)
    CALL FEEDRE(R,835)
    REIRAY(2,3) = R
    GO TO 30
35 CALL ERROR8
    GO TO 30

C C DETERMINES THE VALUE OF X AT THE ORIGIN F LOG SCALE.
C
40 WRITE (6,640) REIRAY(2,1)
    WRITE (6,615)
    CALL FEEDRE(R,845)
    REIRAY(2,1) = R
    IF (R.NE.0.0) GO TO 49
    CALL ERROR4(0,0)
    GO TO 40
45 CALL ERROR8
    GO TO 40

C C DETERMINES THE VALUE OF THE X CYCLE IN INCHES.
C
49 CALL FETCMS('CIFSCRN ')

```

[illegible]

```

C**** ID          DUMMY VARIABLE FOR THE TYPE GRAFH TO BE
C****          DEVELOPED.
C****
C****          DUMMY REAL VARIABLE.
C****
C*****
C*****
C***** SUPROUTINE YVALUE
C*****
C  DECLARATIONS.
C
C  REAL R
C  INTEGER ID
C  COMMON RELRAY (6,18), INGRAY (7,18), DETRAY (10,24), IFRAY (11)
C  X(18,100), Y(18,100), ILINE(72), XPLCT(100), YPLCT(100), FILPLT(2)
C  E, ZFLCT(100), Z(18,100), JCOLOR(25)
C  ID = IFRAY(5)
C  GO TO ( 9, 9, 40, 40, 9), ID
C
C  DETERMINES THE VALUE OF Y AT THE ORIGIN.
C
C 9  CALL FRTCMS('CIRSCRN ')
C    WRITE (6,640)
C    WRITE (6,680) RELRAY(2,4)
C    WRITE (6,645)
C    CALL FEEDRE(R, E15)
C    RELRAY(2,4) = R
C    GO TO 19
C    CALL ERROR8
C    GO TO 10
C
C 15
C
C  DETERMINES THE VALUE OF THE Y STEP.
C
C 19  CALL FRTCMS('CIRSCRN ')
C    WRITE (6,680) RELRAY(2,5)
C    WRITE (6,650)
C    CALL FEEDRE(R, E25)
C    RELRAY(2,5) = R
C    GO TO 29
C    CALL ERROR8
C    GO TO 20
C
C 25
C
C  DETERMINES THE MAXIMUM VALUE OF Y.
C
C 29  CALL FRTCMS('CIRSCRN ')
C    WRITE (6,680) RELRAY(2,6)
C    WRITE (6,660)
C    CALL FEEDRE(R, E35)

```

```

REIRAY(2,6) = R
GO TO 70
CALL ERROR8
GC TO 30

```

35

C C DETERMINES THE VALUE OF Y AT THE ORIGIN FOR THE LOG SCALE.

```

40 WRITE (6,640) RELAY(2,4)
   WRITE (6,680) RELAY(2,4)
   WRITE (6,645) RELAY(2,4)
   CALL FEEDRE(R, E45)
   IF (R-NE.0.0) GO TO 49
   CALL ERROR4(0,0)
   GO TO 40
   CALL ERROR8
   GO TO 40

```

45

C C DETERMINES THE VALUE OF THE Y CYCLE IN INCHES.

```

49 CALL FRTCMS('CIRSCRN ')
50 WRITE (6,680) RELAY(2,5)
   WRITE (6,670) RELAY(2,5)
   CALL FEEDRE(R, E55)
   REIRAY(2,5) = R
   GO TO 29
   CALL ERROR8
   GO TO 50
70 CALL FRTCMS('CIRSCRN ')
71 WRITE (6,690)
   CALL REEDIN(NN,E75)
   IF (NN.GT.C) AND. NN.LT. 3) GO TO 80
75 CALL ERROR4(1,2)
   GO TO 71
80 RETURN

```

70

C C FCRMAT STATEMENTS.

```

640 FORMAT(//10X,'THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF TH
SE Y-AXIS: ')
645 FCRMAT(//15X,'WHAT IS THE VALUE OF Y AT THE ORIGIN? (BOTTOM CO
ENER)')
615 FORMAT(//15X,'WHAT IS THE VALUE OF Y AT THE ORIGIN? (BOTTOM CO
ENER//20X,(MUST BE A NONZERO NUMBER FOR LOG AXIS)')
650 FORMAT(//15X,'WHAT IS THE Y STEP INTERVAL IN YOUR UNITS?')
660 FCRMAT(//15X,'WHAT IS THE MAXIMUM VALUE OF THE Y-AXIS? (TOP CO
ENER//20X,'ANSWER TO THIS QUESTION IS NOT USED FOR LOG AXIS)')
670 FORMAT(//15X,'WHAT IS THE Y CYCLE LENGTH IN INCHES?')

```



```

25 CALL FEEDRE(R, £25)
   RELRAY(3,2) = R
   GO TO 29
   CALL ERROR8
   GO TO 20
C
C DETERMINES THE MAXIMUM VALUE OF Z.
C
29 CALL FRTCMS('CLSCRN ')
   WRITE(6,640) RELRAY(3,3)
   CALL FEEDRE(R, £35)
   RELRAY(3,3) = R
   GO TO 40
   CALL ERROR8
   GO TO 30
35 CALL ERROR8
   GO TO 30
40 CALL FRTCMS('CLSCRN ')
   WRITE(6,650)
   CALL REEDIN(NN, £55)
   IFRAY(8) = NN
   IF (NN.GT. 0 .AND. NN.LT. 3) GO TO 60
55 CALL ERROR4(1,2)
   GO TO 50
60 RETURN
C
C FORMAT STATEMENTS.
C
610 FORMAT(//10X, 'THE FOLLOWING QUESTIONS DETERMINE THE SCALE OF TH
      SE Z-AXIS: ', //15X, 'WHAT IS THE VALUE OF Z AT THE ORIGIN?') UNITS?')
615 FORMAT(//15X, 'WHAT IS THE Z STEP INTERVAL IN YOUR UNITS?')
620 FORMAT(//15X, 'WHAT IS THE MAXIMUM VALUE OF Z AT THE END?')
630 FORMAT(//15X, 'NOTE: FOR YOUR REFERENCE, THE CURRENT ANSWER IS'
640 FORMAT(/10X, 'F10.5)
650 FORMAT(//15X, 'WHICH TYPE OF NUMBERS DO YOU WANT ON THE Z-AXIS?'
      £/20X, '1. REAL NUMBERS (I.E. 20.0),
      £/20X, '2. INTEGER NUMBERS (I.E. 20).')
      END
C*****
C***** GRIDDE
C*****
C***** SUBROUTINE TO DETERMINE THE GRID LINE PATTERN.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** INGRAY(1,5) NUMBER OF GRID LINES PER X-AXIS.
C*****
C***** INGRAY(1,6) NUMBER OF GRID LINES PER Y-AXIS.
C*****

```


[illegible]

```

55      CALL ERROR4 (1,2)
56      GO TO 50
57      CALL FRICMS ('CLRSCRN ')
58      GO TO (70,140), NN
59
60      C USER DESIGNATES NUMBER OF DATA PAIRS HE WISHES TO ENTER.
61      C
62
63      70      WRITE (6,630)
64      CALL REEDIN (NN,875)
65      IF (NN.LT. 10) GO TO 80
66      CALL ERROR5
67      GO TO 70
68
69      75      CALL ERROR8
70      GO TO 70
71
72      80      INGRAY (2,1) = NN
73      KKK = NN
74
75      C USER DESIGNATES NUMBER OF DATA POINTS HE WISHES MARKED.
76      C
77
78      90      CALL FRICMS ('CIRSCRN ')
79      WRITE (6,636)
80      CALL REEDIN (NN,895)
81      INGRAY (3,1) = NN
82      IF (IABS(INGRAY (3,1)).LE. KKK) GO TO 100
83      CALL ERROR4 (-KKK, KKK)
84      GO TO 90
85
86      C USER INPUTS THE DATA PAIRS.
87      C
88
89      100      DO 130 JJ=1, KKK
90      110      CALL FRICMS ('CLRSCRN ')
91      120      WRITE (6,640) JJ, KKK
92      READ (5,*,END=125) X(I,JJ), Y(I,JJ)
93      GO TO 130
94
95      125      CALL ERROR8
96      GO TO 120
97
98      130      CONTINUE
99
100     C SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
101     C
102
103     CALL DATCHK (I, KKK)
104     GO TO 140
105
106     C SUPERROUTINE USRFFIL INPUTS DATA FROM A USER-DEFINED FILE.
107     C
108
109     140     IKK = I
110     CALL USRFFIL (IKK)
111     IF (IKK.EQ. -1) GO TO 30
112
113     C

```


040 8CCNNECTED' /24X 'EY A LINE' ,
 050 E// 5X 'HOW FREQUENTLY DC YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
 8SPLAYED?')
 E' PCINT' /13X 'X-COORDINATE Y-COORDINATE IN YOUR UNITS, ' /13X ,
 FCRMAT' /13X 'OF 13 POINTS. ')
 050 FCRMAT' /16X 'REFERENCE - DATA FOR CURVE' 13 ' HAS BEEN FILED U
 ENDER' /13X '244 ' DATA THIS FILE WILL NOT NECESSARILY BE UPDATED' ,
 E/13X ' BUT COULD BE USED TO INPUT CURVE DATA LATER. ' ,
 060 E// FCRMAT' /10X ' DO YOU WANT THIS CURVE DATA FILED FOR YOU? (Y OR N)

```
C*****C*****C*****C*****C*****C*****C*****C*****C*****  
ENT*****SUBROUTINE DISPLAYING THE VERTICAL EXAMPLE  
*****FOR TWO DIMENSIONS.  
C*****VARIABLES AND CONSTANTS  
C*****RELAY(1,1) DEFAULT VALUE OF LENGTH OF THE PAGE IN THE X  
C*****DIRECTION OF 8.5 INCHES.  
C*****RELAY(1,2) DEFAULT VALUE OF HEIGHT OF THE PAGE IN THE Y  
C*****DIRECTION OF 11.0 INCHES.  
C*****RELAY(1,3) DEFAULT VALUE OF LENGTH OF THE SUPPLCT AREA  
C*****IN THE X DIRECTION OF 6 INCHES.  
C*****RELAY(1,4) DEFAULT VALUE OF LENGTH OF THE SUPPLCT AREA  
C*****IN THE Y DIRECTION OF 8 INCHES.  
C*****SUBROUTINE VERT(NP)  
C*****C*****C*****C*****C*****C*****C*****C*****C*****
```

```

DECLARATIONS.
INTEGER IP (600), C (4), D (4), E (4), F (4)
REAL A (2), B (2), G (6, 18), H (18, 100), I (18, 100)
COMMON RELRAY (6, 18), INGRAY (7, 18), LETRAY (10, 24), IFRAY (11)
E, X (18, 100), Y (18, 100), LINE (72), XPLOT (100), YPLOT (100), FILPLT (2)
E, ZPLOT (100), Z (18, 100), JCOLOR (25)
DATA A, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z,
E D/1.5, 2.5, 3.5, 4.5, E/0.5, 1.0, 2.0, 3.0, F/0.5, 2.0, 4.0, 6.0/
GO TO (5, 96), NF
ID = IFRAY (5)
CALL HPROT (AUTO)

```

```

CALL HMSCAL (8.5, 11.0,
CALL AREASD (.5, SCREEN),
CALL FRAME (6.C, 8.0),
CALL TRIPLEX,
CALL THKFRM (.015),
CALL THKCRV (.02),
CALL XNAME {X-Axis {INCHES} 1, 100},
CALL YNAME {Y-Axis {INCHES} 1, 100},
CALL HEADIN {EXAMPLE GRAPH 1, 100, 1.5, 1},
CALL MESSAGE {MESSAGE 1, 100, 5.0, -7, 1},
CALL LINES {CURVE 1, 1, 1},
CALL LINES {CURVE 2, 1, 2},
CALL LINES {CURVE 3, 1, 3},
GO TO (10, 20, 30, 40, 10, ID)
CALL TO GRAF (0.0, 1.0, 6.0, 0.0, 1.0, 8.0)
REIRAY (2, 1) = 6.0
REIRAY (2, 2) = 1.0
REIRAY (2, 3) = 6.0
REIRAY (2, 4) = 0.0
REIRAY (2, 5) = 1.0
REIRAY (2, 6) = 8.0
GO TO 60

20 CALL XLOG (0.4, 3.0, 0.0, 1.0)
REIRAY (2, 1) = 6.4
REIRAY (2, 2) = 3.0
REIRAY (2, 3) = 40.
REIRAY (2, 4) = 0.0
REIRAY (2, 5) = 1.0
REIRAY (2, 6) = 8.0
GO TO 60

30 CALL YLOG (0.0, 1.0, 0.1, 4.0)
REIRAY (2, 1) = 6.0
REIRAY (2, 2) = 1.0
REIRAY (2, 3) = 10.0
REIRAY (2, 4) = 0.1
REIRAY (2, 5) = 4.0
REIRAY (2, 6) = 10.
GO TO 60

40 CALL LOGLOG (0.4, 3.0, 0.1, 4.0)
REIRAY (2, 1) = 0.4
REIRAY (2, 2) = 3.0
REIRAY (2, 3) = 40.
REIRAY (2, 4) = 0.1
REIRAY (2, 5) = 4.0
REIRAY (2, 6) = 10.
GO TO 60

