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MAGNETIC TAPE COPIES OF MIT GEOPHYSICS PROGRAM SET II

(TIME SERIES PROGRAMS FOR THE IBM 709, 7090, 7094)

S. M. Simpson, Jr.

Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Contract No. AF19(604)-7378

Project No. 8652

Task No. 865203

Scientific Report No. 10

March 31, 1965

Work Sponsored by Advanced Research Projects Agency

Project Vela-Uniform

ARPA Order No. 180-61, Amendment 2

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AIR FORCE CAMBRIDGE RESEARCH LABORATORIES
OFFICE OF AEROSPACE RESEARCH
UNITED STATES AIR FORCE
BEDFORD, MASSACHUSETTS

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ABSTRACT

The set of programs known as "MIT Geophysics Program Set I" has been expanded, edited, and upgraded to form Set II. This new set consists of 267 programs for the IBM 709, 7090, 7094 and is available to qualified applicants, via magnetic tape copies of the symbolic decks, from the Seismic Data Laboratory of United Electroynamics. A complete copy requires two 2400 foot high density (900 BPI) tapes.

The symbolic decks of Set II form an interlocking system of self-documenting (including examples) subroutines written in FORTRAN and FAP (compatible with FORTRAN-II) concerned primarily with single and multiple time series analysis. Because of the subroutine nature of its construction, however, much of the system is readily accessible for use in other computational areas.

The new programs in Set II concentrate largely on utility functions (graphical and other input-output, miscellaneous numerical operators) and on time series operators for multidimensional and multi-input processes (including in particular high speed recursion techniques for solving least squares simultaneous equations). A handful of specialized or outmoded programs from Set I has been suppressed; most of the others have been upgraded with respect to documentation; and some have been modified with respect to coding.

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1. Introduction

MIT Geophysics Program Set II is an expanded, modified version of Program Set I which was introduced (Simpson, 1962) as follows.

"The MIT Department of Geology and Geophysics has a history in time series computations by high speed computers which extends back to 1952 when it began using Whirlwind I to instrument Wiener's optimum filter concepts in the signal-noise problems of reflection seismology. Since then it has steadily developed and expanded the computer technology of time series analysis, adapting computational concepts to the shifting ground of new machine languages.

"The programs developed in this process have been made available on an individual basis in the past but, particularly with impetus from VELA UNIFORM research, the increased volume of requests have necessitated a more concentrated effort to systematize this distribution. Moreover, the widespread adoption of FORTRAN and IBM 700 series machines justifies for us the considerable effort we have taken to carefully document and assemble the large number of our most useful programs which we are now making available as "MIT Geophysics Program Set I.

"Symbolic programs are the best for general distribution and because of the number of cards involved (over 23,000) we have chosen to transmit them by magnetic tape. The symbolic programs on the tape copies are completely self-explanatory. The present report is concerned with supplementary information such as complete tables of contents, conventions used in program design and description, details on the production and testing of the master tape, and a KWIC-type index to the programs.

"The bulk of the programs included are the work of Stephen M. Simpson, Jr., Jon F. Claerbout, James N. Galbraith, and Ralph A. Wiggins, but they include contributions from Jacqueline Clark, Enders A. Robinson, Roy J. Greenfield, and there are a few programs originating in the MIT Computation Center as well as one or two modifications

of FORTRAN system routines. Authorship is given individually in the comment cards of each program.

"The production and testing of the master tape involved not only the work of the authors but also extensive test program writing by Joseph Procito and seemingly endless card preparation, handling and editing by Elizabeth Studer, Dauna Trop, and Karl Gentili to whom the authors are most grateful.

"Test computations were performed both on the IBM 7090 at the MIT Computation Center and on the IBM 709 of the Cooperative Computing Laboratory of MIT, with the valuable assistance of Michael Saxton and Anthony Sacco, respectively."

The above serves to introduce Program Set II with the following additional comments

1. The symbolic card count now exceeds 50,000.
2. The names of Mrs. Myrna Kasser, Regina Lahteine, and Mrs. Barbara Cullum should be added to the list of those assisting in punched card work and the names of John Harmon, Thomas Burhoe, Mason Fleming and William Jarvis to the list of computer operators.
3. The IBM 7094 of the MIT Computation Center was the principal computing instrument used during the period since Program Set I.

REFERENCE

Simpson, Jr., S. M., 1962, Magnetic tape copies of MIT Geophysics Program Set I (Time series programs for the IBM 709, 7090): Sci. Rept. 4 of Contract AF 19(604)7378, AFCL-65-207, ARPA Project VELA UNIFORM.

2. Tables of Contents of the Symbolic Tapes

The symbolic versions of the 267 programs of Set II appear on two BCD tapes, 116 on the first tape and 151 on the second. The first file of each tape gives a table of contents for that tape, and the remaining files are the successive programs, ordered alphabetically by program name, terminated by an "END TAPE" file. Consequently the first tape contains 118 files and the second one 153 files. The following 11 pages show listings of the first files of the two tapes.

Listing of first file of Tape 1 of
Program Set II (Page 1 of 5)

•	TABLE OF CONTENTS	
•	FILE NO.	1 ON THIS TAPE IS
•	TABLE OF CONTENTS	
•	FILE NO.	2 ON THIS TAPE IS
•	ASVAL	FAST ABSOLUTE VALUE OF A VECTOR
•	FILE NO.	3 ON THIS TAPE IS
•	ADANL	MODIFY AUTO- OR CROSS-CORRELATIONS FOR DANIELL SPECTRA
•	FILE NO.	4 ON THIS TAPE IS
•	ADCK	MODIFY A SET OF VARIABLES BY A CONSTANT OR BY CONSTANTS
•	FILE NO.	5 ON THIS TAPE IS
•	AMPHZ	AMPLITUDE AND PHASE FROM REAL AND IMAGINARY, OR REVERSE
•	FILE NO.	6 ON THIS TAPE IS
•	ARBCL	FIND A MATRIX COLUMN WITH ARBITRARY INDEX BY INTERPOLATION
•	FILE NO.	7 ON THIS TAPE IS
•	ARCTAN	ARCTANGENT FUNCTION
•	FILE NO.	8 ON THIS TAPE IS
•	ASPECT	FAST COSINE TRANSFORMS OF ONE-SIDED AUTOCORRELATIONS
•	FILE NO.	9 ON THIS TAPE IS
•	ASPEC?	AUTOSPECTRUM BY COSINE TRANSFORM OF AUTOCORRELATION
•	FILE NO.	10 ON THIS TAPE IS
•	AVRAGE	FIND AVERAGE OF FLOATING VECTOR
•	FILE NO.	11 ON THIS TAPE IS
•	BLKSLM	SUMMATION OF VECTOR OVER ABUTTING BLOCKS OF CONSTANT LENGTH
•	FILE NO.	12 ON THIS TAPE IS
•	BOOST	ADD A CONSTANT TO ELEMENTS OF A FIX OR FLTG VECTOR
•	FILE NO.	13 ON THIS TAPE IS
•	CARIGE	SPACE CARRIAGE N LINES OR RESTORE PAGE
•	FILE NO.	14 ON THIS TAPE IS
•	CHISCR	COMPUTE CHI-SQUARE FOR CONSTANT PROBABILITY CASE
•	FILE NO.	15 ON THIS TAPE IS
•	CHOOSE	SET A LIST OF VARIABLES TO ONE OF TWO SETS OF VALUES
•	FILE NO.	16 ON THIS TAPE IS
•	CHPRTS	FAST REVERSAL OF SPECIAL VECTORS (AS PRODUCED BY SPLIT)
•	FILE NO.	17 ON THIS TAPE IS
•	CHSIGN	CHANGE ALL SIGN BITS OF A VECTOR
•	FILE NO.	18 ON THIS TAPE IS
•	CLKON	CHECK IF INTERVAL TIMER IS ON MAKING ON-LINE REQUEST IF NOT
•	FILE NO.	19 ON THIS TAPE IS
•	CLOCK1 (7090)	FOR REAL TIME TIMING IN SECONDS USING 7090 INTERVAL CLOCK
•	FILE NO.	20 ON THIS TAPE IS
•	CMPPARP	COMPARE PAIRS OF VARIABLES OR A SET OF VARIABLES FOR EQUALITY
•	FILE NO.	21 ON THIS TAPE IS
•	CMPPRV	FAST COMPARE TWO ARBITRARY MODE VECTORS FOR IDENTITY
•	FILE NO.	22 ON THIS TAPE IS
•	CMPPRA	COMPARE ARITHMETICALLY TWO WORDS WHERE -0 IS LESS THAN +0
•	FILE NO.	23 ON THIS TAPE IS
•	CNTRCB	CONTOUR A MATRIX ON THE PRINTER IN DECIBELS
•	FILE NO.	24 ON THIS TAPE IS
•	CNTRCW	FIND CONTOUR LEVELS FOR PLOTTING A ROW OF DATA
•	FILE NO.	25 ON THIS TAPE IS
•	COLABL	LABEL PRINTER COLUMNS WITH INCREASING 3-DIGIT INTEGERS
•	FILE NO.	26 ON THIS TAPE IS
•	COLAPS	COLLAPSE ONE-SIDED VECTOR INTO SMALLER RANGE
•	FILE NO.	27 ON THIS TAPE IS
•	CONTRK	CONTOUR OF MATRIX SUBSET ON OFF-LINE PRINTER

Listing of first file of Tape 1 of
Program Set II (Page 2 of 5)

•	FILE NO.	28 ON THIS TAPE IS
•CONVLV		COMPLETE CONVOLUTION OF TWO TRANSIENTS
•	FILE NO.	29 ON THIS TAPE IS
•CONVLV-II		COMPLETE CONVOLUTION OF TWO TRANSIENTS
•	FILE NO.	30 ON THIS TAPE IS
•COSISL		FAST COSINE AND/OR SINE TRANSFORMS OF ODD-LENGTH SERIES
•	FILE NO.	31 ON THIS TAPE IS
•COSP		FAST COSINE AND/OR SINE TRANSFORMS FROM 2 OR 4 EVEN-ODD PARTS
•	FILE NO.	32 ON THIS TAPE IS
•COSTBL		GENERATE COSINE OR SINE HALF-WAVE TABLES, FIXED OR FLOATING
•	FILE NO.	33 ON THIS TAPE IS
•CPYFL2		FAST COPY FILE FROM ONE TAPE TO ANOTHER - VERSION 2
•	FILE NO.	34 ON THIS TAPE IS
•CROSS		CROSSCORRELATION OF TRANSIENTS BEGINNING WITH ZERO LAG
•	FILE NO.	35 ON THIS TAPE IS
•CROST		CROSSCORRELATION OF TRANSIENTS BEGINNING WITH ANY LAG
•	FILE NO.	36 ON THIS TAPE IS
•CRSVP		CROSSCORRELATION OF TRANSIENT VECTORS OF MATRICES
•	FILE NO.	37 ON THIS TAPE IS
•CSOUT		OUTPUT VARIABLES FIVE PER LINE IN G FORMAT
•	FILE NO.	38 ON THIS TAPE IS
•CUFIT1		FIND CUBIC WHICH EXACTLY FITS 4 EQUALLY SPACED POINTS
•	FILE NO.	39 ON THIS TAPE IS
•CVSOLT		OUTPUT COLUMN VECTORS BY NORMAL OR LITERAL FORMATS
•	FILE NO.	40 ON THIS TAPE IS
•DADECK		LIST DATA DECK AND REPOSITION TAPE TO FRONT OF DECK
•	FILE NO.	41 ON THIS TAPE IS
•DELTA		DELTA FUNCTION AND STEP FUNCTIONS, FLOATING AND FIXED POINT
•	FILE NO.	42 ON THIS TAPE IS
•DERIVA		DERIVATIVE OF A VECTOR BY DIFFERENCING
•	FILE NO.	43 ON THIS TAPE IS
•DIFPRS		DIFFERENCE FIXED OR FLOATING VECTOR ELEMENTS IN PAIRS
•	FILE NO.	44 ON THIS TAPE IS
•DISPLA (709)		WRITE HOLLERITH TEXT ON SCOPE
•	FILE NO.	45 ON THIS TAPE IS
•DISPLA(7090)		WRITE HOLLERITH TEXT ON SCOPE
•	FILE NO.	46 ON THIS TAPE IS
•DIVICE		DIVIDE A FLOATING VECTOR BY A CONSTANT
•	FILE NO.	47 ON THIS TAPE IS
•DOTJ		VECTOR DOT PRODUCT WITH ARBITRARY INCREMENTS
•	FILE NO.	48 ON THIS TAPE IS
•DOTP		DISPLACED DOT PRODUCT OF 2-DIMENSIONAL ARRAYS
•	FILE NO.	49 ON THIS TAPE IS
•DSPFMT		VARIABLE ORIGIN FORMAT GENERATOR FOR SCOPE SUBROUTINE DISPLA
•	FILE NO.	50 ON THIS TAPE IS
•DUBLX		FAST DOUBLING OR HALVING OF A VECTOR (FIXED OR FLOATING)
•	FILE NO.	51 ON THIS TAPE IS
•EXCHVS		EXCHANGE ANY TWO VECTORS
•	FILE NO.	52 ON THIS TAPE IS
•EXPAND		HI-SPEED EXPANSION OF A VECTOR UNDER CUBIC INTERPOLATION
•	FILE NO.	53 ON THIS TAPE IS
•FACTOR		FACTOR POWER SPECTRUM TO FIND MINIMUM PHASE WAVELET
•	FILE NO.	54 ON THIS TAPE IS
•FAPSLM		COMPUTE A LOGICAL SUMCHECK