60 CONTINUE

```



```
C
INTEGER IP(600) C(4), D(4), E(4), F(4)
REAL A(2), B(2), G(2), H(2), I(2), J(2), K(2), L(2), M(2), N(2), O(2), P(2), Q(2), R(2), S(2), T(2), U(2), V(2), W(2), X(2), Y(2), Z(2), AA(2), AB(2), AC(2), AD(2), AE(2), AF(2), AG(2), AH(2), AI(2), AJ(2), AK(2), AL(2), AM(2), AN(2), AO(2), AP(2), AQ(2), AR(2), AS(2), AT(2), AU(2), AV(2), AW(2), AX(2), AY(2), AZ(2), BA(2), BB(2), BC(2), BD(2), BE(2), BF(2), BG(2), BH(2), BI(2), BJ(2), BK(2), BL(2), BM(2), BN(2), BO(2), BP(2), BQ(2), BR(2), BS(2), BT(2), BU(2), BV(2), BW(2), BX(2), BY(2), BZ(2), CA(2), CB(2), CC(2), CD(2), CE(2), CF(2), CG(2), CH(2), CI(2), CJ(2), CK(2), CL(2), CM(2), CN(2), CO(2), CP(2), CQ(2), CR(2), CS(2), CT(2), CU(2), CV(2), CW(2), CX(2), CY(2), CZ(2), DA(2), DB(2), DC(2), DD(2), DE(2), DF(2), DG(2), DH(2), DI(2), DJ(2), DK(2), DL(2), DM(2), DN(2), DO(2), DP(2), DQ(2), DR(2), DS(2), DT(2), DU(2), DV(2), DW(2), DX(2), DY(2), DZ(2), EA(2), EB(2), EC(2), ED(2), EE(2), EF(2), EG(2), EH(2), EI(2), EJ(2), EK(2), EL(2), EM(2), EN(2), EO(2), EP(2), EQ(2), ER(2), ES(2), ET(2), EU(2), EV(2), EW(2), EX(2), EY(2), EZ(2), FA(2), FB(2), FC(2), FD(2), FE(2), FF(2), FG(2), FH(2), FI(2), FJ(2), FK(2), FL(2), FM(2), FN(2), FO(2), FP(2), FQ(2), FR(2), FS(2), FT(2), FU(2), FV(2), FW(2), FX(2), FY(2), FZ(2), GA(2), GB(2), GC(2), GD(2), GE(2), GF(2), GG(2), GH(2), GI(2), GJ(2), GK(2), GL(2), GM(2), GN(2), GO(2), GP(2), GQ(2), GR(2), GS(2), GT(2), GU(2), GV(2), GW(2), GX(2), GY(2), GZ(2), HA(2), HB(2), HC(2), HD(2), HE(2), HF(2), HG(2), HH(2), HI(2), HJ(2), HK(2), HL(2), HM(2), HN(2), HO(2), HP(2), HQ(2), HR(2), HS(2), HT(2), HU(2), HV(2), HW(2), HX(2), HY(2), HZ(2), IA(2), IB(2), IC(2), ID(2), IE(2), IF(2), IG(2), IH(2), II(2), IJ(2), IK(2), IL(2), IM(2), IN(2), IO(2), IP(2), IQ(2), IR(2), IS(2), IT(2), IU(2), IV(2), IW(2), IX(2), IY(2), IZ(2), JA(2), JB(2), JC(2), JD(2), JE(2), JF(2), JG(2), JH(2), JI(2), JJ(2), JK(2), JL(2), JM(2), JN(2), JO(2), JP(2), JQ(2), JR(2), JS(2), JT(2), JU(2), JV(2), JW(2), JX(2), JY(2), JZ(2), KA(2), KB(2), KC(2), KD(2), KE(2), KF(2), KG(2), KH(2), KI(2), KJ(2), KK(2), KL(2), KM(2), KN(2), KO(2), KP(2), KQ(2), KR(2), KS(2), KT(2), KU(2), KV(2), KW(2), KX(2), KY(2), KZ(2), LA(2), LB(2), LC(2), LD(2), LE(2), LF(2), LG(2), LH(2), LI(2), LJ(2), LK(2), LL(2), LM(2), LN(2), LO(2), LP(2), LQ(2), LR(2), LS(2), LT(2), LU(2), LV(2), LW(2), LX(2), LY(2), LZ(2), MA(2), MB(2), MC(2), MD(2), ME(2), MF(2), MG(2), MH(2), MI(2), MJ(2), MK(2), ML(2), MM(2), MN(2), MO(2), MP(2), MQ(2), MR(2), MS(2), MT(2), MU(2), MV(2), MW(2), MX(2), MY(2), MZ(2), NA(2), NB(2), NC(2), ND(2), NE(2), NF(2), NG(2), NH(2), NI(2), NJ(2), NK(2), NL(2), NM(2), NO(2), NP(2), NQ(2), NR(2), NS(2), NT(2), NU(2), NV(2), NW(2), NX(2), NY(2), NZ(2), OA(2), OB(2), OC(2), OD(2), OE(2), OF(2), OG(2), OH(2), OI(2), OJ(2), OK(2), OL(2), OM(2), ON(2), OO(2), OP(2), OQ(2), OR(2), OS(2), OT(2), OU(2), OV(2), OW(2), OX(2), OY(2), OZ(2), PA(2), PB(2), PC(2), PD(2), PE(2), PF(2), PG(2), PH(2), PI(2), PJ(2), PK(2), PL(2), PM(2), PN(2), PO(2), PP(2), PQ(2), PR(2), PS(2), PT(2), PU(2), PV(2), PW(2), PX(2), PY(2), PZ(2), QA(2), QB(2), QC(2), QD(2), QE(2), QF(2), QG(2), QH(2), QI(2), QJ(2), QK(2), QL(2), QM(2), QN(2), QO(2),QP(2), QQ(2), QR(2), QS(2), QT(2), QU(2), QV(2), QW(2), QX(2), QY(2), QZ(2), RA(2), RB(2), RC(2), RD(2), RE(2), RF(2), RG(2), RH(2), RI(2), RJ(2), RK(2), RL(2), RM(2), RN(2), RO(2), RP(2), RQ(2), RR(2), RS(2), RT(2), RU(2), RV(2), RW(2), RX(2), RY(2), RZ(2), SA(2), SB(2), SC(2), SD(2), SE(2), SF(2), SG(2), SH(2), SI(2), SJ(2), SK(2), SL(2), SM(2), SN(2), SO(2), SP(2), SQ(2), SR(2), SS(2), ST(2), SU(2), SV(2), SW(2), SX(2), SY(2), SZ(2), TA(2), TB(2), TC(2), TD(2), TE(2), TF(2), TG(2), TH(2), TI(2), TJ(2), TK(2), TL(2), TM(2), TN(2), TO(2), TP(2), TQ(2), TR(2), TS(2), TT(2), TU(2), TV(2), TW(2), TX(2), TY(2), TZ(2), UA(2), UB(2), UC(2), UD(2), UE(2), UF(2), UG(2), UH(2), UI(2), UJ(2), UK(2), UL(2), UM(2), UN(2), UO(2), UP(2), UQ(2), UR(2), US(2), UT(2), UU(2), UV(2), UW(2), UX(2), UY(2), UZ(2), VA(2), VB(2), VC(2), VD(2), VE(2), VF(2), VG(2), VH(2), VI(2), VJ(2), VK(2), VL(2), VM(2), VN(2), VO(2), VP(2), VQ(2), VR(2), VS(2), VT(2), VU(2), VV(2), VW(2), VX(2), VY(2), VZ(2), WA(2), WB(2), WC(2), WD(2), WE(2), WF(2), WG(2), WH(2), WI(2), WJ(2), WK(2), WL(2), WM(2), WN(2), WO(2), WP(2), WQ(2), WR(2), WS(2), WT(2), WU(2), WV(2), WW(2), WX(2), WY(2), WZ(2), XA(2), XB(2), XC(2), XD(2), XE(2), XF(2), XG(2), XH(2), XI(2), XJ(2), XK(2), XL(2), XM(2), XN(2), XO(2), XP(2), XQ(2), XR(2), XS(2), XT(2), XU(2), XV(2), XW(2), XX(2), XY(2), XZ(2), YA(2), YB(2), YC(2), YD(2), YE(2), YF(2), YG(2), YH(2), YI(2), YJ(2), YK(2), YL(2), YM(2), YN(2), YO(2), YP(2), YQ(2), YR(2), YS(2), YT(2), YU(2), YV(2), YW(2), YX(2), YY(2), YZ(2), ZA(2), ZB(2), ZC(2), ZD(2), ZE(2), ZF(2), ZG(2), ZH(2), ZI(2), ZJ(2), ZK(2), ZL(2), ZM(2), ZN(2), ZO(2), ZP(2), ZQ(2), ZR(2), ZS(2), ZT(2), ZU(2), ZV(2), ZW(2), ZX(2), ZY(2), ZZ(2),
COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11),
& ,X(18,100),Y(18,100),LINE(72),X$LOUT(100),Y$PLCT(100),FILPLT(2)
& ,ZPIC(100),Z(18,100),JCOLOR(25)
& DATA A(0.5,3.0),B(3.0,5.0)/C(3.5,4.5),E(0.5,2.0),4.0,5.5,F(0.5,2.0,4.0,5.5)/
& D(1.5,2.5),3.5,4.5//E(0.5,2.0,4.0,5.5,F(0.5,2.0,4.0,5.5)/
GO TO 596,NF
ID = IFRAY(5)
CALL HWSCAL('SCREEN')
CALL FACE(11,0.8,5)
CALL AREA2D(8.0,6.0)
CALL FRAME
CALL TRIPLEX
CALL SHDCHR(90.,1,.005,1)
CALL SWISSI(-.015)
CALL THKFRM
CALL THKCRV
CALL XNAME{'X-AXIS'INCHES},100}
CALL YNAME{'Y-AXIS'INCHES},100}
CALL HEADIN{'EXAMPLE GRAPH$',100,1.5,1)
CALL LINES{'CURVE 1$',IP,1}
CALL LINES{'CURVE 2$',IP,2}
CALL LINES{'CURVE 3$',IP,3}
GO TO 10,20,30,40,10,I,D
CALL GRAF(0.0,1.0,8.0,0.0,1.0,6.0)
REIRAY(2,1)}=6.0
REIRAY(2,2)}=1.0
REIRAY(2,3)}=8.0
REIRAY(2,4)}=0.0
REIRAY(2,5)}=1.0
REIRAY(2,6)}=6.0
GO TO 60
CALL XIQG(0.4,4.0,0.0,1.0)
REIRAY(2,1)}=6.4
REIRAY(2,2)}=4.0
REIRAY(2,3)}=40.0
REIRAY(2,4)}=0.0
REIRAY(2,5)}=1.0
REIRAY(2,6)}=6.0
GO TO 60
CALL YIQG(0.0,1.0,0.0,1.3,0)
REIRAY(2,1)}=6.0
REIRAY(2,2)}=1.0
REIRAY(2,3)}=8.0
REIRAY(2,4)}=C.1
REIRAY(2,5)}=3.0
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8 ZPICT(100), 2(18,100), JCCLOR(25)
CALL RESET('ALL')
CALL HWROT('CCMIC')
CALL HWSCL('SCREEN')
CALL NOBRDR
CALL PAGE(12, 12.0)
CALL PHYSOR(2, 1.1)
CALL AREA2D(8, 6, 16.5)
CALL SHDCHR(90, 1, .005, 1)
CALL HEIGHT(25)
CALL MESSAG('EXAMPLES OF CHARACTER FONTS AVAILABLE:$', 100, .5, 9.8)
CALL HEIGHT(2)
CALL MESSAG('1. STANDARD$', 100, 3., 9.0)
CALL CARTOG
CALL MESSAG('2. CARTOG$', 100, 3., 8.5)
CALL SIMPLX
CALL MESSAG('3. SIMPLX$', 100, 3., 8.)
CALL SCMPX
CALL MESSAG('4. SCMPX$', 100, 3., 7.5)
CALL COMPLX
CALL MESSAG('5. COMPLX$', 100, 3., 7.0)
CALL DUPLX
CALL MESSAG('6. DUPLX$', 100, 3., 6.5)
CALL TRIPLX
CALL MESSAG('7. TRIPLX$', 100, 3., 6.)
CALL GOTHIC
CALL MESSAG('8. GOTHIC$', 100, 3., 5.5)
CALL SHDCHR(90, 1, .005, 1)
CALL FUTURA
CALL MESSAG('9. FUTURA$', 100, 3., 5.)
CALL RESET('SHECHR')
CALL SERIF
CALL MESSAG('10. SERIF$', 100, 3., 4.5)
CALL LOGO1
CALL MESSAG('11. LOGO1$', 100, 3., 4.0)
CALL FASHON
CALL MESSAG('12. FASHON$', 100, 3., 3.5)
CALL SHDCHR(90, 1, .005, 1)
CALL SWISSL
CALL MESSAG('13. SWISSL$', 100, 3., 3.0)
CALL SWISSM
CALL MESSAG('14. SWISSM$', 100, 3., 2.5)
CALL RESET('SHECHR')
CALL SWISSB
CALL MESSAG('15. SWISSB$', 100, 3., 2.0)
CALL ENDEPL(0)
RETURN
END

```

C*****


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C
C
C  DECLARATIONS.
C
C  INTEGER FF1, FF2, FF3, FF4, FF5, FF6, FF9, K, I, IPAK(600), LP,
C  8 FF7, FF8
C  COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C  8, X(18,100), Y(18,100), LINE(72), XPLOT(100), YFICT(100), FILPLT(2)
C  8, ZFICT(100), Z(18,100), JCOLOR(25)
C
C  FORTRAN REQUIREMENT TO USE A COMPUTED GO IC STATEMENT.
C
C
C  FF1 = IFRAY {1}
C  FF2 = IFRAY {2}
C  FF3 = IFRAY {3}
C  FF4 = IFRAY {4}
C  FF5 = IFRAY {5}
C  FF6 = INGRAY(1,4)
C  FF7 = IFRAY {7}
C  FF8 = IFRAY {6}
C  FF9 = IFRAY {11}
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW BORDER.
C
C
C  GO TO (1, 9), FF9
C  WRITE (6,610)
C  ICCICR = 0
C  CALL COLOR(ICOLOR)
C  JCCLCR(19) = ICCICR
C  DO 2 I = 1, FF6
C
C  SUBROUTINE COICK DETERMINES THE COLOR PEN TO DRAW CURVES.
C
C
C  WRITE (6,620) I
C  ICCICR = 0
C  CALL COLOR(ICOLOR)
C  JCCLCR(I) = ICCICR
C  CONTINUE
C
C  SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
C
C  WRITE (6,630)
C  ICCICR = 0
C  CALL COLOR(ICOLOR)
C  JCCLCR(20) = ICCICR
C  CONTINUE
C
C  SUBROUTINE ERKSET REMOVES ERROR MESSAGE FROM DISSILA EXEC.
C
C  CALL RESET ('All')

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C      CALL ERRSET (208, 256, -1, 1)
C      SUBROUTINE HWSICAL DOES THE SCALING OF THE GRAPH ON THE DEVICE.
C10
C10      CALL HWSICAL ('SCREEN')
C10      CALL HWSICAL ('NCNEI')
C10      CALL UCCHAR
C10      GO TO (20, 30), FF9
C20      CALL SPCMOD
C30      CCNTINUE
C40      GO TO (40, 50), FF9
C40      ICOLOR = JCOLOR(19)
C40      CALL COLOR(ICOLOR)
C50      CCNTINUE
C      SUBROUTINE PAGE DEFINES THE PAGE SIZE.
C      CALL PAGE (RELRAY(1,1), RELRAY(1,2))
C      SUBROUTINE HWROT ECTATES THE PAGE TO FIT THE SCREEN.
C      CALL HWROT ('ACTO')
C      SUBROUTINE AREA2D DEFINES THE SUBPLOT AREA.
C60      CALL AREA2D (RELRAY(1,3), RELRAY(1,4))
C      SUBROUTINE THKFRM DEFINES HOW THICK THE LINE OF THE FRAME WILL BE.
C      CALL THKFRM (.015)
C      SUBROUTINE FRAME FRAMES THE SUBPLOT AREA.
C70      CALL FRAME
C70      CCNTINUE
C      SUBROUTINE LETTAR DEFINES THE TYPE OF LETTERING.
C      CALL LETTAR
C      SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO D ARRAY TO
C      ONE.
C      CALL CHANGE(3)
C      GO TO (72, 71), FF8
C      SUBROUTINE XINTAX PUTS INTEGER NUMBERING ON X-AXIS.
C71      CALL XINTAX

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C C SUBROUTINE XNAME INPUTS THE TITLE OF THE X-AXIS.
C C
72 C C CALL XNAME (LINE, 100)
C C SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C C ARRAY TO ONE.
C C CALL CHANGE (4)
C C GO TO (76,75),FF7
C C SUBROUTINE YINTAX PUTS INTEGER NUMBERING ON Y-AXIS.
C C
75 C C CALL YINTAX
C C SUBROUTINE YNAME INPUTS THE TITLE OF THE Y-AXIS.
C C
76 C C CALL YNAME (LINE, 100)
C C SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C C ARRAY TO ONE.
C C CALL CHANGE (2)
C C SUBROUTINE HEADIN INPUTS THE TITLE OF THE GRAPH.
C C
C C CALL HEADIN (
C C CALL HEADIN (
C C CALL HEADIN (LINE, 100, 1.5, 2 )
C C SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C C ARRAY TO ONE.
C C GO TO (80,90),FF3
C C CALL CHANGE (5)
80 C C SUBROUTINE MESSAGE INPUTS THE USER'S MESSAGE.
C C
C C CALL MESSAGE (LINE, 100, RELAY(4,5),RELAY(4,6))
C C SUBROUTINE GRAF DEFINES THE PARAMETERS OF THE GRAPH.
C C
90 C C GO TO (100,110,120,130,140),FF5
100 C C CALL GRAF (RELAY(2,1),RELAY(2,2), RELAY(2,3),RELAY(2,4),
C C RELAY(2,5), RELAY(2,6))
C C GO TO 140
110 C C CALL XLOG (RELAY(2,1), RELAY(2,2), RELAY(2,4),RELAY(2,5))
C C GO TO 140

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120 CALL YLOG (RELAY(2,1), RELAY(2,2), RELAY(2,4), RELAY(2,5))
130 GO TO 140
140 CALL LOGLOG (RELAY(2,1), RELAY(2,2), RELAY(2,4), RELAY(2,5))
150 GO TO 140
160 CONTINUE
C EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
170 IF (FF6.EQ. 0) GO TO 200
180 DO 200 I = 1, FF6
190 C TYPE OF CURVE FITTING EMPLOYED ON ALL CURVES.
200 CALL FIT(I)
C
210 SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED TO DRAW
220 EACH CURVE.
230 GO TO (160,170),FF9
240 CALL MYSPEC(I)
250 CONTINUE
C
260 ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
270
280 LP = INGRAY(6,I)
290 CALL PAT(LP)
300 CALL RESET ('LEGLIN')
310 GO TO (180,190),FF1
320 IF (INGRAY(3,I).LT. 0) GO TO 190
330 CALL LEGLIN
C
340 SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
350 ARRAYS TO ONE.
360
370 CALL SWITCH (I,INGRAY(2,I))
C
380 SUBROUTINE CURVE LFFINES ALL THE PARAMETERS FOR EACH CURVE.
390
400 CALL CURVE (XPLOT, YPLOT, INGRAY(2,I),INGRAY(3,I))
410 IDIM = 5 + I
C
420 SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
430 ARRAYS TO ONE.
440
450 CALL CHANGE (IDIM)
C
460 SUBROUTINE LINES INPUTS THE TITLE OF EACH CURVE INTO THE LEGEND.
470
480 CALL LINES (LINE,IPAK,I)

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200 CCNTINUE
C SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE LEGEND.
C
C GO TO (201,205),FF9
201 ICCLR = JCCLR(19)
C CALL COLOR(ICCLR)
205 CCNTINUE
C EXECUTES THE USER'S DECISION REGARDING A LEGEND.
C
C GO TO (210,220), FF1
C SUBROUTINE LEGEND INPUTS THE PARAMETERS FOR THE LEGEND AND PUTS A
C BCX AROUND THE LEGEND.
C
210 CALL LEGEND (IPAK, INGRAY(1,4), REIRAY(1,5)+.2, REIRAY(1,6)+.2)
C X1 = XLEGND (IPAK, INGRAY(1,4))
C Y1 = YLEGND (IPAK, INGRAY(1,4))
C SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE LEGEND BORDER.
C
C GO TO (211,215),FF9
211 ICCLR = JCCLR(19)
C CALL COLOR(ICCLR)
215 CCNTINUE
C CALL BLREC (REIRAY(1,5),REIRAY(1,6), X1+.4, Y1+.4,-2.0)
220 CCNTINUE
C SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
C GO TO (230,240),FF9
230 ICCLR = JCCLR(20)
C CALL COLOR(ICCLR)
240 CCNTINUE
C EXECUTES USER'S DECISION REGARDING GRID LINES.
C
C GO TO (250,260),FF4
C SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
C LP = INGRAY(5,6)
C CALL PAT(LP)
C CALL GRID (INGRAY(1,5),INGRAY(1,6))
250 CCNTINUE
C CALL RESET ('ALL')
C CALL ENDPL (0)
260 RETURN