Listing of first file of Tape 1 of
Program Set II (Page 3 of 5)

•	FILE NO.	55 ON THIS TAPE IS
•FASCAN		FAST SCAN VECTOR FOR ELEMENT EQUAL OR GREATER THAN GIVEN VALUE
•	FILE NO.	56 ON THIS TAPE IS
•FASCLB		FAST EVALUATE CUBIC FOR EVENLY SPACED ARGUMENTS
•	FILE NO.	57 ON THIS TAPE IS
•FASTRK		FAST TRACK THROUGH A VECTOR OF INDICES
•	FILE NO.	58 ON THIS TAPE IS
•FDOF		FAST DOT PRODUCT OF TWO VECTORS
•	FILE NO.	59 ON THIS TAPE IS
•FIRE2		TWO-DIMENSIONAL FILTER BY RECURSION
•	FILE NO.	60 ON THIS TAPE IS
•FIXV		FIX A FLOATING VECTOR WITH OR WITHOUT ROUNDING
•	FILE NO.	61 ON THIS TAPE IS
•FLOATH		FLOAT ANY MACHINE LANGUAGE INTEGER
•	FILE NO.	62 ON THIS TAPE IS
•FLOATV		FLOAT A VECTOR
•	FILE NO.	63 ON THIS TAPE IS
•FMTOLT		WRITE OUTPUT TAPE WITH NORMAL OR LITERAL FORMAT VECTOR
•	FILE NO.	64 ON THIS TAPE IS
•FNDFMT		ACCESS TO LITERAL OR ORDINARY FORMAT
•	FILE NO.	65 ON THIS TAPE IS
•FRAME (709)		ADVANCE FILM FRAME ON SCOPE
•	FILE NO.	66 ON THIS TAPE IS
•FRAME(7090)		ADVANCE FILM FRAME ON SCOPE
•	FILE NO.	67 ON THIS TAPE IS
•FRQCT1		FREQUENCY DISTRIBUTION OF A FIXED POINT VECTOR
•	FILE NO.	68 ON THIS TAPE IS
•FRQCT2		FREQUENCY COUNT OF NUMBER OF VALUES OF A SERIES IN GIVEN RANGES
•	FILE NO.	69 ON THIS TAPE IS
•FSKIP		SKIP FORWARD OR BACKWARD OVER FILES ON TAPE
•	FILE NO.	70 ON THIS TAPE IS
•FT24		HIGH SPEED 24 POINT SPECTRUM
•	FILE NO.	71 ON THIS TAPE IS
•FT24 -II		HIGH SPEED 24 POINT SPECTRUM
•	FILE NO.	72 ON THIS TAPE IS
•FXCATA		SCALE, CONVERT FLTG. VECTOR TO MACHINE INTEGERS OR CONVERSELY
•	FILE NO.	73 ON THIS TAPE IS
•GENHCL		GENERATE HOLLERITH FIELD
•	FILE NO.	74 ON THIS TAPE IS
•GETHCL		GET HOLLERITH DATA FROM CALLING SEQUENCE
•	FILE NO.	75 ON THIS TAPE IS
•GETRC1		ACCESS ROUTINE FOR RAND CORP. MILLION RANDOM DIGITS FROM TAPE
•	FILE NO.	76 ON THIS TAPE IS
•GETX		ALLOWS VARIABLE DEPTH INDEXING OF VECTORS
•	FILE NO.	77 ON THIS TAPE IS
•GNFLT1		GENERATE SYMMETRICAL FILTER WITH GIVEN AMPLITUDE RESPONSE
•	FILE NO.	78 ON THIS TAPE IS
•GNHOL2		GENERATE HOLLERITH CHARACTERS
•	FILE NO.	79 ON THIS TAPE IS
•GRAPH		MULTIPLE FRAME SCOPE PLOTS OF VECTOR SETS
•	FILE NO.	80 ON THIS TAPE IS
•GRAPHX		SUBROUTINE GRAPH EXPANDED OVER VERTICAL FRAMES
•	FILE NO.	81 ON THIS TAPE IS
•GRUP2		DIVIDE THE X AXIS INTO EQUALLY PROBABLE RANGES

Listing of first file of Tape 1 of
Program Set II (Page 4 of 5)

•	FILE NO.	82 ON THIS TAPE IS
•HLADJ		HOLLERITH LEFT ADJUST OR RIGHT ADJUST FUNCTION
•	FILE NO.	83 ON THIS TAPE IS
•HSTPLT		HISTOGRAM PLOTTING FOR SUBROUTINE GRAPH
•	FILE NO.	84 ON THIS TAPE IS
•HSTPLT-II		BAR GRAPH PLOTTING FOR SUBROUTINE GRAPH
•	FILE NO.	85 ON THIS TAPE IS
•HSTPLT-III(709)		CUBIC CURVE SCOPE PLOTTING FOR SUBROUTINE GRAPH
•	FILE NO.	86 ON THIS TAPE IS
•HSTPLT-III(7090)		CUBIC CURVE SCOPE PLOTTING FOR SUBROUTINE GRAPH
•	FILE NO.	87 ON THIS TAPE IS
•HVTOIV		SPREAD OUT HOLLERITH VECTOR AS FORTRAN INTEGERS
•	FILE NO.	88 ON THIS TAPE IS
•IDERIV		INVERSION OF DIFFERENTIATION BY DIFFERENCING
•	FILE NO.	89 ON THIS TAPE IS
•IFNCIN		INVERSION OF A MONOTONE FUNCTION BY LINEAR INTERPOLATION
•	FILE NO.	90 ON THIS TAPE IS
•IINTGR		INVERSION OF TRAPEZOIDAL INTEGRAL
•	FILE NO.	91 ON THIS TAPE IS
•INDATA		FAST AND CONVENIENT RETRIEVAL OF DATA FROM A SPECIAL TAPE
•	FILE NO.	92 ON THIS TAPE IS
•INDEX		HYBRID SUBPROGRAMS FOR INCREMENTING, TESTING, AND SETTING
•	FILE NO.	93 ON THIS TAPE IS
•INTGRA		INDEFINITE INTEGRAL BY TRAPEZOIDAL RULE
•	FILE NO.	94 ON THIS TAPE IS
•INTHCL		INTERPRET HOLLERITH
•	FILE NO.	95 ON THIS TAPE IS
•INTOPR		INTERPOLATION OPERATOR FOR 1 TO 4 EVENLY SPACED DATA VALUES
•	FILE NO.	96 ON THIS TAPE IS
•INTSLM		INTEGRATED SUMMATION OF A FLOATING OF FIXED VECTOR
•	FILE NO.	97 ON THIS TAPE IS
•IPLYEV		COMPLEX POLYNOMIAL EVALUATION
•	FILE NO.	98 ON THIS TAPE IS
•ITOMLI		FAST CONVERT FORTRAN INTEGER VECTOR TO MLI VECTOR
•	FILE NO.	99 ON THIS TAPE IS
•IVTOFV		PACK UP FORTRAN INTEGER VECTOR AS HOLLERITH VECTOR
•	FILE NO.	100 ON THIS TAPE IS
•IXCARG		LOCATE ARGUMENT WITH RESPECT TO COMMON
•	FILE NO.	101 ON THIS TAPE IS
•KIINTI		PROBABILITY THAT A CHI-SQUARED VARIATE EXCEEDS A VALUE
•	FILE NO.	102 ON THIS TAPE IS
•KOLAPS		COLLAPSE ODD-LENGTHED VECTOR ABOUT ITS MIDPOINT
•	FILE NO.	103 ON THIS TAPE IS
•LIMITS		CHECK THAT VARIABLES FROM LIST FALL WITHIN GIVEN LIMITS
•	FILE NO.	104 ON THIS TAPE IS
•LINE (709)		FAST ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE
•	FILE NO.	105 ON THIS TAPE IS
•LINE (7090)		FAST ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE
•	FILE NO.	106 ON THIS TAPE IS
•LINE+ (709)		PLOT FAST HORIZONTAL LINE ON SCOPE
•	FILE NO.	107 ON THIS TAPE IS
•LINE+(7090)		PLOT FAST HORIZONTAL LINE ON SCOPE
•	FILE NO.	108 ON THIS TAPE IS
•LINEV (709)		PLOT FAST VERTICAL LINE ON SCOPE

Listing of first file of Tape 1 of
Program Set II (Page 5 of 5)

• FILE NO. 109 ON THIS TAPE IS
•LINEV(7090) PLOT FAST VERTICAL LINE ON SCOPE
• FILE NO. 110 ON THIS TAPE IS
•LINTR1 LINEAR INTERPOLATION IN A TABLE
• FILE NO. 111 ON THIS TAPE IS
•LISTNG LIST AUXILIARY INFORMATION FOR AN INDATA-ODATA TYPE TAPE
• FILE NO. 112 ON THIS TAPE IS
•LOC CORE LOCATION WITH INDEXABLE ARGUMENT
• FILE NO. 113 ON THIS TAPE IS
•LOCATE LOCATE AND OPERATE SUBROUTINES BY PROXY CALL STATEMENTS
• FILE NO. 114 ON THIS TAPE IS
•LSHFT LOGICAL SHIFT FUNCTION
• FILE NO. 115 ON THIS TAPE IS
•LSLINE LEAST SQUARES LINE
• FILE NO. 116 ON THIS TAPE IS
•LSSS1 LEAST SQUARES SHAPER BY SIDEWAYS ITERATION
• FILE NO. 117 ON THIS TAPE IS
•MATINV INVERSE OF A MATRIX
• FILE NO. 118 ON THIS TAPE IS
•END TAPE CARD IN FORMAT(1H*,6X,8HEND TAPE)

Listing of first file of Tape 2 of
Program Set II (Page 1 of 6)