```



```

C C DECLARATIONS.
C
      INTEGER IDIM
      DIMENSION CCUVE(18)
      COMMON RELAY Y(18,100), XPLCT(100), IFRAY(11)
      E, X(18,100), Z(18,100), JCOLOR(25)
      E, ZPLOT(100), E01, E02, E03, E04, E05, E06, E07,
      E08, E09, E10, E11, E12, E13, E14, E15,
      E16, E17, E18, BL, CURV,
      FILPLT(1) = BL
      FILPLT(2) = CCUVE(IDIM)
      CONTINUE
10 RETURN
20 END
C *****
C ***** SWITCH *****
C *****
C ***** SUBROUTINE TO EXCHANGE ONE- AND TWO-DIMENSIONAL *****
C ***** NUMBER ARRAYS. *****
C *****
C ***** VARIABLES AND CONSTANTS *****
C *****
C ***** XPLCT ONE-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT. *****
C ***** YPLCT ONE-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT. *****
C ***** X TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT. *****
C ***** Y TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT. *****
C ***** ICUR THE CURVE NUMBER. *****
C ***** IXY THE NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE. *****
C *****
C ***** SUBROUTINE SWITCH (ICUR, IXY) *****
C *****
C C DECLARATIONS.
C
      INTEGER IXY, ICUR, I
      COMMON RELAY Y(18,100), XPLCT(100), IFRAY(11)
      E, ZPLOT(100), Z(18,100), JCOLOR(25)
      DO 10 I = 1, IXY
         XPLCT(I) = X(ICUR, I)

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10      YPLOT(I) = Y(ICUR, I)
      ZPLOT(I) = Z(ICUR, I)
      CONTINUE
      RETURN
      END
*****
***** SUBROUTINE TO GET FILE FOR USER TO PLOT A CURVE.
*****
***** VARIABLES AND CONSTANTS
*****
***** TWO-DIMENSIONAL ARRAY FOR X-COORDINATE OF
***** A DATA POINT.
*****
***** TWO-DIMENSIONAL ARRAY FOR Y-COORDINATE OF
***** A DATA POINT.
*****
***** KK
***** THE CURVE NUMBER.
*****
***** INGRAY(2, KK) NUMBER OF POINTS TO BE PLOTTED FOR THIS CURVE.
*****
***** INGRAY(3, KK) NUMBER OF POINTS TO BE MARKED FOR THIS CURVE.
*****
***** SUEROUTINE USRFILE (KK)
*****
C      DECLARATIONS.
C
C      REAL XY(10, 100)
C      INTEGER I, K, KK, J
C      COMMON RELRAY(6, 18), INGRAY(7, 18), LETRAY(10, 24), IFRAY(11)
C      X(18, 100), Y(18, 100), LINE(72), XPLOT(100), YPLOT(100), FILPLT(2)
C      E, ZPLOT(100), Z(18, 100), JCOLOR(25)
C      CALL FRTCMS('CIRSCRN', JCOLOR)
C
C      GIVES USER INSTRUCTIONS CN HOW TO INPUT HIS FILE.
C
C      WRITE (6, 600)
C
C      INFUTS THE USER-DEFINED NAME OF DATA FILE.
C
C      WRITE (6, 610)
C      READ (5, 16) END=15) (FILPLT(I), I=1, 2)
C      CALL FRTCMS('EXEC', CHECK, FILPLT, NN)
C      READ (5, *) NN
C      CALL FRTCMS('CIRSCRN', )

```

```

11 IF (NN.EQ.0) GO TO 20
   WRITE(6,660)
   CALL REEDIN(NN,812)
12 IF (NN.GT.0.AND. NN.LT.3) GO TO 13
   CALL ERROR4 (1,3)
   GO TO 11
13 GO TO (10,170,180),NN
   GC TO 20
15 CALL ERROR8
   GO TO 10
20 CALL FRTCMS('FILEDEF','3','DISK','FILPIT','DATA')
   REWIND 3
25 CALL FRTCMS('CIRSCRN')
   WRITE(6,615)
   CALL REEDIN(NN,828)
   IXF = NN
   IF (NN.GT.0.AND. NN.LT.11) GO TO 29
28 CALL ERROR4 (1,10)
   GO TO 25
   C DETERMINES THE METHOD THE USER WOULD LIKE TO USE TO INPUT HIS DATA;
   C A FAIR AT A TIME OR BY SENTINEL METHOD.
29 CALL FRTCMS('CIRSCRN')
   WRITE(6,620)
30 CALL REEDIN(NN,835)
   IF (NN.GT.0.AND. NN.LT.3) GO TO 40
35 CALL ERROR4 (1,2)
   GO TO 30
40 GO TO (50,80), NN
   C DETERMINES HOW MANY POINTS THE USER WISHES TO INPUT FOR THIS CURVE.
50 WRITE(6,630)
   CALL REEDIN(NN,855)
   I = NN
   INGRAY(2,KK) = I
   IF (I.LT.104) GO TO 60
   CALL ERROR5
   GO TO 50
55 CALL ERROR8
   GO TO 50
60 DO 70 JY = 1,I
   C READS IN THE DATA FROM A USER DEFINED FILE.
   C READ(3,*) (XY(IX,JY),IX = 1,IXF)
70 CONTINUE
   GO TO 130

```

AD-A150 779

EASYPLOT: AN INTERACTIVE USER-FRIENDLY GRAPHICS PROGRAM 2/2
(U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA
J C MAINWARING SEP 84

UNCLASSIFIED

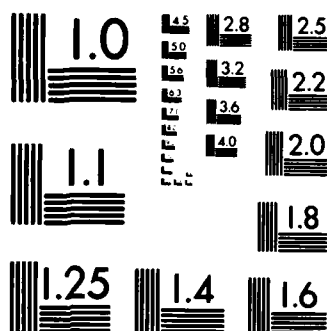
F/G 9/2

NL

END

1. MED

1. 1/1



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

```

C      DETERMINES THE SENTINEL VALUE THE USER WANTS TO USE.
C
80      WRITE (6,640)
      CALL FEEDRE(R,E90)
      GO TO 100
90      CALL ERROR8
      GO TO 80
100     J = 1
C
C      READS IN THE DATA FROM A USER DEFINED FILE.
C
110     READ(3,*) (XY(IX,J), IX = 1,IXF)
      IF (R.EQ.XY(1,J)) GO TO 130
      INGRAY(2,KK) = INGRAY(2,KK) + 1
      IF (J.EQ.100) GC TO 120
      J = J + 1
      GO TO 110
      CALL ERROR5
C
C      USER DESIGNATES NUMBER OF DATA POINTS HE WISHES PLOTTED.
C
130     CONTINUE
      CALL FRTCMS ('CLRSCRN ')
      WRITE (6,670) KK
      CALL FEEDIN(NN,E133)
      IX = NN
      IF (NN.GT.0.AND.NN.LE.IXF) GO TO 134
      GO TO 132
      JYM = INGRAY(2,KK)
      DO 135 JY = 1,JYM
      X(KK,JY) = XY(IX,JY)
      CONTINUE
      CALL FRTCMS ('CLRSCRN ')
      WRITE (6,680) KK
      CALL FEEDIN(NN,E137)
      IX = NN
      IF (NN.GT.0.AND.NN.LE.IXF) GO TO 138
      GO TO 136
      JYM = INGRAY(2,KK)
      DO 139 JY = 1,JYM
      Y(KK,JY) = XY(IX,JY)
      CONTINUE
      CALL FRTCMS ('CLRSCRN ')
      WRITE (6,636)
      CALL FEEDIN(NN,E150)
      INGRAY(3,KK) = NN

```

```

IF (IABS(INGRAY(3,KK))-LE. INGRAY(2,KK)) GO TO 169
LL= INGRAY(2,KK)
CALL ERRRCM4 (-LL,IL)
GO TO 140
CALL ERRCF8
GO TO 14C

150
169 RETURN
170 KK = -1
180 RETURN
CALL EXIT1
RETURN

CC CCFORMAT STATEMENTS.
510 FORMAT (2A4),
600 FORMAT (/10X,'NOTE: BEFORE THIS PROGRAM CAN BE USED,
E/10X,'YOUR DATA FILE MUST BE A FIXED FORMAT FILE, 80 CHARACTERS',
E/10X,'IN LENGTH, WITH A SPACE OR A COMMA BETWEEN THE VALUES.',)
610 FORMAT (/10X,'WHAT IS THE FILENAME FOR THIS FILE?',
E/10X,'(FILE TYPE MUST BE DATA BUT IS NOT TO BE ENTERED)'),
615 FORMAT (/10X,'HOW MANY NUMBERS PER ROW DO YOU HAVE? (10 MAX)'),
620 FORMAT (/10X,'HOW WOULD YOU LIKE TO INPUT THESE DATA POINTS?',
E/10X,'1. BY INPUTTING THE NUMBER OF DATA POINTS YOU WISH TO PLOT.',
E/10X,'VALUES WILL BE PLOTTED IN ORDER FROM THE FIRST TO THE LAST',
E/10X,'2. BY INPUTTING A LAST VALUE IN THE FIRST COLUMN OF YOUR DATA',
E/10X,'FILE.',)
ENTINEL:/10X,'THIS VALUE WILL NOT BE PLOTTED AND IS CALLED A SE-
ENTINEL'
630 FORMAT (/10X,'HOW MANY POINTS DO YOU WISH TO PLOT FROM YOUR FILE',
E/10X,'(100 MAX)'),
636 FORMAT (/30X,'MARKER SYMBOL INFORMATION'/
E/8Y,'A POSITIVE NUMBER--POINTS WILL BE CONNECTED AND MARKER SYMBOL',
E/14X,'IS DESIGNATED',
E/14X,'*',
E/8X,'ZERO (0)--POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.',
E/14X,'-',
E/8X,'A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBOL',
E/14X,'ONLY',
E/14X,'*',
E/10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND',
E/10X,'CONNECTED',)
E/5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI-
ESPLAYED?',)
640 FORMAT (/10X,'WHAT IS THE VALUE OF YOUR SENTINEL?',
E/10X,'NOTE: YOU MUST STILL PUT TWO VALUES IN SENTINEL DATA LINE',
E/10X,'FIRST VALUE IS THE SENTINEL.',)
E/10X,'FORMAT (/10X,'FILE NAME WAS NOT FOUND" PLEASE ENTER ONE OF TH-
E/10X,'E FOLLOWING NUMBERS',)
E/10X,'1. REENTER THE FILE NAME',
E/10X,'2. CONTINUE BY ENTERING AN NEW CURVE',

```



```

C C DETERMINES YES, NC, OR ERROR, (YES=1,NO=2,ERROR=3).
C C
C C CALL YORN(ILIC)
C C GO TO (20,145,10),IDIC
C C DETERMINES THE NAME UNDER WHICH THE USER WANTS THIS DATA FILED.
C 20 WRITE (6,605)
C READ(5,600) ENL=25) (FILELT(I),I=1,2)
C GO TO 30
C 25 CALL ERROR8
C GO TO 20
C 30 CALL FRTCHS('FILEDEF ','3 ','DISK ','FILELT ','DATA ')
C REWIND 3
C IFCINT = 1
C DO 35 JJ = 1, 18
C IF (IPOINT.GT. INGRAY(2,JJ)) GO TO 35
C IPOINT = INGRAY(2,JJ)
C 35 CCNTINUE
C C WRITES GRAPH INFORMATION INTO USER DEFINED DATA FILE.
C C
C 40 WRITE(3,620) (IFRAY(I),I=1,10)
C DO 40 I = 1, 10
C WRITE (3,630) I, (LETHAY(K,I),K=1,10)
C CONTINUE
C DO 50 I = 1, 7
C WRITE (3,650) I, (INGRAY(I,K),K=1,6)
C CONTINUE
C DO 60 I = 1, 6
C WRITE (3,640) I, (RELAY(I,K),K=1,6)
C CONTINUE
C DO 70 J = 1, IFCINT
C WRITE(3,640) J, (X(I,J),I=1,6)
C WRITE(3,640) J, (Y(I,J),I=1,6)
C WRITE(3,640) J, (Z(I,J),I=1,6)
C CONTINUE
C IF (INGRAY(1,4).IE.6) GO TO 140
C DO 80 I = 1, 6
C WRITE (3,650) I, (INGRAY(I,K),K=7,12)
C CONTINUE
C DO 90 I = 1, 6
C WRITE (3,640) I, (RELAY(I,K),K=7,12)
C CONTINUE
C DO 100 J = 1, IFCINT
C L = J+6
C WRITE(3,640) L, (X(I,J),I=7,12)
C WRITE(3,640) L, (Y(I,J),I=7,12)
C WRITE(3,640) L, (Z(I,J),I=7,12)

```

```

100      CCNTINUE(1,4),IE,12) GO TO 140
      IF (INGRAY(1,4),IE,12) GO TO 140
110      DO 110 I = 1,6
          WRITE(3,650) I, (INGRAY(I,K),K=13,18)
          CCNTINUE
      DO 120 I = 1,6
          WRITE(3,640) I, (RELRAY(I,K),K=13,18)
          CCNTINUE
120      DO 130 J = 1, IPOINT
          L = J+12
          WRITE(3,640) L, (X(I,J),I=13,18)
          WRITE(3,640) L, (Y(I,J),I=13,18)
          CCNTINUE
130      WRITE(6,610) (FILPLT(I),I=1,2)
140      RETURN
145
C      FCRMAT STATEMENTS.
C
500      FCRMAT (2A4)
600      FORMAT (//10X 'WOULD YOU LIKE THIS GRAPH DATA FILED? (Y OR N)'
      &/10X 'GRAPH MUST BE FILED TO MAKE A HARD COPY',
605      FCRMAT (//10X 'UNDER WHAT NAME WOULD YOU LIKE THIS DATA FILED?')
610      FCRMAT (//10X 'THIS DATA HAS BEEN SAVED IN FILE NAMED "2A4',
      &/10X 'DATA.'//)
620      FCRMAT (10I5)
630      FCRMAT (I2,10A4)
640      FCRMAT (I4,6E12.5)
650      FCRMAT (I2,6I5)
      ENL
C*****
C***** REID
C*****
C*****
C*****
C***** SUBROUTINE READING FILE FOR USER TO PLOT A GRAPH.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** INGRAY AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS
C***** DISPLA PARAMETERS.
C***** FELRAY AN ARRAY CONTAINING REAL NUMBERS FOR VARIOUS
C***** DISPLA PARAMETERS.
C***** LETRAY AN ARRAY CONTAINING CHARACTER STRING
C***** INFORMATION FOR VARIOUS DISPLA PARAMETERS.
C***** IFRAY AN ARRAY CONTAINING INTEGER VALUES FOR VARIOUS
C***** USER DECISIONS.
C*****