*	TABLE OF CONTENTS	
*	FILE NO.	1 ON THIS TAPE IS
*	TABLE OF CONTENTS	
*	FILE NO.	2 ON THIS TAPE IS
*	MATML1	SQUARE MATRIX MULTIPLICATION
*	FILE NO.	3 ON THIS TAPE IS
*	MATML3	N X M MATRIX BY M X L MATRIX MULTIPLICATION
*	FILE NO.	4 ON THIS TAPE IS
*	MATRA	MATRIX TRANSPOSE
*	FILE NO.	5 ON THIS TAPE IS
*	MATRA1	SQUARE MATRIX TRANSPOSE
*	FILE NO.	6 ON THIS TAPE IS
*	MAXSA	FIND SIGNED OR UNSIGNED EXTREMAL VALUES OF A VECTOR
*	FILE NO.	7 ON THIS TAPE IS
*	MAXSAM	EXTREMAL VALUES OF MATRIX ELEMENTS
*	FILE NO.	8 ON THIS TAPE IS
*	MDOT	DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTORS OF MATRICES
*	FILE NO.	9 ON THIS TAPE IS
*	MDOT3	DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTORS OF MATRICES
*	FILE NO.	10 ON THIS TAPE IS
*	MEMUSE	OFF-LINE PRINT OF MEMORY USAGE - PROGRAM AND COMMON
*	FILE NO.	11 ON THIS TAPE IS
*	MFACT	FACTOR A SYMMETRIC POSITIVE DEFINITE MATRIX
*	FILE NO.	12 ON THIS TAPE IS
*	MIFLS	MULTI-INPUT FILTER BY LEAST SQUARES
*	FILE NO.	13 ON THIS TAPE IS
*	MIPLS	MULTI-INPUT PREDICTOR BY LEAST SQUARES
*	FILE NO.	14 ON THIS TAPE IS
*	MISS	MULTI-INPUT SIDEWARDS ITERATION
*	FILE NO.	15 ON THIS TAPE IS
*	MLISCL	MULTIPLY AN MLI VECTOR BY A FORTRAN FIXED POINT INTEGER
*	FILE NO.	16 ON THIS TAPE IS
*	MLI2A6	CONVERT MACHINE LANGUAGE INTEGER TO EQUIVALENT HOLLERITH
*	FILE NO.	17 ON THIS TAPE IS
*	MONOCK	CHECK VECTOR FOR MONOTONE INCREASING OR DECREASING BEHAVIOR
*	FILE NO.	18 ON THIS TAPE IS
*	MOUT	MATRIX OUTPUT IN G FORMAT
*	FILE NO.	19 ON THIS TAPE IS
*	MOUTAI	OUTPUT A MATRIX AS INTEGERS DENSELY PACKED OFF-LINE
*	FILE NO.	20 ON THIS TAPE IS
*	MOVE	MOVE A VECTOR TO A DIFFERENT LOCATION
*	FILE NO.	21 ON THIS TAPE IS
*	MOVECS	MOVE AN ARBITRARY SET OF VECTORS
*	FILE NO.	22 ON THIS TAPE IS
*	MOVREV	MOVE, REVERSE, CHANGE SPACING, OR CHANGE SIGN OF A VECTOR
*	FILE NO.	23 ON THIS TAPE IS
*	MPSECI	MAP A SEQUENCE OF NUMBERS INTO AN INTEGER SERIES
*	FILE NO.	24 ON THIS TAPE IS
*	MRVRS	REVERSE VECTOR OF MATRICES
*	FILE NO.	25 ON THIS TAPE IS
*	MSCON1	MEAN SQUARE CONTINGENCY AND DEPENDENCY FROM PROBABILITY DENSITY
*	FILE NO.	26 ON THIS TAPE IS
*	MULK -II	MULTIPLY ANY NO. OF VARIABLES BY A SINGLE FLTG. PT. CONSTANT
*	FILE NO.	27 ON THIS TAPE IS
*	MULLER	POLYNOMIAL ROOT FINDER

Listing of first file of Tape 2 of
Program Set II (Page 2 of 6)

* FILE NO.	28 ON THIS TAPE IS
*MULPLY	MULTIPLY VECTOR BY FLOATING OR FIXED CONSTANT
* FILE NO.	29 ON THIS TAPE IS
*MUVACD	FAST MOVING SUMMATION OF A FIXED POINT VECTOR
* FILE NO.	30 ON THIS TAPE IS
*MVBLCk	MOVE DATA BLOCK
* FILE NO.	31 ON THIS TAPE IS
*MVINAV	MOVING AVERAGE OF A VECTOR
* FILE NO.	32 ON THIS TAPE IS
*MVNSUM	MOVING SUMMATION WITH DIVISION BY A CONSTANT
* FILE NO.	33 ON THIS TAPE IS
*MVNTIN	MOVING TRAPEZOIDAL INTEGRAL OR ABSOLUTE VALUE INTEGRAL
* FILE NO.	34 ON THIS TAPE IS
*MVSQAV	MOVING MEAN SQUARE AVERAGE OF A VECTOR
* FILE NO.	35 ON THIS TAPE IS
*MXRARE	REGION TO MAXIMIZE RATIO OF TWO DISTRIBUTION FUNCTIONS
* FILE NO.	36 ON THIS TAPE IS
*NMZMG1	NORMALIZE A VECTOR TO GIVEN MAXIMUM VALUE
* FILE NO.	37 ON THIS TAPE IS
*NOINT1	NORMAL DISTRIBUTION AND DIVISION INTO EQUALLY LIKELY SECTIONS
* FILE NO.	38 ON THIS TAPE IS
*NRMVEC	NORMALIZE AND CHANGE MEAN OF A VECTOR
* FILE NO.	39 ON THIS TAPE IS
*NTHA	RETURN N-TH ARGUMENT BEYOND THE FIRST
* FILE NO.	40 ON THIS TAPE IS
*NURINC	CREATE ONE VECTOR FROM ANOTHER WITH NEW RANGE AND INCREMENT
* FILE NO.	41 ON THIS TAPE IS
*NXALRM	SCAN VECTOR FOR POSSIBLE BLOCK OF VALUES ALL ABOVE GIVEN LEVEL
* FILE NO.	42 ON THIS TAPE IS
*ONLINE	OPTIONAL ONLINE MONITOR OF BCD TAPE WRITING
* FILE NO.	43 ON THIS TAPE IS
*OUCATA	FAST AND CONVENIENT DATA STORAGE ON TAPE
* FILE NO.	44 ON THIS TAPE IS
*PACDAT	READ EVERY N-TH WORD FROM BINARY TAPE
* FILE NO.	45 ON THIS TAPE IS
*PAKN	SCALE AND FIX DATA VECTOR, PACK N DATA POINTS PER REGISTER
* FILE NO.	46 ON THIS TAPE IS
*PLANSF	FAST TWO-DIMENSIONAL SPATIAL SPECTRUM
* FILE NO.	47 ON THIS TAPE IS
*PLOTVS	PRINTER-PLOT OF ARBITRARY SET OF VECTORS
* FILE NO.	48 ON THIS TAPE IS
*PLTVS1	PRINTER PLOT OF A SET OF EQUAL LENGTH VECTORS
* FILE NO.	49 ON THIS TAPE IS
*PLURAS	PLURALIZE THE NEXT SUBROUTINE
* FILE NO.	50 ON THIS TAPE IS
*PLYSYN	POLYNOMIAL SYNTHESIZED FROM ITS REAL AND COMPLEX ROOTS
* FILE NO.	51 ON THIS TAPE IS
*POKCT1	EVALUATION OF INTEGER SEQUENCE IN GROUPS OF FIVE AS POKER HANDS
* FILE NO.	52 ON THIS TAPE IS
*POLYCV	PERFORM LONG DIVISION OF TWO POLYNOMIALS
* FILE NO.	53 ON THIS TAPE IS
*POLYEV	EVALUATE A POLYNOMIAL WITH REAL COEFFICIENTS FOR REAL ARGUMENT
* FILE NO.	54 ON THIS TAPE IS
*POLYSN	POLYNOMIAL SYNTHESIS FROM REAL AND COMPLEX ROOTS

Listing of first file of Tape 2 of
Program Set II (Page 3 of 6)

•	FILE NO.	55 ON THIS TAPE IS
•POWER		RAISE VECTOR TO POWER OR SUM POWER OF DEVIATIONS FROM BASE
•	FILE NO.	56 ON THIS TAPE IS
•PRBFIT		GENERATE PROBABILITY DISTRIBUTION WITH SPECIFIED MOMENTS
•	FILE NO.	57 ON THIS TAPE IS
•PROB2		SECOND PROBABILITY DENSITY OF INTEGER SERIES AT GIVEN LAG
•	FILE NO.	58 ON THIS TAPE IS
•PROCCR		FAST CORRELATIONS FOR LONG SERIES OF FIXED POINT INTEGERS
•	FILE NO.	59 ON THIS TAPE IS
•PSQRT		FIND THE POWER SERIES SQUARE ROOT OF A POLYNOMIAL
•	FILE NO.	60 ON THIS TAPE IS
•PWMLIV		PRINT OR WRITE OUTPUT TAPE A MACHINE LANGUAGE INTEGER VECTOR
•	FILE NO.	61 ON THIS TAPE IS
•QACORR		FAST AUTOCORRELATIONS FOR LONG, LIMITED ACCURACY SERIES
•	FILE NO.	62 ON THIS TAPE IS
•QCNVLV		FAST CONVOLUTIONS FOR LONG, LIMITED ACCURACY SERIES
•	FILE NO.	63 ON THIS TAPE IS
•QFURRY		FAST FOURIER TRANSFORM OF TRANSIENT WITH ARBITRARY TIME ORIGIN
•	FILE NO.	64 ON THIS TAPE IS
•QIFURY		QUICK INVERSE FOURIER TRANSFORM WITH ARBITRARY TIME ORIGIN
•	FILE NO.	65 ON THIS TAPE IS
•QINTR1		QUADRATIC INTERPOLATION IN A TABLE
•	FILE NO.	66 ON THIS TAPE IS
•QUFIT1		FIND QUADRATIC WHICH EXACTLY FITS 3 EQUALLY SPACED POINTS
•	FILE NO.	67 ON THIS TAPE IS
•QXCORR		FAST CROSS-CORRELATIONS FOR LONG, LIMITED ACCURACY SERIES
•	FILE NO.	68 ON THIS TAPE IS
•QXCOR1		QUICK CROSSCORRELATION OF MLI TRANSIENTS
•	FILE NO.	69 ON THIS TAPE IS
•RDATA		READ DATA IN GENERALIZED FORMAT
•	FILE NO.	70 ON THIS TAPE IS
•REFLEC		REFLECT A FIXED OR FLOATING VECTOR THROUGH A CONSTANT
•	FILE NO.	71 ON THIS TAPE IS
•REMAV		REMOVE THE MEAN FROM A FLOATING VECTOR
•	FILE NO.	72 ON THIS TAPE IS
•REREAD		REREAD DATA RECORD AND END FILE MONITOR
•	FILE NO.	73 ON THIS TAPE IS
•REVER		REVERSE A VECTOR ELSEWHERE OR IN PLACE
•	FILE NO.	74 ON THIS TAPE IS
•REVERS		FAST REVERSE STORAGE ORDER OF A VECTOR
•	FILE NO.	75 ON THIS TAPE IS
•RLSPR		REALIZABLE LEAST SQUARES PREDICTOR BY RECURSION, 1-DIMENSION
•	FILE NO.	76 ON THIS TAPE IS
•RLSPR2		REALIZABLE LEAST SQUARES PREDICTOR BY RECURSION, 2-DIMENSIONS
•	FILE NO.	77 ON THIS TAPE IS
•RLSSR		REALIZABLE LEAST SQUARES SHAPER BY RECURSION
•	FILE NO.	78 ON THIS TAPE IS
•RMSDEV		R.M.S. DEVIATION FROM GIVEN BASE OR FROM TRUE AVERAGE
•	FILE NO.	79 ON THIS TAPE IS
•RND		ROUND FLTG. PT. NO. UP, DOWN, OR TO NEAREST FLTG. PT. INTEGER
•	FILE NO.	80 ON THIS TAPE IS
•RNDV		ROUND, ROUND UP, OR ROUND DOWN A FLOATING VECTOR
•	FILE NO.	81 ON THIS TAPE IS
•ROAR2		ROTATE CENTRO-SYMMETRIC OR ANTISYMMETRIC 2-DIMENSIONAL ARRAY

Listing of first file of Tape 2 of
Program Set II (Page 4 of 6)