```

```

*****
C*****      AN ARRAY CCNTAINING THE X VALUES FOR THE
C*****      DIFFERENT DATA POINTS.
C*****
C*****      AN ARRAY CCNTAINING THE Y VALUES FOR THE
C*****      DIFFERENT DATA POINTS.
C*****
C*****      TEE VARIABLE NAME FOR USER FILE DATA.
C*****
C*****      SUEROUTINE REED
C*****
C    C   DECLARATIONS.
C    C   INTEGER B I,K,J,L,JJ,IPECINT
C    C   COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
C    C   E,X(18,100),Y(18,100),LINE(72),XPLCT(100),YPLCT(100),FILPILT(2)
C    C   E,ZPLCT(100),Z(18,100),JCOLOR(25)
C    C
C    C   GETS USER DATA FILE.
C    C
C    CALL FRFCMS('FILEDEF','3','DISK','FILELT','DATA')
C    REWIND 3
C
C    READS IN THE DATA FROM USER'S FILE TO PLOT OLD GRAPH.
C
C    READ(3,510) (IFRAY(I),I=1,10)
C    DO 10 I = 1,24
C    READ(3,520) L,(LETRAY(K,I),K=1,10)
C    CONTINUE
C    DO 20 I = 1,7
C    READ(3,540) L,(INGRAY(I,K),K=1,6)
C    CONTINUE
C    IPCINT = 1
C    DO 25 JJ = 1,18
C    IF(JPOINT.GT. INGRAY(2,JJ)) GO TO 25
C    IPOINT = INGRAY(2,JJ)
C    CONTINUE
C    DO 30 I = 1,6
C    READ(3,530) L,(FELRAY(I,K),K=1,6)
C    CONTINUE
C    DO 40 J = 1,IPCINT
C    READ(3,530) I,{X{I,J},I=1,6}
C    READ(3,530) I,{Y{I,J},I=1,6}
C    READ(3,530) I,{Z{I,J},I=1,6}
C    CONTINUE
C    IF(INGRAY(1,4).IE.6) GO TO 110
C    DO 50 I = 1,6

```



```

*****
X      AN ARRAY CONTAINING THE X VALUES FOR THE
C***** DIFFERENT DATA POINTS.
C*****
Y      AN ARRAY CONTAINING THE Y VALUES FOR THE
C***** DIFFERENT DATA POINTS.
C*****
C***** SUPEROUTINE ZERC *****
C*****
C C DECLARATIONS.
C C
C C     INTEGER I,J,K,BLANK INGRAY(7,18), LETRAY(10,24), IFRAY(11)
COMMON RELAY{6,18}, LINE(72), XELOT(100), YELOT(100), FILPLT(2)
C C     E,X(18,100),Z(18,100),JCOLOR(25)
C C     E,ZPLOT(100),Z(I8,100),JCOLOR(25)
C C     DATA BLANK,/
C C
C C     CLEARS WORKING FILE SPACE.
C C
C C     DO 20 I = 1,10
IFRAY(I) = 0
DO 10 K = 1,24
LETRAY(I,K) = BLANK
CONTINUE
10 CCNTINUE
20 DO 60 I = 1,6
DO 40 K = 1,18
RELRAY(I,K) = 0.0
CCNTINUE
40 CONTINUE
60 DO 80 I = 1,18
DO 70 J = 1,100
X(I,J) = 0.0
Y(I,J) = 0.0
Z(I,J) = 0.0
CONTINUE
70 CONTINUE
80 DO 100 I = 1,7
DO 90 K = 1,18
INGRAY(I,K) = 0
CCNTINUE
90 CONTINUE
100 RETURN
END
C***** YCFN *****
C*****

```

```

C*****
C***** SUBROUTINE TO CHECK THE ANSWER YES OR NO
C***** RETURNS YES = 1 AND NO = 2.
C*****
C***** VAKIABLES AND CONSTANTS
C*****
C***** IDIC THE INTEGER INDEX FOR THE ANSWER YES OR NO.
C*****
C***** IINE THE DUMMY CHARACTER ARRAY.
C*****
C***** SIEROUTINE YORN (IDIC)
C*****
C***** DECLARATIONS.
C*****
C***** INTEGER I IDIC YES NO EXITA,EXIT3,EXITC,EXITD,EXITE,EXITF
C***** COMMON RELRAY(6,18),INGRAY(7,18),LETRAY(10,24),IFRAY(11)
C***** &,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLCT(100),FILPLT(2)
C***** &,ZPCT(100),Z(18,100),JCOLOR(25)
C***** &DATA YES/Y,NO/N,EXITA/25,EXITF/9,EXITD/9,EXITE/9,EXITC/9
C***** IDIC = 3
C***** READ (5,515,END=20) (LINE(I),I=1,72)
C*****
C***** DETERMINES IF THE ANSWER WAS YES, NO, OR AN ERROR AND ASSIGNS
C***** EITHER 1, 2, OR 3 RESPECTIVELY.
C*****
C***** DO 10 I = 1, 67
C***** IF (LINE(I) .EQ. YES) IDIC = 1
C***** IF (LINE(I) .EQ. NO) IDIC = 2
C***** IF (LINE(I+1) .NE. EXITA) GO TO 9
C***** IF (LINE(I+2) .NE. EXITB) GO TO 9
C***** IF (LINE(I+3) .NE. EXITC) GO TO 9
C***** IF (LINE(I+4) .NE. EXITD) GO TO 9
C***** IF (LINE(I+5) .NE. EXITE) GO TO 9
C***** IF (IDIC.NE.3) GO TO 30
C*****
C***** CONTINUE
C***** REWIND 5
C***** CALL ERROR6
C***** RETURN
C*****
C***** FORMAT STATEMENTS.
C*****
C***** 515 FORMAT(72A1)
C***** END
C*****
C***** REVISE
C*****

```



```

C 50 CALL YAXIS
C GO TO 5
C SUBROUTINE STYLE WILL CHANGE THE TYPE OF LETTERING BEING USED.
C 60 CALL STYLE
C GO TO 5
C SUBROUTINE MESS WILL UPDATE THE INFORMATION FOR THE MESSAGE.
C 70 CALL MESS(2)
C GO TO 5
C 80 CALL MESS(3)
C GO TO 5
C SUBROUTINE LOCLEG WILL UPDATE THE INFORMATION FOR THE LEGEND.
C 90 CALL LOCLEG
C GO TO 5
C SUBROUTINE XVALUE WILL UPDATE THE LENGTH INFORMATION ON THE X-AXIS.
C 100 CALL XVALUE
C GO TO 5
C SUBROUTINE YVALUE WILL UPDATE THE LENGTH INFORMATION ON THE Y-AXIS.
C 110 CALL YVALUE
C GO TO 5
C SUBROUTINE GRIDDE WILL UPDATE THE INFORMATION ON THE GRID PATTERN.
C 120 CALL GRIDDE
C GO TO 5
C SUBROUTINE UPCRVS WILL UPDATE THE CURVE INFORMATION.
C 130 CALL UPCRVS
C GO TO 5
C SUBROUTINE CURVS WILL INPUT A COMPLETE NEW SET OF CURVES.
C 140 CALL CURVS
C GO TO 5
C SUBROUTINE HELP1 WILL INSTRUCT USER ON USE OF MENU.
C 150 CALL HELP1

```



```

C C DECLARATIONS.
C
C      REAL RR
C      INTEGER J,I,JJ,K,KK,LLL
C      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IERAY(11)
C      S,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
C      S,ZPLOT(100),Z(18,100),JCOLOR(25)
10      CALL FRTCMS('CIRSCRN',)
C
C      DETERMINES WHICH FUNCTION USER WISHES TO PERFORM: UPDATE, ADD,
C      OR DELETE A CURVE.
C      WRITE(6,610)
20      CALL REEDIN(NN,825)
C      J = NN
C      IF (J.GT. 0 .AND. J .LT. 6) GO TO 30
25      CALL ERRCR4(1,5)
C      GO TO 20
30      GO TO (50,190,40,45,320),J
C
C      DETERMINES WHICH CURVE THE USER WISHES TO DELETE.
C
C      CALL FRTCMS('CIRSCRN')
C      CALL EDCURVE
C      CALL FRTCMS('CIRSCRN')
C      GO TO 20
40
C
C      SUBROUTINE HELP4 INSTRUCTS THE USER ON THE USE OF THIS MENU.
C
C      CALL FRTCMS('CIRSCRN')
C      CALL HELP4
C      CALL FRTCMS('CIRSCRN')
C      GO TO 20
45
C
C      DETERMINES WHICH CURVE THE USER WISHES TO UPDATE.
C
C      CALL FRTCMS('CIRSCRN')
50      WRITE(6,620)
60      CALL REEDIN(NN,865)
C      I = NN
C      IF (I.GT. 0 .AND. I .LT.19) GO TO 70
C      CALL ERRCR7
C      GO TO 60
C      CALL ERRCR8
65      GO TO 60
C      CALL FRTCMS('CIRSCRN')
70
C
C      DETERMINES WHICH AREA OF THE CURVE THE USER WISHES TO UPDATE: TITLE,
C      DATA POINTS, ADD DATA POINTS, DELETE DATA POINTS,

```

```

C FILE NAME, NUMBER OF DATA POINTS TO BE MARKED, AND
C PATTERN OF LINE DRAWN.
C
80 WRITE(6,630) I
   CALL REEDIN(NN,885)
   IF (NN.GT.0) AND. NN.L1.11) GO TO 30
85   CALL ERROR4 (1,10)
   GO TO 80
90   J = NN
   CALL FRTCMS ('CIRSCRN ')
   GO TO (110,120,130,140,150,160,170,180,185,190), J
C DETERMINES THE USER'S NEW TITLE FOR THE CURVE.
C
110 WRITE(5,520) (LETRAY(K,J),K=1,9)
   WRITE(6,640) I
   J = 5
   READ (5,510) END=115) (LETRAY(K,J),K=1,9)
   CALL LITTE(J,IJ)
   IF (JJ.II.10) GO TO 70
   CALL ERROR3
   GO TO 110
   CALL ERROR8
   GO TO 110
115
C JEDATES THE DATA ECINTS FOR THE USER DESIRED CURVE.
C
120   KKK = INGRAY(2,I)
   CALL DATCHK(I,KKK)
   GO TO 70
C
C ADDS A DATA PCINT TO THE CURVE.
C
130   CALL APOINT(I)
   CALL FRTCMS ('CIRSCRN ')
   GO TO 70
C
C DELETES A DATA POINT FROM THE CURVE.
C
140   CALL DPOINT(I)
   CALL FRTCMS ('CIRSCRN ')
   GO TO 70
C
C CHANGES THE DATA FILE THE USER WISHES TO USE FOR THAT CURVE.
C
150   IKK = I
   CALL USRFILE(IKK)
   GO TO 70
C

```

```

C USER DESIGNATES NUMBER OF DATA POINTS HE WISHES MARKED.
C
160 WRITE (6,634)
CALL REEDIN(NN,8105)
INGRAY(3,I) = NN
IF (IABS(INGRAY(3,I)) - LE. INGRAY(2,I)) GO TO 70
LL = INGRAY(2,I)
CALL ERROR4(-LL,LL)
GO TO 160
165 CALL ERRCF8
GO TO 160

C DETERMINES LINE PATTERN TO BE DRAWN.
C
170 CALL PATNER (LF)
INGRAY(6,I) = LF
GO TO 70

C DETERMINES CURVE INTERPOLATION TO BE USED.
C
180 CALL FITTYP (I)
GO TO 70

C SUBROUTINE HELPS INSTRUCTS THE USER ON THE USE OF THIS MENU.
C
185 CALL FRTCMS ('CIRSCRN ')
CALL HELP5
GO TO 70

C ADDS A CURVE TO THE GRAPH.
C
190 INGRAY(1,4) = INGRAY(1,4) + 1
I = INGRAY(1,4)
IF (I - IT.19) GO TO 199
CALL ERROR7
GO TO 80
199 CALL FRTCMS ('CIRSCRN ')

C DETERMINES THE TITLE OF THE CURVE TO BE ADDED.
C
200 WRITE (6,640) I
J = 5 + I
READ (5,510,END=205) (LETRAY(K,J),K=1,9)
CALL LITTE(J,JJ)
IF (JJ - IT.19) GO TO 210
CALL ERROR3
GO TO 200
CALL ERROR8
GO TO 200
205

```

```

C DETERMINES LINE PATTERN TO BE DRAWN.
C 210 CALL PATNER (LP)
    INGRAY(6,I) = I
C DETERMINES THE METHOD THE USER WISHES TO USE TO INPUT DATA FOR THIS
C NEW CURVE.
C 220 WRITE (6,650)
    CALL REEDIN(NN, E225)
    IF (NN.EQ.1 .OR. NN.EQ.2) GO TO 230
    CALL ERROR4(1,2)
    GO TO 220
C 230 GO TO (240,300), NN
C DETERMINES HOW MANY POINTS THE USER WISHES TO PLOT.
C 240 WRITE (6,660)
    CALL REEDIN(NN, E245)
    IF (NN.LT.100.) GO TO 250
    CALL ERROR5
    GO TO 240
C 245 CALL ERROR8
    GO TO 240
C 250 INGRAY(2,I) = NN
C DESIGNATES NUMBER OF DATA POINTS USER WISHES MARKED ON GRAPH.
C 260 CALL FRICMS ('CLRSCRN ')
    WRITE (6,634)
    CALL REEDIN(NN, E265)
    INGRAY(3,I) = NN
    IF (IABS(INGRAY(3,I)).LE. INGRAY(2,I)) GO TO 270
    LL = INGRAY(2,I)
    CALL ERROR4(-LL,LL)
    GO TO 260
C 265 CALL ERROR8
    GO TO 260
C INFUTS THE DATA PCINTS A PAIR AT A TIME FROM THE TERMINAL.
C 270 KKK = INGRAY(2,I)
    DO 290 JJ=1, KKK
        CALL FRICMS ('CLRSCRN ')
        WRITE (6,670) JJ, KKK
        REAL (5,*, END=285) X(I,JJ), Y(I,JJ)
        GO TO 290
    CALL ERROR8
C 285

```



```

ELS ONLY.'
E//14X,'(* * * EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
E//10X,'EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH A SYMBOL AND
E//CNNECTED,/24X,'BY A LINE)
E//5X,'HOW FREQUENTLY DO YOU WANT MARKER SYMBOLS FOR THIS CURVE DI
ESPLAYED?')
640 FORMAT(//10X,'WHAT IS THE NEW TITLE OF CURVE',I2,' ?'/15X,
      & FORMAT(//10X,'(32 CHARACTERS MAX),')
      & FORMAT(//10X,'WHICH METHOD DO YOU WISH TO USE TO INPUT T
      & HIS CURVES DATA?',/
      & 16X,'1. TYPE IN DATA ONE PAIR AT A TIME.'
      & 16X,'2. USE DATA FILE INPUT.')
660 E//16X,'HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE
      & ? (100 MAX)',/10X,'X-COORDINATE Y-COORDINATE IN YOUR UNITS,'/13X,
      & 16X,'13. C',I3,' POINTS.',)
      & ENF
C*****
C***** DATCKH
C*****
C***** SUBROUTINE TO VERIFY DATA FOR EACH GRAPH.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** X 2-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT.
C***** Y 2-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT.
C***** I THE CURVE NUMBER.
C***** J THE NUMBER OF POINTS TO BE CHECKED FOR THIS CURVE.
C***** LINE ONE-DIMENSIONAL ARRAY FOR CHARACTER STRINGS.
C*****
C***** SUBROUTINE DATCKH (I,J)
C*****
C***** DECLARATIONS.
C*****
REAL FR
INTEGER J,I,IDIC,N,N,I,K,K,K
COMMON RELAY(6,18),INGRAY(7,18),LETRAY(10,24),IFRAY(11)
E,X(18,100),Y(18,100),LINE{72},XPLOT(100),YPLOT(100),FILFLT(2)
E,ZPLOT(100),Z(18,100),JCOLOR(25)
K=5
CALL FRTCMS ('CIRSCRN ')

```

```

C C DETERMINES IF THE USER WISHES TO CONTINUE TO UPDATE DATA.
C C
C C 20 CALL FRICMS ('CIRSCRN ')
C C   WRITE (6,600) I
C C
C C SUBROUTINE YORN DETERMINES IF THE ANSWER WAS YES, NC, OR ERROR.
C C
C C   CALL YORN(IDIC)
C C   GO TO (30,110,20), IDIC
C C
C C PRINTS ON THE SCREEN FIVE DATA POINTS AT A TIME FOR THE USER
C C TO CHECK.
C C
C C 30 WRITE (6,610) I
C C   DC 50 NN = K, KK
C C   WRITE (6,620) NN, X(I,NN), Y(I,NN)
C C   CONTINUE
C C
C C DETERMINES FROM THE USER IF THESE DATA POINTS ARE CORRECT.
C C
C C 60 WRITE (6,630) I
C C
C C SUBROUTINE YORN DETERMINES IF THE ANSWER WAS YES, NC, OR ERROR.
C C
C C   CALL YORN (IDIC)
C C   GO TO (90,70,30), IDIC
C C
C C DETERMINES WHICH PAIR THE USER WISHES TO CHANGE.
C C
C C 70 WRITE (6,640)
C C   CALL REEDIN(NN,875)
C C   IF II = NN
C C     IF (II-IT-K-OR-II-GT-KK) GO TO 85
C C     IF (II-IE-J) GC TC 80
C C     CALL ERROR4(K,J)
C C     GO TC 30
C C     CALL ERROR8
C C     GO TC 70
C C
C C DETERMINES THE DATA TO BE UPDATED FROM THE USER.
C C
C C 80 WRITE (6,650)
C C   READ (5,END=100) X(I,II), Y(I,II)
C C   CALL FRICMS ('CLRSCRN '),
C C     GO TO 30
C C
C C 85 CALL ERROR4(K, KK)
C C     GO TC 70
C C
C C 90 IF (KK-GE-J) GO TO 110