•	FILE NO.	82 ON THIS TAPE IS
•ROTAT1		ROTATE A VECTOR UPWARDS OR DOWNWARDS AN ARBITRARY AMOUNT
•	FILE NO.	83 ON THIS TAPE IS
•RPLFMT		REPLACE THE FORMAT OF A SUCCEEDING INPUT OR OUTPUT STATEMENT
•	FILE NO.	84 ON THIS TAPE IS
•RSKIP		SKIP FORWARD OR BACKWARD OVER RECORDS ON TAPE
•	FILE NO.	85 ON THIS TAPE IS
•SAME		ENABLE MIXED EXPRESSIONS IN FORTRAN
•	FILE NO.	86 ON THIS TAPE IS
•SCPSCL		SCALE VECTOR TO INTEGERS FOR SCOPE, CLIPPING EXCESSIVE VALUES
•	FILE NO.	87 ON THIS TAPE IS
•SEARCH		SEARCH A VECTOR FOR A VALUE
•	FILE NO.	88 ON THIS TAPE IS
•SEQSAC		FAST FUNCTIONS FOR SEQUENTIAL SINES AND COSINES
•	FILE NO.	89 ON THIS TAPE IS
•SETINO		INITIALIZE FOR ADDING TO AN INDATA-OUTDATA TAPE
•	FILE NO.	90 ON THIS TAPE IS
•SETK		SET VARIABLES OR VECTORS TO GIVEN VALUES
•	FILE NO.	91 ON THIS TAPE IS
•SETK -II		SET ANY NO. OF VARIABLES EQUAL TO A SINGLE VALUE (FXD OR FLTG)
•	FILE NO.	92 ON THIS TAPE IS
•SETKP		PLURALIZED FORMS OF SUBROUTINES SETK AND SETVEC
•	FILE NO.	93 ON THIS TAPE IS
•SETKS -II		SET ANY NO. OF VARIABLES EQUAL TO SEPARATE VALUES (FXD OR FLTG)
•	FILE NO.	94 ON THIS TAPE IS
•SETKV		SET ALL ELEMENTS OF VECTOR EQUAL TO A CONSTANT (ANY MODE)
•	FILE NO.	95 ON THIS TAPE IS
•SETKVS		SET ANY NO. OF VECTORS EQUAL TO SEPARATE VALUES (FXD OR FLTG)
•	FILE NO.	96 ON THIS TAPE IS
•SETLIN		SET FXD OR FLTG VECTOR EQUAL TO A LINEAR SEGMENT
•	FILE NO.	97 ON THIS TAPE IS
•SETLAS		SET LINEAR VECTORS, FIXED AND/OR FLOATING
•	FILE NO.	98 ON THIS TAPE IS
•SEVRAL		OPERATE SEVERAL SUBROUTINES OR ONE SUBROUTINE REPEATEDLY
•	FILE NO.	99 ON THIS TAPE IS
•SHFTR1		SHIFT VECTOR ELEMENTS ARITHMETICALLY LEFT OR RIGHT
•	FILE NO.	100 ON THIS TAPE IS
•SHFTR2		SHIFT VECTOR ELEMENTS LOGICALLY LEFT OR RIGHT
•	FILE NO.	101 ON THIS TAPE IS
•SHUFFL		SHUFFLE A LIST OF INTEGERS FROM 1 TO N
•	FILE NO.	102 ON THIS TAPE IS
•SIFT		FORM A VECTOR BY SIFTING ANOTHER AT EVEN INCREMENTS
•	FILE NO.	103 ON THIS TAPE IS
•SIMEG		SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT EVALUATION
•	FILE NO.	104 ON THIS TAPE IS
•SIZECP		FAST MAKE INDEX (BY INCREASING SIZE) OF ELEMENTS IN A VECTOR
•	FILE NO.	105 ON THIS TAPE IS
•SMPSCN		UNSCALE OR SCALE VECTOR FOR SIMPSON INTEGRAL AND/OR INTEGRATE
•	FILE NO.	106 ON THIS TAPE IS
•SPCOR2		SPATIAL CROSSCORRELATION OF 2-DIMENSIONAL SPATIAL ARRAYS
•	FILE NO.	107 ON THIS TAPE IS
•SPLIT		SPLIT A VECTOR INTO ITS EVEN AND ODD PARTS (OR INVERSE)
•	FILE NO.	108 ON THIS TAPE IS
•SQRDFR		SUM SQUARE DIF. OF FLTG VECTOR FROM ANOTHER OR FROM A CONSTANT

Listing of first file of Tape 2 of
Program Set II (Page 5 of 6)

•	FILE NO.	109 ON THIS TAPE IS
•SQRMLI		FAST SQUARE ELEMENTS OF A MACHINE LANGUAGE INTEGER VECTOR
•	FILE NO.	110 ON THIS TAPE IS
•SQROCT		SQUARE ROOT OF A FLOATING VECTOR
•	FILE NO.	111 ON THIS TAPE IS
•SQRSLM		SUM THE SQUARED ELEMENTS OF A FLTG OR FXD VECTOR
•	FILE NO.	112 ON THIS TAPE IS
•SQUARE		SQUARE ELEMENTS OF FXD OR FLTG VECTOR
•	FILE NO.	113 ON THIS TAPE IS
•SRCHI		SEARCH VECTOR FOR NUMBER, STARTING FROM FIRST OR LAST TERM
•	FILE NO.	114 ON THIS TAPE IS
•STZ		FAST SET VECTOR TO ZERO
•	FILE NO.	115 ON THIS TAPE IS
•STZS		SET A LIST OF VECTORS TO ZERO
•	FILE NO.	116 ON THIS TAPE IS
•SUM		SUM ELEMENTS OF FLOATING OR FIXED VECTOR
•	FILE NO.	117 ON THIS TAPE IS
•SUMDFR		SUM DIFFERENCE OF VECTOR FROM ANOTHER OR FROM A CONSTANT
•	FILE NO.	118 ON THIS TAPE IS
•SWITCH		TEST THE CONDITION OF ANY SENSE SWITCH
•	FILE NO.	119 ON THIS TAPE IS
•TAMVL		TRIANGULAR AVERAGING, MOVING LEFT OR RIGHT END
•	FILE NO.	120 ON THIS TAPE IS
•TIMA2B (7094)		REAL TIME, TO SPECIFIED ACCURACY, OF GIVEN PROGRAM RANGE
•	FILE NO.	121 ON THIS TAPE IS
•TIMSLB		FIND OPERATION TIME OF NEXT SUBROUTINE TO GIVEN ACCURACY
•	FILE NO.	122 ON THIS TAPE IS
•TINGL		DEFINITE TRAPEZOIDAL INTEGRAL OF FUNCTION OR ITS MAGNITUDE
•	FILE NO.	123 ON THIS TAPE IS
•TRMIND		TERMINATE AN INDATA-OUTDATA TAPE
•	FILE NO.	124 ON THIS TAPE IS
•UNPAKN		UNPACK AND RESCALE A PACKED DATA VECTOR
•	FILE NO.	125 ON THIS TAPE IS
•VARARG		ENABLE FORTRAN VARIABLE LENGTH CALLING SEQUENCES
•	FILE NO.	126 ON THIS TAPE IS
•VDOTV		DOT PRODUCT OF TWO VECTORS WITH DIVISION BY CONSTANT
•	FILE NO.	127 ON THIS TAPE IS
•VDVBVY		DIVIDE ELEMENTS OF ONE VECTOR BY THOSE OF ANOTHER
•	FILE NO.	128 ON THIS TAPE IS
•VECOLT		OFFLINE VECTOR OUTPUT WITH NORMAL OR LITERAL FORMAT
•	FILE NO.	129 ON THIS TAPE IS
•VOUT		OUTPUT NAMED VECTOR BY NORMAL OR LITERAL FORMAT WITH SPACING
•	FILE NO.	130 ON THIS TAPE IS
•VPLUSV		ADD OR SUBTRACT TWO FLOATING OR FIXED VECTORS
•	FILE NO.	131 ON THIS TAPE IS
•VRSOLT		OUTPUT VARIABLES BY NORMAL OR LITERAL FORMAT
•	FILE NO.	132 ON THIS TAPE IS
•VSOUT		OUTPUT NAMED VECTORS BY NORMAL OR LITERAL FORMATS WITH SPACING
•	FILE NO.	133 ON THIS TAPE IS
•VTIMSV		MULTIPLY ELEMENTS OF TWO VECTORS FIXED OR FLOATING
•	FILE NO.	134 ON THIS TAPE IS
•WAC		WIENER AUTOCORRELATION
•	FILE NO.	135 ON THIS TAPE IS
•WHICH		CHOOSE BETWEEN TWO VARIABLES BY A THIRD ONE BEING ZERO