```



```

C 10 INTEGER I, IC, JD, N, II, J
      READ 5
      COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
      C,X(18,100),Y(18,100),LINE(72),XPLCT(100),YPLCT(100),FILPLT(2)
      E,ZPIC(100),Z(18,100),JCOLOR(25)

C 20 WRITE(6,610)
      JD = INGRAY(2,IC)
      DO 20 I = 1, JC
        WRITE(6,620) I, X(IC,I), Y(IC,I)
      CC CONTINUE

C 30 DETERMINES IF USER STILL WISHES TO DELETE A POINT.
      WRITE(6,630)

C 40 SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
      CALL YORN(I,IC)
      CALL FRTCMS('CIRSCRN')
      GO TO (40,70,30),I,IC

C 50 DETERMINES WHICH PCINT THE USER WANTS DELETED AND EXECUTES.
      WRITE(6,640)
      CALL REEDIN(NN,845)
      N = NN
      IF (N .GT. 0 .AND. N .LE. JD) GO TO 50
      CALL ERROR4(1,JD)
      GO TO 40
      CALL ERROR8
      GO TO 40
      II = INGRAY(2,IC)
      DO 60 J = N, II
        X(IC,J-1) = X(IC,J)
        Y(IC,J-1) = Y(IC,J)
      CC CONTINUE
      INGRAY(2,IC) = II - 1
      X(IC,II) = 0.0
      Y(IC,II) = 0.0
      RETURN

C 60 FORMAT STATEMENTS.

C 610 FORMAT('10X','THIS IS A CURRENT LISTING OF YOUR DATA POINTS, FIVE
      E AT A TIME')
C 620 E/10X,'NUMBER',10X,'X VALUE',10X,'Y VALUE'/'
      E/10X,'12.5,5X,1PE12.5)'
C 630 FORMAT('12X','DO YOU STILL WISH TO DELETE A PCINT? (Y OR N)')
      E/10X,'10X,'10X,'1PE12.5)'

```


[illegible]

```

INTEGER I, N, NN, J, II, IDIC
REAL R
COMMON RELRAY (6,18), INGRAY (7,18), LETRAY (10,24), FRA Y (11)
      X (18,100), Y (18,100), LINE (72), X1LOT (100), Y1LOT (100), F1LOT (2)
      Z1LOT (100), J1LOT (100), JCOLOR (25)
      J2 = INGRAY (2, IC)
      IF (JD.LT.100) GO TO 10
      CALL ERRORS5
      GO TO 60
10  WRITE (6,610)
      DO 20 I = 1, JF
        WRITE (6,620) I, X (IC,I), Y (IC,I)
20  CONTINUE
C  DETERMINES IF USER STILL WISHES TO ADD A POINT.
C
C 30  WRITE (6,630)
C
C  SUROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1, NO=2, ERROR=3).
C
      CALL YORN (IDIC)
      CALL FETCHS (CIRSCRN ')
      GO TO (40,80,30), IDIC
40  WRITE (6,640)
      CALL REEDIN (N, E45)
      IF (N.GT.6.AND. N.LE. JD) GO TO 50
      CALL ERROR4 (1, JD)
      GO TO 40
45  CALL ERROR8
      GO TO 40
50  II = 99 - N
      INGRAY (2, IC) = INGRAY (2, IC) + 1
      DO 60 J = 1, II
        X (IC, 101-J) = X (IC, 100-J)
        Y (IC, 101-J) = Y (IC, 100-J)
        CONTINUE
60  WRITE (6,650)
      READ (5,*) END=75) X (IC, N+1), Y (IC, N+1)
70  GO TO 80
75  REWIND 5
      CALL ERROR8
      GO TO 70
80  RETURN
C
C  FORMAT STATEMENTS.
C
610  FORMAT (/10X, 'THIS IS A CURRENT LISTING OF YOUR DATA POINTS.',
      & /10X, 'NUMBER', 10X, 'X VALUE', 10X, 'Y VALUE', /)
620  FORMAT (/12X, 13, 2(5X, 1E12.5))

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```

630 FORMAT (//10X,'DO YOU STILL WISH TO ADD A POINT? (Y OR N)')
640 FORMAT (//5X,'INPUT THE NUMBER OF THE POINT AFTER WHICH THE NEW P
      &CINT WILL BE ADDED:')
650 FORMAT (//10X,'WHAT IS THE NEW DATA POINT? (X,Y)')
      END
C*****
C*****THREED
C*****
C*****      SUBROUTINE TO CONTROL CONSTRUCTION OF 3-D GRAPHS.
C*****
C*****
C*****
C*****      SUBROUTINE THREED
C*****
C      DECLARATIONS.
C
C      INTEGER I, IDIC
C      REAL RR
C      COMMON RELRAY (6,18), INGRAY (7,18), LETRAY (10,24), IFRAY (11)
C      &, X (18,100), Y (18,100), LINE (72), XPLT (100), YPLT (100), FILPLT (2)
C      &, ZPLT (100), Z (18,100), JCOLOR (25)
C
C      SUBROUTINE EX2D DETERMINES WHICH GRAPHICS DEVICE IS BEING USED.
C
C      CALL FRTCMS ('CIRSCRN ')
C      CALL EX2D
C      CALL FRTCMS ('CIRSCRN ')
C
C      DECISION TO INPUT A NEW GRAPH OR EDIT AN OLD ONE.
C
C10  WRITE (6,610)
C
C      SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
C      CALL YORN (IDIC)
C      GO TO (30,20,10),IDIC
C
C      SUBROUTINE THREED INPUTS DATA FOR A NEW GRAPH.
C
C20  CALL TH3D
C      GC TO 80
C
C      DETERMINES FILE NAME OF GRAPH USER WISHES TO EDIT.
C
C30  WRITE (6,620)
C      READ (5,520,END=35) (FILPLT(I),I=1,2)
C      CALL FRTCMS ('EXEC',CHECK',FILPLT,NN)
C      READ (5,*) NN

```

```

31 IF (NN.EQ.0) GO TO 50
   CALL FRTCMS('CIRSCRN ')
   WRITE(6,650)
   CALL REEDIN(NN,833)
33 IF (NN.GT.0.AND. NN.IT.3) GO TO 34
   CALL ERROR4(1,2)
   GO TO 31
34 GO TO (30,20) NN
   CALL FRTCMS('FILEDEF ',3
   CALL FRTCMS('CIRSCRN ')
   GO TO 50
35 CALL ERROR8
   GO TO 30

C SUPROUTINE REED INPUTS GRAPH DATA FROM USER'S FILE.
C
50 CALL REED
C
C SUPROUTINE PLOT3D PLOTS USER'S GRAPH.
C
   NN = IFRAY(5)
   GO TO (60,60,60,60,70), NN
60 CALL PLOT2D
   GO TO 80
70 CALL PLOT3D
   GO TO 80
C
C DECISION FOR USER TO CONTINUE EDITING GRAPH.
C
80 WRITE (6,630)
C
C SUPROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1,NO=2,ERROR=3).
C
   CALL YORN(ILIC)
   GO TO (90,100,80), IDIC
C
C SUPROUTINE REV3D ELITS USER'S GRAPH.
C
90 CALL REV3D
100 CCNTINUE
C
C SUPROUTINE FILE FILES GRAPH DATA UNDER USER'S DEFINED FILE NAME
C FOR FURTHER USE.
C
   CALL FRTCMS ('CIRSCRN ')
   CALL FILE
C
C DECISION FOR USER TO CONTINUE WORKING ON A NEW GRAPH.
C

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```

110 WRITE (6,640)
    CALL ZERO
C SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1, NO=2, ERROR=3).
C
    CALL YORN(ILIC)
    GO TO (10,120,110),IDIC
120 CONTINUE
C SUBROUTINE DONEPL TERMINATES PLOTTING SEQUENCE.
C
    CALL DONEPI
    RETURN
C
C FORMAT STATEMENTS.
C
520 FORMAT (2A4)
510 FORMAT (//10X, 'IS THIS AN UPDATE OF AN OLD GRAPH? (Y OR N)')
620 FORMAT (//10X, 'WHAT IS THE FILE NAME OF YOUR GRAPH?')
630 FORMAT (//10X, 'DO YOU WISH TO UPDATE THIS GRAPH? (Y OR N)')
640 FORMAT (//10X, 'DO YOU WISH TO DEVELOP ANOTHER 3-D GRAPH? (Y OR N)')
650 FORMAT (//10X, 'FILE NAME WAS NOT FOUND " PLEASE ENTER ONE OF TH
    &F FOLLOWING: //10X, '1. REENTER THE FILE NAME,
    & /10X, '2. CONTINUE BY ENTERING A NEW GRAPH')
    END
C*****
C*****TH3D
C*****
C***** SUBROUTINE TO CONTRCI CONSTRUCTION OF 3-D NEW GRAPHS.
C*****
C*****
C***** SUBROUTINE TH3D
C***** CALL FRTCMS ('CLRCRN ')
C
C SUBROUTINE EXAMPL DISPLAYS AN EXAMPLE TO GUIDE USER.
C
    CALL EXAM3D
    CALL FRTCMS ('CLRCRN ')
C
C SUBROUTINE PAGE2D DETERMINES DESIRED PAGE SIZE FOR GRAPH.
C
    CALL PAGE2D
    CALL FRTCMS ('CLRCRN ')
C
C SUBROUTINE SUBPLT DETERMINES DIMENSIONS OF SUBPLOT AREA.
C

```

```

C      CALL SUBPLT
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE HEADNG INPUTS TITLE OF USER'S GRAPH.
C
C      CALL HEADNG
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE XAXIS INPUTS TITLE OF X-AXIS.
C
C      CALL XAXIS
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE YAXIS INPUTS TITLE OF Y-AXIS.
C
C      CALL YAXIS
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE ZAXIS INPUTS TITLE OF Z-AXIS.
C
C      CALL ZAXIS
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE MESS INPUTS A MESSAGE FOR THE USER.
C
C      CALL MESS (1)
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE LOCLEG DETERMINES LEGEND LOCATION.
C
C      CALL LOCLEG
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE XVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF X-AXIS.
C
C      CALL XVALUE
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE YVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF Y-AXIS.
C
C      CALL YVALUE
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE ZVALUE INPUTS ORIGIN VALUE, STEP, AND MAX VALUE OF Z-AXIS.
C
C      CALL ZVALUE
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE GRID3D INPUTS THE GRID DATA.

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```

C      CALL GRID3D
C      CALL FRTCMS ('CLRSCRN ')
C      SUEROUTINE CRVS INFUTS THE DATA FOR USER'S CURVES.
C
C      CALL CRVS3D
C      CALL FRTCMS ('CLRSCRN ')
C      SUEROUTINE PLOT3D PLOTS USER'S GRAPH.
C
C      CALL PLOT3D
C      RETURN
C      END
C*****
C***** SUBROUTINE TO DEVELOP A CURVE.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** DUMMY REAL VALUE FOR DEVICE TYPE.
C*****
C***** INGRAY(2,I) NUMBER OF POINTS ON THE CURVE.
C*****
C***** KKK      NUMBER OF POINTS ON THE CURVE.
C*****
C***** INGRAY(1,4) NUMBER OF CURVES FOR THIS GRAPH.
C*****
C***** KK       NUMBER OF CURVES FOR THIS GRAPH.
C*****
C***** INGRAY(3,I) NUMBER OF POINTS TO BE PLOTTED FOR THIS GRAPH.
C*****
C***** LETTER(10,I) TITLE OF EACH CURVE FOR THIS GRAPH.
C*****
C***** J        WHICH OF THE CURVES IS BEING OPERATED ON.
C*****
C***** JJ       NUMBER OF LETTERS IN THE CURVE TITLE.
C*****
C***** X(I,JJ)  X-COORDINATE OF A DATA POINT.
C*****
C***** Y(I,JJ)  Y-COORDINATE OF A DATA POINT.
C*****
C***** Z(I,JJ)  Z-COORDINATE OF A DATA POINT.
C*****
C***** SUEROUTINE CRVS3D
C*****
C

```

```

C DECLARATIONS.
C
  REAL RR
  INTEGER J,I,JJ,K,KK,L,LP
  COMMON RELRAY(6,18), INGRAY(7,18), LETRAY(10,24), IFRAY(11)
  C,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLCT(100),FILFLT(2)
  E,ZPLOT(100),Z(18,100),JCOLCR(25)

C DETERMINES HOW MANY CURVES ARE TO BE PLOTTED.
C
10  WRITE (6,600)
    CALL REEDIN(NN,815)
    INGRAY(1,4) = NN
    IF (NN.LT.1) GO TO 220
    IF (NN.LT.15) GO TO 20
    CALL ERROR7
    GO TO 10
20  KK = INGRAY(1,4)

C DETERMINES THE TITLE OF EACH CURVE.
C
30  DO 210 I=1, KK
40  CALL FRTCMS ('CLRSCRN ')
    WRITE (6,610) I
    J = 5 + I
    READ (5,510) FND=45) (LETRAY(K,J),K=1,9)
    CALL LETTER(J,JJ) TO 60
    IF (JJ.IT.10) GO TO 60
    CALL ERROR3
    GO TO 40
    CALL ERROR8
    GO TO 40
45

C DETERMINES THE LINE PATTERN TO BE USED.
C
60  CALL FATNER(LP)
    INGRAY(6,1) = LP
    CALL FRTCMS ('CLRSCRN ')

C DETERMINES WHICH METHOD THE USER WISHES TO USE TO INPUT CURVE DATA.
C
70  WRITE (6,620)
    CALL REEDIN(NN,875)
    IF (NN.GT.0.AND.NN.LT.3) GO TO 90
    CALL ERROR4 (1,2)
    GO TO 70
75  CALL FRTCMS('CLKSCRN ')
    GO TO (100,200),NN
90
C

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```

C USER DESIGNATES NUMBER OF LATA POINTS HE WISHES TO ENTER.
C
100 WRITE (6,630)
    CALL REEDIN(NN, &105) GO TO 120
    IF (NN.EQ.101)
    CALL ERRORS
        GO TO 100
    CALL ERRORS
        GO TO 100
    INGRAY(2,I) = NN
    KKK=NN
105
120
C USER DESIGNATES NUMBER OF LATA POINTS HE WISHES MARKED.
C
C CALL FRCHMS ('CLKSCRN ')
130 WRITE (6,636)
    CALL REEDIN(NN, &135)
    INGRAY(3,I) = NN
    IF (IABS(INGRAY(3,I)) .LE. KKK) GO TO 150
    CALL ERRORS4 (-KKK, KKK)
135 GO TO 130
C USER INPUTS THE DATA PAIRS.
C
150 DO 190 JJ=1, KKK
160 CALL FRCHMS ('CLKSCRN ')
170 WRITE (6,640) JJ, KKK
    READ (5,*, END=186) X(I, JJ), Y(I, JJ), Z(I, JJ)
    GO TO 180
    CALL ERRORS
    GO TO 170
180 CONTINUE
190
C SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
C
C CALL DTCH3D(I, KKK)
    GO TO 210
C SUBROUTINE USEFIL INPUTS DATA FROM A USER-DEFINED FILE.
C
200 IKK = I
    CALL USRPF3I (IKK)
    IF (IKK.EQ.-1) GO TO 30
C SUBROUTINE DATCHK CHECKS CORRECTNESS OF INPUTTED DATA.
C
C CALL DTCH3D(I, KKK)
210 CONTINUE
220 CCCONTINUE

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```

C      E,X(18,100),Y(18,100),LINE(72),XPLOT(100),YPLOT(100),FILPLT(2)
C      E,ZPLOT(100),Z(18,100),JCOLOR(25)
C      FORTRAN REQUIREMENT TO USE A COMPUTED GO TO STATEMENT.
C
C      FF1 = IFRAY(1)
C      FF3 = IFRAY(3)
C      FF4 = IFRAY(4)
C      FF6 = INGRAY(1,4)
C      FF7 = IFRAY(7)
C      FF8 = IFRAY(8)
C      FF5 = IFRAY(6)
C      FF9 = IFRAY(11)
C      GO TO (5,45),FF9
C      CALL SPECMOD
C
C      SUBROUTINE COLOR DETERMINES THE COLOR PEN TO BE USED TO DRAW BORDER.
C
C      WRITE (6,610)
C      ICCIOR = 0
C      CALL COLOR(ICOLOR)
C
C      SUBROUTINE COLOR DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
C      DO 10 I=1,FF6
C      WRITE (6,620) I
C      ICCIOR = 0
C      CALL COLOR(ICOLOR)
C      JCCIOR(I)=ICCIOR
C  10 CONTINUE
C
C      SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C      FOR PLANE A.
C
C      WRITE (6,630)
C      ICCIOR = 0
C      CALL COLOR(ICOLOR)
C      JCCIOR(20)=ICCIOR
C
C      SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C      FOR PLANE B.
C
C      WRITE (6,640)
C      ICCIOR = 0
C      CALL COLOR(ICOLOR)
C      JCCIOR(21)=ICCIOR
C
C      SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES
C      FOR PLANE C.

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```

C      WRITE (0,650)
C      ICCOLOR = 0
C      CALL COLOR (ICOLOR)
C      JCOLOR(22) = ICOLOR
C      ICCOLOR = JCOLOR(19)
C      CALL COLOR (ICOLOR)
C      CCNTINUE
45
C      SUBROUTINE ERRSET REMOVES ERROR MESSAGE FROM DISPLAY AND
C
C      CALL RESET ('ALL')
C      CALL ERRSET (208, 256, -1, 1)
C
C      SUBROUTINE HWSICAL DOES THE SCALING OF THE GRAPH ON THE DEVICE.
C
50      CALL HWSICAL ('SCREEN')
C50      CALL HWSICAL ('MCNE')
C      CALL UCCHAR
C
C      SUBROUTINE PAGE DEFINES THE PAGE SIZE.
C
C      CALL PAGE (RELAY(1,1), RELAY(1,2))
C
C      SUBROUTINE HWROT ROTATES THE PAGE TO FIT THE SCREEN.
C
C      CALL HWROT ('AUTO')
C
C      SUBROUTINE AREA2D DEFINES THE SUBPLOT AREA.
C
60      CALL AREA2D (RELAY(1,3), RELAY(1,4))
C
C      SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C      AREA TO ONE.
C
70      GO TO (70,80), FF3
C      CALL CHANGE (5)
C
C      SUBROUTINE MESSAGE INPUTS THE USER'S MESSAGE.
C
80      CALL MESSAGE (LINE, 100, RELAY(4,5), RELAY(4,1))
C      CCNTINUE
C
C      SUBROUTINE LETTAR DETERMINES THE TYPE OF LETTERING.
C
C      CALL LETTAR
C
C      SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C      AREA TO ONE.

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```

C      CALL CHANGE (3)
C      SUBROUTINE YINTAX INPUTS INTEGER NUMBERING ON X-AXIS.
C
C      GO TO (82,81),FF5
C      CALL YINTAX
C
C      SUBROUTINE X3NAME INPUTS THE TITLE OF THE X-AXIS.
C
C      82      CALL X3NAME (LINE, 100)
C      SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C      ARRAY TO ONE.
C
C      CALL CHANGE (4)
C      SUBROUTINE YINTAX INPUTS INTEGER NUMBERING ON Y-AXIS.
C
C      GO TO (84,83),FF7
C      CALL YINTAX
C
C      SUBROUTINE Y3NAME INPUTS THE TITLE OF THE Y-AXIS.
C
C      84      CALL Y3NAME (LINE, 100)
C      SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C      ARRAY TO ONE.
C
C      CALL CHANGE (1)
C      SUBROUTINE ZINTAX INPUTS INTEGER NUMBERING ON Z-AXIS.
C
C      GO TO (86,85),FF8
C      CALL ZINTAX
C
C      SUBROUTINE Z3NAME INPUTS THE TITLE OF THE Z-AXIS.
C
C      86      CALL Z3NAME (LINE, 100)
C      SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C      ARRAY TO ONE.
C
C      CALL CHANGE (2)
C      SUBROUTINE HEADIN INPUTS THE TITLE OF THE GRAPH.
C
C      CALL HEADIN ('          ', 100, 1.5, 0)

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C      CALL HEADIN (LINE, 100, 1.5, 2)
C
C      SUBROUTINE GRAF DEFINES THE PARAMETERS OF THE GRAPH.
C
140  IF (RELPAV(1,3).GE.HELPAV(1,4)) GO TO 141
150  R = RELPAV(1,3) - .5
    GO TO 151
    R = RELPAV(1,4) - .5
151  CONTINUE
    CALL VOLM3D (R, E, E)
    CALL VUABS (-1.5 * R - 1.5 * E, 1.5 * R)
    CALL GRAF3D (RELPAV(2,3), RELPAV(2,2), RELPAV(2,1), RELPAV(2,0))
    RELPAV(2,5), RELPAV(2,4), RELPAV(3,1), RELPAV(3,2), RELPAV(3,3), RELPAV(3,4)
C
C      EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
160  IF (FF6.EQ. 0) GO TO 200
    DO 200 I = 1, FF6
C
C      TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
    CALL FIT(I)
C
C      SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
170  GO TO (170,180), FF9
180  CALL MYSPEC(I)
    CONTINUE
C
C      ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
    LP = INGRAY(6,I)
    CALL PAT(LP)
    CALL RESET ('LEGLIN')
    GO TO (190,195), FF1
    IF (INGRAY(3,I).LT. 0) GO TO 200
    CALL LEGLIN
190
C
C      SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE THE COLOR OF LINE
C      ALWAYS TO ONE.
C
195  CALL SWITCH (I, INGRAY(2,1))
C
C      SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
200  CALL CURV3D (XPLAT, YPLAT, ZPLAT, INGRAY(2,1), INGRAY(2,0))
    CONTINUE
C

```

```

C THE INFORMATION THAT DEFINES PLANE B.
C
C SUBROUTINE GRFITI DEFINES THE PARAMETERS OF PLANE B.
C
C CALL GRFITI (R,K,0.0,K,0.0,0.0,K,0.0,1.0)
C CALL AREA2D (R,K)
C CALL GRAF (RELKAY(2,4), RELKAY(2,5), RELKAY(2,6), RELKAY(3,1),
C RELKAY(3,2), RELKAY(3,3))
C
C EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
C400 IF (FF6.EQ. 0) GO TO 445
C DO 445 I = 1, FF6
C
C TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
C CALL FIT(I)
C
C SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
C GO TO (410,420),FF9
C410 CALL MYSPEC(I)
C420 CONTINUE
C
C ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
C LP = INGRAY(6,1)
C CALL PAT(LP)
C
C SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C AREAS TO ONE.
C
C440 CALL SWITCH (1,INGRAY(2,1))
C
C SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
C445 CALL CURVE (XPLOT, EPIOT, INGRAY(2,1),INGRAY(3,1))
C CONTINUE
C
C EXECUTES USER'S DECISION REGARDING GRID LINES.
C
C GO TO (450,480),FF4
C
C SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
C450 GO TO (460,470),FF9
C460 ICOLOR=ICOLOR(2,1)
C CALL COLOR(ICOLOR)
C470 CONTINUE

```

```

C SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
      LP = INGRAY(7,2)
      CALL PAT(LP)
      CALL GRID (INGRAY(5,4), INGRAY(5,5))
480 CONTINUE
C THE INFORMATION THAT DEFINES PLANE C.
C
C SUPROUTINE GRFITI LINES THE PARAMETERS OF PLANE C.
      CALL GRFITI (0.0,0.0,0.0,R,0.0,0.0,0.0,R,0.0)
      CALL AREA2D (R,R)
      CALL GRAP (RELAY(2,3), RELAY(2,2), RELAY(2,1), RELAY(2,6),
500 RELAY(2,5), RELAY(2,4))
C EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
      IF (FF6.EQ. 0) GO TO 550
      DO 550 I = 1, FF6
C TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
      CALL FIT(I)
C SUPROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
      GO TO (520,530),FF9
520 CALL MYSPEC(1)
530 CONTINUE
C ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
      LP = INGRAY(6,1)
      CALL PAT(LP)
C SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGING THE SWITCHES FOR
C ARRAYS TO ONE.
C
545 CALL SWITCH (1,INGRAY(2,1))
C SUPROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
      CALL CURVE (XPLOT, YPLOT, INGRAY(2,1), INGRAY(2,2))
550 CONTINUE
C EXECUTES USER'S DECISION REGARDING GRID LINES.

```

```

C      GO TO (560,590),FF4
C      SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE GRID LINES.
C
560  GO TO (570,580),FF9
570  ICOLOR=JCOL(R(22))
      CALL COLOR(ICOLOR)
580  CONTINUE
C
C      SUBROUTINE GRID DEFINES THE PARAMETERS FOR GRID LINES.
C
      LP = INGRAY(5,6)
      CALL PAT(LP)
      CALL GRID (INGRAY(1,5), INGRAY(1,6))
590  CONTINUE
C
C      THE INFORMATION THAT DEFINES PLANE A.
C
C      SUBROUTINE GRFIT1 LINES THE PARAMETERS OF PLANE A.
C
      CALL GRFIT1 (0.0,0.0,1.0,0.0,0.0,0.0,1.0)
      CALL AREA2D (R,F)
      CALL GRAF (RELKAY(2,3), RELKAY(2,2), RELKAY(2,1), RELKAY(3,1),
      & RELKAY(3,2), RELKAY(3,3))
C
C      EXECUTES USER'S DECISION ON NUMBER OF CURVES TO BE PLOTTED.
C
220  IF (FF6.EQ. 0) GO TO 270
      DO 270 I = 1, FF6
C
C      TYPE OF CURVE FITTING EMPLOYED ON CURVES.
C
      CALL FIT(I)
C
C      SUBROUTINE MYSPEC DETERMINES THE COLOR PEN TO BE USED FOR EACH CURVE.
C
      GO TO (230,240),FF9
230  CALL MYSPEC(1)
240  CONTINUE
C
C      ALTERS THE TYPE OF LINE DRAWN FOR EACH CURVE.
C
      LP = INGRAY(6,1)
      CALL PAT(LP)
      CALL RESET ('LEGLIN')
      GO TO (250,260),FF1
      IF (INGRAY(3,1).LT. 0) GO TO 290
      CALL LEGLIN
250

```

```

C SUBROUTINE SWITCH IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C AFFAYS TO ONE.
C
C 260 CALL SWITCH (I,INGRAY(2,1))
C
C SUBROUTINE CURVE DEFINES ALL THE PARAMETERS FOR EACH CURVE.
C
C CALL CURVE (XPL0T, ZI0T, INGRAY(2,1), INGRAY(3,1))
C      IDIM = 5 + I
C
C SUBROUTINE CHANGE IS A PROGRAM SUBROUTINE TO CHANGE TWO-DIMENSIONAL
C AFFAY TO ONE.
C
C CALL CHANGE (IDIM)
C
C SUBROUTINE LINES INPUTS THE TITLE OF EACH CURVE INTO THE LEGEND.
C
C CALL LINES (LINE,IPAK,I)
C 270 CCNTINUE
C
C SUBROUTINE COLOR DETERMINES THE COLOR PEN TO BE USED.
C
C GO TO (275,276), FF9
C 275 ICOLOR = JCCICK(19)
C CALL COLOR(ICOLOR)
C 276 CONTINUE
C
C EXECUTES THE USER'S DECISION REGARDING A LEGEND.
C
C GO TO (280,290), FF1
C
C SUBROUTINE LEGEND INPUTS THE PARAMETER FOR THE LEGEND AND PUTS A
C BCX AROUND THE LEGEND.
C
C 280 CALL LEGEND (IFAK, INGRAY(1,4), RELAY(1,5)+.2, RELAY(1,6)+.2)
C
C SUBROUTINE COLOR DETERMINES THE COLOR PEN TO DRAW THE LEGEND.
C
C GO TO (285,286), FF9
C 285 ICOLOR = JCCICK(19)
C CALL COLOR(ICOLOR)
C 286 CONTINUE
C      X1 = XLEGND (IPAK, INGRAY(1,4))
C      Y1 = YLEGND (IPAK, INGRAY(1,4))
C CALL BLEEC (RELAY(1,5), RELAY(1,6), X1+.4, Y1+.4, -2.0)
C 290 CONTINUE
C
C EXECUTES USER'S DECISION REGARDING GRID LINES.

```



```
C**** INGRAY(3,KK) NUMBER OF POINTS TO BE MARKED FOR TEST DATA. *****  
C***** SUFRROUTINE USRFEEL (KK) *****  
C*****  
CC DECLARATIONS.  
C  
    INTEGER I,K,KK,J  
    REAL XYZ(10,10)  
    COMMON RELRAY Y(6,18), INGRAY(7,18), LETRAY(10,24), PFLAY(11,  
     X(18,100), LINE{72},XLOF(100),YLOC(109),FILEPT(2)  
     ZFIOT(166),Z(18,166),JCOLOR(25)  
     CALL FRTCMS ('CIRSCRN')  
C  
GIVES USER INSTRUCTIONS ON HOW TO INPUT HIS FILE.  
  
WRITE (6,600)
```

```
C  
INFUJS THE USER-DEFINED NAME OF DATA FILE.
```

```
C  
10 WRITE (6,610)  
   READ (5,516 END=15) (FILFIT(I),I=1,2)  
   CALL FRTCMS('EXEC',CHECK,,FILPLT,NM)  
   READ (5,* ) NM  
   CALL IRTCMS ('CIRSCRN')  
   IF (NM.EQ. 0) GO TO 20  
   WRITE (6,660)  
   CALL REEIDIN(NM,512)  
   IF (NM.GT. 0 .AND. NM.LT. 3) GO TO 13  
   CALL ERROR4 (1,3)  
   GO TO 11  
11 GO TO 10,156,160 ,NM  
   CALL ERROR8  
   GO TO 10  
12 GO TO 10
```

```
C  
13 CALL FRTCMS('FILEDEF','','DISK','FILED','DATA')
```

```
C  
20 CALL FRTCMS('CIRSCRN')  
CALL REEIND 3  
CALL FRTCMS ('CIRSCRN')  
WRITE (6,615)  
CALL REEIDIN(NM,528)  
IXF = NN  
IF (NN.GT. 0 .AND. NM - LF,11) GO TO 24  
CALL EKFOR4 (1,10)  
GO TO 25
```

```
C  
25  
28  
C DETERMINES THE METHOD THE USER WOULD LIKE TO USE TO GET DATA;  
C A POINT AT A TIME OR BY SENTINEL APPROACH.
```

```
C  
29 CALL FRTCMS ('CIRSCRN')
```

```

30 WRITE(6,620)
CALL FEEDIN(NN,635)
IF (NN.GT.6.AND. NN.LT. 3) GO TO 40
35 CALL ERRCE4 (1,2)
GO TO 30
40 GO TO (50, 60), NN
C DETERMINES HOW MANY POINTS THE USER WISHES TO INPUT FOR THIS CURVE.
C
50 WRITE(6,630)
CALL FEEDIN(NN,655)
I = NN
INGRAY(2, KK) = I
IF(I.LT. 101) GO TO 60
CALL ERROR5
GO TO 50
55 CALL ERROR8
GO TO 50
60 DC 70 JY=1, I
C READS IN THE DATA FROM A USER DEFINED FILE.
C
70 READ(3,*) (XYZ(IX,JY), IX = 1, IXF)
CONTINUE
GO TO 120
C DETERMINES THE SENTINEL VALUE THE USER WANTS TO USE.
C
80 WRITE (6,640)
CALL FEEDRE(R,685)
GO TO 90
85 CALL ERROR8
GO TO 80
90 J = 1
C READS IN THE DATA FROM A USER DEFINED FILE.
C
100 READ(3,*) (XYZ(IX,JY), IX = 1, IXF)
IF (R.EQ. XYZ(1,J)) GO TO 120
INGRAY(2, KK) = INGRAY(2, KK) + 1
IF (J.EQ. 100) GO TO 110
J = J + 1
GO TO 100
110 CALL ERROR5
C USER DESIGNATES NUMBER OF DATA POINTS HE WISHES TO INPUT.
C
120 CONTINUE
CALL FRCHMS ('CIRCULAR ')

```

```

121 WRITE (6,679)
CALL FEEDIN(NN,E123)
IX = NN
IF (NN.GT.C.AND. NN.LL.IXF) GO TO 124
CALL ERRCF4(1,IXF)
GO TO 121
123 JYM = INGRAY(2,KK)
DO 125 JY = 1, JY4
X(KK,JY) = XYZ(IX,JY)
CONTINUE
CALL FRTCMS ('CIRSCN ')
124 WRITE (6,680)
CALL FEEDIN(NN,E127)
IX = NN
IF (NN.GT.C.AND. NN.LL.IXF) GO TO 128
CALL ERRCF4(1,IXF)
GO TO 128
125 JYM = INGRAY(2,KK)
DO 129 JY = 1, JY4
Y(KK,JY) = XYZ(IX,JY)
CONTINUE
CALL FRTCMS ('CIRSCN ')
126 WRITE (6,690)
CALL FEEDIN(NN,E133)
IX = NN
IF (NN.GT.C.AND. NN.LL.IXF) GO TO 134
CALL ERRCF4(1,IXF)
GO TO 134
127 JYM = INGRAY(2,KK)
DO 135 JY = 1, JY4
Z(KK,JY) = XYZ(IX,JY)
CONTINUE
CALL FRTCMS ('CIRSCN ')
128 WRITE (6,636)
CALL FEEDIN(NN,E137)
INGRAY(3,KK) = NN
IF (ABS(INGRAY(3,KK)).LE. INGRAY(2,KK)) GO TO 140
LL = INGRAY(2,KK)
CALL ERRCF4(-LL,IL)
GO TO 136
CALL ERRCF8
GO TO 136
129 RETURN
KK = -1
130 RETURN
CALL EXIT
131 RETURN
C FORMAT STATEMENTS.

```



```

C DECLARATIONS.
C
C      REAL RR
C      INTEGER I
C      COMMON RELRAY (6,18), INGRAY (1,18), DELTAY (10,24), XAXIS (11)
C      X (18,100), Y (18,100), LINE (2), XCOLOR (100), YPLOT (100), PLOT (2)
C      E, X (18,100), Z (18,100), JCOLOR (25)
C      E, ZPLOT (100), Z (18,100), JCOLOR (25)

C DETERMINES WHICH AREA THE USER WISHES TO UPDATE.
C
C      5 CALL FRTCMS ('CIRSCRN ')
C      6 WRITE (6,610)
C      CALL FEEDIN (1,27)
C      IF (I.GT.0) AND. I .LT. 15) GO TO 10
C      7 CALL ERROR4 (1,19)
C      GO TO 6
C      10 CONTINUE
C      CALL FRTCMS ('CIRSCRN ')
C      GO TO (11,22,33,44,55,66,77,88,99,100,111,112,113,114,115,116,117
C      E,118), I

C SUPERROUTINE PAGE2D WILL UPDATE THE PAGE SIZE OF THE GRAPH.
C
C      11 CALL PAGE2D
C      GO TO 5

C SUPERROUTINE SUBPLT WILL UPDATE THE SIZE OF THE SUPERLOT AREA.
C
C      22 CALL SUBPLT
C      GO TO 5

C SUPERROUTINE HEADING WILL CHANGE THE TITLE OF THE GRAPH.
C
C      33 CALL HEADING
C      GO TO 5

C SUPERROUTINE XAXIS WILL CHANGE THE TITLE OF THE X-AXIS.
C
C      44 CALL XAXIS
C      GO TO 5

C SUPERROUTINE YAXIS WILL CHANGE THE TITLE OF THE Y-AXIS.
C
C      55 CALL YAXIS
C      GO TO 5

C SUPERROUTINE ZAXIS WILL CHANGE THE TITLE OF THE Z-AXIS.
C

```

66 CALL ZAXIS
 GO TO 5
 C SUEROUTINE MESS WILL UPDATE THE INFORMATION FOR THE MESSAGE.
 C
 77 CALL MESS(2)
 GC TO 5
 88 CALL MESS(3)
 GC TO 5
 C SUEROUTINE LOCLEG WILL UPDATE THE INFORMATION FOR THE LEGEND.
 C
 99 CALL LOCLEG
 GO TO 5
 C SUEROUTINE XVALUE WILL UPDATE THE SCALE INFORMATION ON THE X-AXIS.
 C
 100 CALL XVALUE
 GC TO 5
 C SUBROUTINE YVALUE WILL UPDATE THE SCALE INFORMATION ON THE Y-AXIS.
 C
 111 CALL YVALUE
 GO TO 5
 C SUEROUTINE ZVALUE WILL UPDATE THE SCALE INFORMATION ON THE Z-AXIS.
 C
 112 CALL ZVALUE
 GO TO 5
 C SUBROUTINE GRID3D WILL UPDATE THE INFORMATION ON THE GRID PATTERN.
 C
 113 CALL GRID3D
 GO TO 5
 C SUBROUTINE UPCRVS WILL UPDATE THE CURVE INFORMATION.
 C
 114 CALL UPCR3D
 GC TO 5
 C SUEROUTINE STYLE WILL UPDATE THE LETTER TYPE.
 C
 115 CALL STYLE
 GC TO 5
 C SUROUTINE HELP2 INSTRUCTS USER ON THE USE OF THIS MENU.
 C
 116 CALL HELP2
 GC TO 5


```

C DECLARATIONS.
C
REAL ER
INTEGER J,I,JJ,K,KK,KKK,I,LL
COMMON RELAY(6,18), INCRAY(1,13), LETRAY(10,24), IRLAY(11)
E,X(18,100),Y(18,100),LINE(72),X5PLOT(100),Y5PLOT(100),FILLPL4(2)
E,ZPLOT(100),Z(18,100),JCOLOR(25)
10 CALL FRTCMS ('CLKSCRN',)
C
C DETERMINES WHICH FUNCTION USER WISHES TO PERFORM: JUPDATE, ADD,
C OR DELETE A CURVE.
C
20 WRITE(6,610)
CALL REEDIN(NN,825)
J = NN
IF (J.GT. 0 .AND. J .LT. 6) GO TO 30
25 CALL ERFCR4(1,5)
GO TO 20
30 GO TO (41,180,33,35,310),J
C
C DETERMINES WHICH CURVE THE USER WISHES TO DELETE.
C
33 CALL FRTCMS ('CIRSCRN ')
CALL PCURVE
CALL FRTCMS ('CIRSCRN ')
GO TO 20
C
C SUPROUTINE HELP4 EXPLAINS THE MENU TO THE USER.
C
35 CALL HELP4
GO TO 20
C
C DETERMINES WHICH CURVE THE USER WISHES TO UPDATE.
C
41 CALL FRTCMS ('CIRSCRN ')
50 WRITE(6,620)
CALL REEDIN(NN,855)
I = NN
IF (I.GT. 0 .AND. I .LT. 19) GO TO 60
55 CALL ERFCR7
GO TO 50
CALL ERFCR8
GO TO 50
60 CALL FRTCMS ('CIRSCRN ')
C
C DETERMINES WHICH AREA OF THE CURVE THE USER WISHES TO UPDATE: TITLE,
C DATA POINTS, ADD DATA POINTS, DELETE DATA POINTS,
C FILE NAME, NUMBER OF DATA POINTS MARKED,
C PATTERN OF LINE DPAUN.
C

```

```

70 WRITE(6,633) I
   CALL FEEDIN(NH,875)
75 IF (NN.GT.0.LND, NN.LT.11) GO TO 80
   CALL FRTCH4 (1,10)
   GO TO 70
80 J = NN
   CALL FRTCMS ('CIRSCAN ')
   GO TO (90,10,120,130,140,150,160,170,175,10), I
C  DETERMINES THE NEW TITLE FOR THE CURVE THE USER DESIRES.
C
90 WRITE (6,640) I
   J = 5 + I
   READ (5,510,END=100) (ZTRAY(K,J),K=1,9)
   CALL LFTTR(J,JJ)
   IF (JJ.LT.10) GO TO 90
   CALL ERROR3
   GO TO 90
100 CALL ERROR8
   GO TO 90
C  UPDATES THE DATA POINTS FOR THE USER DESIRED CURVE.
C
110 KKK = INGRAY(2,I)
   CALL DTCH3D (I,KKK)
   GO TO 60
C
C  APPES A DATA POINT TO THE CURVE.
C
120 CALL APNT3D(I)
   CALL FRTCHS ('CIRSCAN ')
   GO TO 60
C  DELETES A DATA POINT FROM THE CURVE.
C
130 CALL DPNT3D(I)
   CALL FRTCMS ('CIRSCAN ')
   GO TO 60
C  CHANGES THE DATA FILE THE USER WISHES TO USE FOR THAT CURVE.
C
140 IKK = I
   CALL USHFL3L(IKK)
   GO TO 60
C  USER DESIGNATES NUMBER OF DATA POINTS PL PLOTTED. A. I.
C
150 WRITE (6,634)

```

```

CALL FEEDIN(NN, E155)
INGRAY(3, IL) = IN
IF (IABS(INGRAY(3, I)) - LE. INGRAY(2, I)) GO TO 60
155 CALL ERRCS4 (-IL, IL)
GO TO 150
CALL ERRCS8
GO TO 150
C DETERMINES LINE PATTERN TO BE DRAWN.
160 CALL PATNER (LF)
INGRAY(6, I) = IF
GO TO 60
C DETERMINES CURVE FIT TO BE USED.
170 CALL FITTYP (I)
GO TO 60
C SUBROUTINE HELPS5 EXPLAINS THE MENU TO THE USER.
175 CALL HELPS
GO TO 60
C ADDS A CURVE TO THE GRAPH.
180 INGRAY(1, 4) = INGRAY(1, 4) + 1
I = INGRAY(1, 4)
IF (I - LT. 19) GO TO 185
CALL ERROR7
GO TO 70
185 CALL IRTCMS ('CIRSCIN ')
C DETERMINES THE TITLE OF THE CURVE TO BE ADDED.
190 WRITE (6, 640) I
J = 5 + I
READ (5, 510, END=195) (LETGRAY(K, J), K=1, 9)
CALL LETTER(J, JJ)
IF (JJ - LT. 10) GO TO 200
CALL ERROR3
GO TO 190
195 CALL ERROR8
GO TO 190
C DETERMINES LINE PATTERN TO BE DRAWN.
200 CALL PATNER (LF)

```

```

      INGRAY(6,I) = IF
C   DETERMINES THE METHOD THE USER WISHES TO USE TO READ IN A NEW CURVE.
C   NEW CURVE.
C
210  WRITE (6,650)
      CALL REEDIN(NN,6215)
      IF (NN.EQ.1) OR (NN.EQ.2) GO TO 220
215  CALL ERROR4(1,2)
      GO TO 210
220  GO TO (220,290),NN
C   DETERMINES HOW MANY POINTS THE USER WISHES TO PLOT.
C
230  WRITE (6,660)
      CALL REEDIN(NN,6235)
      IF (NN.LT.100.) GO TO 240
      CALL ERROR5
      GO TO 230
235  CALL ERROR3
      GO TO 230
240  INGRAY(2,I) = NN
C   DESIGNATES NUMBER OF DATA POINTS USER WISHES MARKED ON GRAPH.
C
      CALL FRCHMS ('CLRSCHN ')
250  WRITE (6,634)
      CALL REEDIN(NN,6255)
      INGRAY(3,I) = NN
      IF (IABS(INGRAY(3,I)).LE. INGRAY(4,I)) GO TO 260
      IL= INGRAY(2,I)
      CALL ERROR4(-LL,IL)
      GO TO 250
255  CALL ERROR8
      GO TO 250
C   INPUTS THE DATA POINTS A POINT AT A TIME FROM THE TERMINAL.
C
260  KKK= INGRAY(2,I)
      DO 280 JJ=1,KKK
      CALL FRCHMS ('CLRSCHN ')
270  WRITE (6,670) JJ,KKK
      REAL (5,*) ENDL=270, Y(1,00), Y(1,10), Y(1,10)
      GO TO 280
275  CALL ERROR6
      GO TO 270
280  CONTINUE
C   SUBROUTINE DTCH3D WILL ALLOW USER TO VERIFY AND SAVE.

```

```

C      CALL DTCH3D(1,KKK)
C      GO TO 10
C      SUBROUTINE USRF3L READS USER DESIGNATED FILE FOR DATA POINTS.
C290      IKK = I
C      CALL USRF3L (IKK)
C      IF (IKK .EQ. -1) GO TO 190
C      SUBROUTINE DTCH3D WILL ALLOW USER TO VERIFY HIS DATA.
C      CALL DTCH3L(I,KKK)
C310      CCNTINUE
C      GO TO 10
C      RETURN
C      FORMAT STATEMENTS.
C510      FORMAT (9A4)
C610      FORMAT (//10X, 'WHICH OF THE FOLLOWING DO YOU WISH TO PERFORM?',
E//15X, '1. UPDATE AN EXISTING CURVE?',
E//15X, '2. ADD A CURVE?',
E//15X, '3. DELETE A CURVE?',
E//15X, '4. HELP.',
E//15X, '5. TERMINATE EDITING?')
C620      FORMAT (//10X, 'WHICH CURVE DO YOU WISH TO UPDATE? (1 THRU 18)')
C630      FORMAT (//10X, 'WHICH AREA OF THIS CURVE', I2,
E//10X, 'DO YOU WISH TO UPDATE?',
E//15X, '1. CURVE TITLE.',
E//15X, '2. CHECK DATA POINTS.',
E//15X, '3. ADD A DATA POINT.',
E//15X, '4. DELETE A DATA POINT.',
E//15X, '5. CHANGE FILE NUMBER OF DATA POINTS TO BE MARKED.',
E//15X, '6. CHANGE THE NUMBER OF DATA POINTS TO BE GRAPHED.',
E//15X, '7. CHANGE THE LINE PATTERN TO BE GRAPHED.',
E//15X, '8. CHANGE THE TYPE OF CURVE INTERPOLATION USED.',
E//15X, '9. HELP.',
E//15X, '10. TERMINATE EDITING ON THIS CURVE.')
```

634

```

C      FORMAT (//30X, 'MARKER SYMBOL INFORMATION',
E//3X, 'A POSITIVE NUMBER--POINTS WILL BE CONNECTED ALL MARKER SYMBOL
E//14X, '1. E. {1} = *-----*-----*-----*')
E//18X, '2. E. {0} = --POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
E//14X, '3. I. E. {0} = *-----*-----*-----*')
E//18X, '4. I. E. {0} = --POINTS WILL BE CONNECTED WITH NO MARKER SYMBOLS.'
E//14X, '5. A NEGATIVE NUMBER--POINTS WILL NOT BE CONNECTED, MARKER SYMBOL
E//18X, '6. C. N.Y.')
```

EXAMPLE: 3 = EVERY 3RD DATA POINT MARKED WITH NO MARKER SYMBOLS.

```

CONNECTED',/24X,'BY A LINE'.
8//5X,'HOW FREQUENTLY DO YOU WANT PAPER SYNOPSIS OF THIS CURVE TO
ESTIMATED?')
640 FORMAT(//10X,'WHAT IS THE REV TITLE OF CURVE?',1,' ',2//15X,
      1,'(52 CHARACTERS MAX).')
650 FORMAT(//10X,'WHICH METHOD DO YOU WISH TO USE TO INPUT THE
      1 CURVES DATA?'//10X,'AT A TIME.'
      1 //10X,'1-TYPE IN DATA ONE POINT AT A TIME.'
      1 //16X,'2-USE DATA FILE INPUT.')
660 .FORMAT(//10X,'HOW MANY POINTS DO YOU WISH TO PLOT ON THIS CURVE
      1 ? (100 MAX)')
670 .FORMAT(//10X,'X-COORDINATE, Y-COORDINATE, AND Z-COORDINATE IN
      1 YOUR UNITS,',13X,'POINT',13,' OF',13,' POINTS').
      1 END
C*****
C***** DICH3D
C*****
C***** SUBROUTINE TO VERIFY DATA FOR EACH GRAPH.
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** X 2-DIMENSIONAL ARRAY FOR X-COORDINATE OF A DATA POINT.
C*****
C***** Y 2-DIMENSIONAL ARRAY FOR Y-COORDINATE OF A DATA POINT.
C*****
C***** Z 2-DIMENSIONAL ARRAY FOR Z-COORDINATE OF A DATA POINT.
C*****
C***** I THE CURVE NUMBER.
C*****
C***** J THE NUMBER OF POINTS TO BE CHECKED FOR THIS CURVE.
C*****
C***** SUBROUTINE DTCH3D(I,J)
C*****
C***** DECLARATIONS.
C*****
C***** REAL ER
C***** INTEGER J,I,JJ,IDIC,NN,II,M
C***** COMMON RELAY(6,13), INGRAY (/,13), DERIVY(10,10), DEPRV(11)
C***** ,X(18,100),Y(18,150),TIME(72),XAXIS(100),YAXIS(100),COLOR(25)
C***** ,Z(18,100),ZCOLOR(25)
C***** K=1
C***** K = 5
C***** CALL FRTCMS ('CIESCEN ')
C*****
C***** DETERMINES IF THE USER WISHED TO CONTINUE A DRAWING.

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      8, ZPIOT(100), Z(13,100), JCOLOR(25)
C 10  WRITE (6,610)
      JD = INGRAY(2,IC)
      DO 20 I = 1,JD
        WRITE (6,620) I, X(IC,I), Y(IC,I), Z(IC,I)
C 20  CONTINUE
C    DETERMINES IF USER STILL WISHES TO DELETE A POINT.
C 25  WRITE (6,630)
C    SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1, NO=2, ERROR=3).
C    CALL YORN (IIIC)
    CALL FRTCMS ('CIRSCRN ')
    GO TO (35,60,25),IIIC
C    DETERMINES WHICH PCINT THE USER WANTS DELETED AND EXECUTES.
C 30  WRITE (6,640)
    CALL REEDIN (NN,E35)
    K = NN
    IF (N.GT. 0 .AND. N.LE. JD ) GO TO 40
    CALL ERROR4(1,JD)
    GO TO 30
    CALL ERROR8
    GO TO 30
    II = INGRAY(2,IC)
    DO 50 J = N,II
      X{IC,J-1} = X{IC,J}
      Y{IC,J-1} = Y{IC,J}
      Z{IC,J-1} = Z{IC,J}
    CONTINUE
    INGRAY(2,IC) = II - 1
    X{IC,II} = 0.0
    Y{IC,II} = 0.0
    Z{IC,II} = 0.0
    RETURN
C 50
C 60
C    FORMAT STATEMENTS.
C 610  FORMAT(/10X,'THIS IS A CURRENT LISTING OF YOUR DATA POINTS, GIVE
      8 AT A TIME.
      8 /10X,'NUMBER: 10X,'X VALUE',10X,'Y VALUE',10X,'Z VALUE'/)
C 620  FORMAT(/12X,13.5X,1PE12.5,13.5X,1PE12.5,13.5X,1PE12.5)
C 630  FORMAT(/10X,'DO YOU STILL WISH TO DELETE A POINT (Y OR N)?')
C 640  FORMAT(/10X,'INPUT THE NUMBER OF THE POINT YOU WISH TO DELETE.')
      END

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```

35 GO TO 30
   CALL ERROR8
36 GO TO 30
   N = 99 - N
   INGRAY(2, IC) = INGPAY(2, IC) + 1
DO 50 J=1, II
  X{IC, 101-J} = X{IC, 100-J}
  Y{IC, 101-J} = Y{IC, 100-J}
  Z{IC, 101-J} = Z{IC, 100-J}
CONTINUE
WRITE(6, 650)
READ(5, * END=55) X(IC,N+1), Y(IC,N+1), Z(IC,N+1)
GO TO 60
REWIND 5
CALL ERROR8
GO TO 5C
RETURN
60 C
CC C
CC C
FORMAT STATEMENTS.
610 FORMAT(/ / 10X, 'THIS IS A CURRENT LISTING OF YOUR DATA POINTS.',
E / 10X, NUMBER, 10X, 'X VALUE', 10X, 'Y VALUE', 10X, 'Z VALUE' //
620 FORMAT (/ / 12X, 13, 3(5X, 1P E12.5))
630 FORMAT (/ / 10X, 'DO YOU STILL WISH TO ADD A POINT? (Y OR N).')
640 FCMTAT {/// 5X, INPUT THE NUMBER OF THE POINT AFTER WHICH THE NEW P
      ECINT WILL BE ADDED:')
650 FCMTAT (/ / 10X, 'WHAT IS THE NEW DATA POINT? (X,Y,Z)')
      ENCL
*****
***** EXAM3D *****
***** SUBROUTINE DISPLAYING A 3-D EXAMPLE FOR USER. *****
***** VARIABLES AND CONSTANTS *****
***** INDEX VALUES. *****
***** I *****
*****
***** SUBROUTINE EXAM3D *****
***** DECLARATIONS. *****
***** INTEGRAL, N, J, II, IP(80*) *****
***** REAL FR *****
***** COMMON RELRAY(6, 18), INGRAY(7, 18), OUTGRAY(19, 14), GRAY(11) *****
***** & , X(18, 100), Y(18, 100), LINE(12), TIME(100), TFC(100), VTC(100), FGC(100), GTC(100) *****

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```

C      E, ZFIOT(100), Z(13,100), JCOLOR(2)
C
C      ALGORITHM CALCULATION
C
      DO 10 I = 1, 10
        ZFIOT(I) = FLOAT(I)
        YFIOT(I) = FLOAT(I)*2
        XFIOT(I) = FLOAT(I)*.9
      CONTINUE
10
C      ALGORITHM FIGURE1
C
      CALL BHSCAL('SCREEN')
      CALL PAGE(8.5, 11.)
      CALL AREA2D(7.5, 7.5)
      CALL SHDCHR(90., 1., 605, 1)
      CALL SWISSL
      CALL MESSAGE(' 100, 6.0, 7.0, 1.5, 1)
      CALL HEADIN('3-D EXAMPLE GRAPH$')
      CALL HEIGHT(20)
      CALL X3NAME('X-AXIS', 100)
      CALL Y3NAME('Y-AXIS', 100)
      CALL Z3NAME('Z-AXIS', 100)
      CALL VOLM3D(-1.5*7., -1.5*7., 1.5*7.-)
      CALL RESET('HEIGHT')
      CALL GRAF3D(10., -1.6, 0.0, 20., -2.0, 0.0, 0.0, 1.0, 10.0)
      CALL FASPLN(0)
      CALL CURV3D(XPICT, YPLOT, ZPLOT, 10, 1)
      FLANE A
      CALL GRFIT(0.0, 7., 0.0, 1.0, 7., 0., 5., 7.0, 1.0)
      CALL AREA2D(7.5, )
      CALL HEIGHT(20)
      CALL LINES('CURVE 1$', IP, 1)
      C REVERSE X AXIS
      CALL GFAT(10.0, -1.0, 0.0, 0.0, 1.0, 10.0)
      CALL CURVE(XPICT, ZPLOT, 10, 1)
      CALL LEGEND(IP, 1, 0, 2.0)
      CALL ELREC(9., 1.0, 2.0, .8, -2)
      CALL HEIGHT(30)
      CALL MESSAGE('PLANE A$', 100, 3.0, 5.0)
      CALL ELREC(3.4, 5.4, 2.1, 5., -2)
      CALL DOT
      CALL GRID(1, 1)
      CALL END3Gr(0)
      FLANE B
      CALL GRFIT(7.0, 7.0, 0.0, 7.0, 0.0, 0.0, 1.0, 0.0, 1.0)
      CALL AREA2D(7.0, 7.0)
      CALL GRAF(0.0, 2.0, 20.0, 0.0, 1.0, 1.0)
      CALL MESSAGE('PLANE B$', 100, 3.0, 4.0)

```

```

CALL ELREC (3.44, 7.22, 2.5-2, 16, 1)
CALL CURVE (VPIC, 2, PIC, 16, 1)
CALL DOT
CALL GRID (1, 1)
CALL END3GR(0)
PLANE C
CALL GREFTI (0.0, 0.0, 0.0, 10.0, 0.0, 0.0, 0.0, 0.0, 10.0, 0.0, 0.0)
CALL AREA2C (7.0, 7.0, 0.0, 20.0, 0.0, 0.0)
CALL GRAF (10.0, 1.0, 0.0, 20.0, 0.0, 0.0)
CALL MESSAG (PLANE C, 1, 100, 4.6, 1.3)
CALL ELREC (3.81, 6.22, 7-2, 16, 1)
CALL CURVE (XPIC, 2, PIC, 16, 1)
CALL DOT
CALL GRID (1, 1)
REIRAY (1, 1) = 8.5
REIRAY (1, 2) = 11.0
REIRAY (1, 3) = 7.5
REIRAY (1, 4) = 7.5
REIRAY (1, 5) = 1.0
REIRAY (1, 6) = 2.0
REIRAY (2, 1) = 1.0
REIRAY (2, 2) = 1.0
REIRAY (2, 3) = 1.0
REIRAY (2, 4) = 0.0
REIRAY (2, 5) = 2.0
REIRAY (2, 6) = 2.0
REIRAY (3, 1) = 1.0
REIRAY (3, 2) = 1.0
REIRAY (3, 3) = 6.0
REIRAY (4, 5) = 6.0
REIRAY (4, 6) = 6.0
CALL END3GR(0)
CALL ENDPL(0)
REIRAY (1, 1) = 8.5
REIRAY (1, 2) = 11.0
REIRAY (1, 3) = 7.5
REIRAY (1, 4) = 7.5
REIRAY (1, 5) = 1.0
REIRAY (1, 6) = 2.0
REIRAY (2, 1) = 1.0
REIRAY (2, 2) = 1.0
REIRAY (2, 3) = 1.0
REIRAY (2, 4) = 0.0
REIRAY (2, 5) = 2.0
REIRAY (2, 6) = 2.0
REIRAY (3, 1) = 1.0
REIRAY (3, 2) = 1.0
REIRAY (3, 3) = 6.0
REIRAY (4, 5) = 6.0
REIRAY (4, 6) = 6.0

```

```

C      REIRAY(4,6) = -.5
C      END FIGURE1
C
C      RETURN
C      END
C*****
C***** SUBROUTINE TO DETERMINE THE GRID LINE PATTERN.
C*****
C*****
C***** VARIABLES AND CONSTANTS
C*****
C***** INGRAY(1,5) NUMBER OF GRID LINES PER X-AXIS X,Y PLANE.
C*****
C***** INGRAY(1,6) NUMBER OF GRID LINES PER Y-AXIS X,Y PLANE.
C*****
C***** INGRAY(5,2) NUMBER OF GRID LINES PER X-AXIS X,Z PLANE.
C*****
C***** INGRAY(5,3) NUMBER OF GRID LINES PER Z-AXIS Y,Z PLANE.
C*****
C***** INGRAY(5,4) NUMBER OF GRID LINES PER Y-AXIS Y,Z PLANE.
C*****
C***** INGRAY(5,5) NUMBER OF GRID LINES PER Z-AXIS Y,Z PLANE.
C*****
C***** IFRAY(4)   WHETHER OR NOT GRAPH HAS GRID LINES.
C*****
C***** IDIC      USED TO STORE YES OR NO ANSWERS.
C*****
C***** I         INDEX.
C*****
C***** RR        LUMMY REAL VALUE.
C*****
C*****
C***** SJERCUTINE GRID3D
C*****
C      DECLARATIONS.
C
C      INTEGER I, IDIC, LP
C      REAL RR
C      COMMON RELRAY(6,18), INGRAY(1,18), REIRAY(10,24), REIRAY(11)
C      8, X(18,100), Y(18,100), TIME(72), XCOLOR(100), YCOLOR(100), PLOT(2)
C      8, ZPLOT(100), Z(18,100), JCOLOR(2)
C      IFRAY(4) = 2
C
C      DECISION ON WHETHER OR NOT TO HAVE GRID LINES.
C
C      10  WRITE (6,610)

```

```
C SUBROUTINE YORN DETERMINES YES, NO, OR ERROR (YES=1, NO=2, ERROR=3)
C
C   CALL YORN(ILIC)
C   GO TO (20,120,10),IDIC
C   IFRAY(4) = 1
C
C   DETERMINES HOW MANY GRID LINES PER X-AXIS STEP INTERVAL PLANE A.
C
C   30 WRITE(5,65C)
C      WRITE(5,62C)
C      CALL FEEDIN(NN,835)
C      INGRAY(5,2) = NN
C      GO TO 40
C   35 CALL ERRCF8
C      GO TO 30
C
C   DETERMINES HOW MANY GRID LINES PER Z-AXIS STEP INTERVAL PLANE A.
C
C   40 WRITE(6,640)
C      CALL REEDIN(NN,845)
C      INGRAY(5,3) = NN
C      GO TO 50
C   45 CALL ERRCF8
C      GO TO 40
C
C   DETERMINES THE LINE PATTERN TO BE USED.
C
C   50 CALL IATNER(LP)
C      INGRAY(7,1) = LP
C
C   DETERMINES HOW MANY GRID LINES PER Y-AXIS STEP INTERVAL PLANE B.
C
C   60 CALL FRTCMS ('CIRSCEN ')
C      WRITE(5,66C)
C      WRITE(5,63C)
C      CALL FEEDIN(NN,865)
C      INGRAY(5,4) = NN
C      GO TO 70
C   65 CALL ERRCF8
C      GO TO 60
C
C   DETERMINES HOW MANY GRID LINES PER J-AXIS STEP INTERVAL PLANE C.
C
C   70 WRITE(6,640)
C      CALL FEEDIN(NN,875)
C      INGRAY(5,5) = NN
C      GO TO 80
C   75 CALL ERRCF8
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607 8/5X, '32 CHARACTERS MAXIMUM.'
    8/5X, 'MESSAGE STATEMENT--GIVES THE ABILITY TO ADD A SI
    8/5X, 'STATEMENT OF 32 CHARACTERS MAXIMUM (I.E. SUBTITLE, FIGURE NO.
    8/5X, 'C...)'
    8/5X, 'ANYWHERE ON THE PAGE.'
    8/5X, '8. MESSAGE LOCATION CHANGE--ALLOWS YOU TO REVISE WH
    8/5X, 'ERE ON THE PAGE.'
    8/5X, 'YOU WISH THE MESSAGE LOCATED. THE LOCATION IS PINPOINTED USIN
    8/5X, 'THE LOWER LEFT CORNER OF THE MESSAGE AS REFERENCE.'
    8/5X, '9. LEGEND LOCATION CHANGE--ALLOWS YOU TO DESIGNATE
    8/5X, 'THE GRAPH.'
    8/5X, 'YOU WISH THE LEGEND LOCATED. THE LOCATION IS PINPOINTED USING
    8/5X, 'THE LOWER LEFT CORNER OF THE LEGEND AS REFERENCE.'
    8/5X, '10. X-AXIS SCALE--DETERMINES HOW THE X-AXIS IS TO B
    8/5X, 'E SET UP.'
    8/5X, 'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
    8/5X, 'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR X VALUES.'
    8/5X, 'THE MAXIMUM VALUE REFERS TO THE FINAL X VALUE.'
    8/5X, '11. Y-AXIS SCALE--DETERMINES HOW THE Y-AXIS IS TO B
    8/5X, 'E SET UP.'
    8/5X, 'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
    8/5X, 'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR Y VALUES.'
    8/5X, 'THE MAXIMUM VALUE REFERS TO THE FINAL Y VALUE.'
    8/5X, '12. Z-AXIS SCALE--DETERMINES HOW THE Z-AXIS IS TO B
    8/5X, 'E SET UP.'
    8/5X, 'FOR A NORMAL AXIS: THE ORIGIN REFERS TO THE STARTING POINT.'
    8/5X, 'THE STEP INTERVAL REFERS TO THE INCREMENT OF YOUR Z VALUES.'
    8/5X, 'THE MAXIMUM VALUE REFERS TO THE FINAL Z VALUE.'
    8/5X, '13. GRID--THE EMPLACEMENT OF LINES ON THE GRAPH TO
    8/5X, 'MAKE IT MORE EASILY'
    8/5X, 'READ. YOU ARE ASKED THE NUMBER OF GRID LINES YOU WANT PER EA
    8/5X, 'X, Y, AND Z STEP INTERVAL.'
    8/5X, '14. CHANGE CURVES--ALLOWS YOU TO UPDATE ALL THE INF
    8/5X, 'ORMATION'
    8/5X, 'THAT PERTAINS TO THE CURVE.'
    8/5X, '15. TYPE LETTERING--THE LETTER STYLE THAT YOU DESIR
    8/5X, 'E FOR THE VARIOUS'
    8/5X, 'HEADINGS AND TITLES IN YOUR GRAPH.'
    8/5X, '16. HELP--AN ATTEMPT TO CLEAR UP PROBLEMS, YOU MAY
    8/5X, 'WISH TO REFER'
    8/5X, 'TO THE DISPLA USER MANUAL.'
    8/5X, '17. PLOT THE UPDATED GRAPH--THIS REPLOTS THE GRAPH
    8/5X, 'YOU HAVE BEEN UPDATING.'
    8/5X, '18. NO CHANGES--ALLOWS YOU TO SAVE THIS GRAPH AND C
    8/5X, 'ONTINUE ON.'
    8/5X, 'TO EITHER DEVELOP A NEW GRAPH OR EXIT.'

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C      FORMAT STATEMENTS.
C      780      FORMAT (/25X,'*** ERROR ***',
C              8/10X,'YOU MUST MAKE AN ENTRY THAT ANSWERS THE QUESTION',
C              8/16X,'PLEASE REENTER')
C      END
C      SUBROUTINE EXIT1
C      SUBROUTINE EXIT1 ALLOWS THE USER TO EXIT THE PROGRAM.
C      SUBROUTINE EXIT1
C      CALL FRTCMS ('CLRSCRN ')
C      SUBROUTINE FILE FILES GRAPH DATA UNDER USER'S DEFINED FILE NAME.
C      CALL FILE
C      CALL DONEPL
C      STOP
C      END
C      EASYFLCT EXEC
C      THIS EXEC LINKS TO THE PROPER USERID FOR EXECUTION OF THE
C      PROGRAM.
C      CONTROL ERROR
C      EXEC ICGEVENT 1 EASYFIOT
C      GETFMADR
C      EREAR VARS &STAR &MODE1 &CUU
C      CP LINK 0056P 191 &CUU RR
C      ACC &CUU &MODE1
C      EXEC EASY2652 &1
C      REL &MODE1 (DET
C      EXEC ICGEVENT 2 EASYFIOT
C      EASY2652 EXEC
C      THIS EXEC EXECUTES THE PROGRAM FOR THE USER.

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