Listing of first file of Tape 2 of
Program Set II (Page 6 of 6)

* FILE NO. 136 ON THIS TAPE IS
*WLLSFP WIENER-LEVINSON LEAST SQUARE ERROR FILTER OR PREDICTOR
* FILE NO. 137 ON THIS TAPE IS
*WRTDAT WRITE BINARY DATA ON TAPE
* FILE NO. 138 ON THIS TAPE IS
*XACTEQ SIGN OF DIFFERENCE OF 2 VARIABLES OR 0 IF SAME INCLUDING SIG.
* FILE NO. 139 ON THIS TAPE IS
*XAVRGE FIND AVERAGE OF FIXED PT VECTOR
* FILE NO. 140 ON THIS TAPE IS
*XDIV FXD PT DIVIDE WITH TRUNCATION OR ROUNDING TO FORTRAN-II INTEGER
* FILE NO. 141 ON THIS TAPE IS
*XDVCE DIVIDE A FXD VECTOR BY A CONSTANT
* FILE NO. 142 ON THIS TAPE IS
*XFIXM TRUNCATE OR ROUND FLOATING PT. NUMBER TO MACHINE INTEGER
* FILE NO. 143 ON THIS TAPE IS
*XLCPM FIND LENGTH OF COMMON STORAGE
* FILE NO. 144 ON THIS TAPE IS
*XLIMIT FIND IF ARGUMENT FALLS INSIDE TWO LIMITING VALUES
* FILE NO. 145 ON THIS TAPE IS
*XLCCV CREATE VECTOR OF MACHINE ADDRESSES OF VARIABLES IN A LIST
* FILE NO. 146 ON THIS TAPE IS
*XOCZE DETERMINE WHETHER FORTRAN-II INTEGER IS EVEN OR ODD
* FILE NO. 147 ON THIS TAPE IS
*XREMAV REMOVE THE MEAN FROM A FIXED VECTOR
* FILE NO. 148 ON THIS TAPE IS
*XSPECT FAST COSINE, SINE TRANSFORMS OF CROSS-CORRELATION FUNCTIONS
* FILE NO. 149 ON THIS TAPE IS
*XSQDFR SUM SQUARE DIF. OF FXD. VECTOR FROM ANOTHER OR FROM A CONSTANT
* FILE NO. 150 ON THIS TAPE IS
*XSQRUT SQUARE ROOT OF A FIXED VECTOR WITH ROUNDING
* FILE NO. 151 ON THIS TAPE IS
*XVCEV DIVIDE ELEMENTS OF TWO FIXED VECTORS WITH OR WITHOUT ROUNDING
* FILE NO. 152 ON THIS TAPE IS
*ZEFBCD TEST IF NEXT TAPE RECORD IS END OF FILE AND REPOSITION TAPE
* FILE NO. 153 ON THIS TAPE IS
ENC TAPE CARD IN FORMAT(1H,6X,8HEND TAPE)

3. Program Statistics

All of the programs of Set II are subroutines or functions, and the name of each program coincides with the name of the entry point to the subroutine or function. In the case of multiple-entry routines the name of the program coincides with that of the first entry card in the deck, and is called the "principal entry". The total count of principal and secondary entries is 395.

The program statistics tabulation which follows provides an alphabetical listing of all entries, with their secondary entries, transfer vectors, storage requirements, acceptance dates of symbolic deck, symbolic deck card counts, binary card counts, authors, and language. The symbol "M" is used for machine language (i.e. FAP), and "F" for FORTRAN. Authors are coded by initials as follows.

AMN	Arcadio M. Niell
CP	Cheh Pan
EAR	Enders A. Robinson
IH	Ira Hanson
JC	Jacqueline Clark
JFC	Jon F. Claerbout
JNG	James N. Galbraith, Jr.
JTO	J. T. Olsztyn
JTP	Joseph T. Procito, Jr.
MIT	MIT Lincoln Lab or Computation Center Staff
RAW	Ralph A. Wiggins
RJG	Roy J. Greenfield
SMS	Stephen M. Simpson, Jr.

 * ABSVAL TO ARBCOL *

PROGRAM STATISTICS

 * ABSVAL TO ARBCOL *

ENTRY NAME	SECTORY	TRANSFECTOR	STORAGE	DATE OF	SYMBOLIC	CARD DECK	SYMBOLIC COUNT	BC INADY COUNT	AUTHOR	LANGUAGE
ABSVAL			50	9/29/64			117	4	SMS	M
ADANL			183	9/29/64			336	11	JFC	M
XDANL		SIN								
ADANX										
XDANX										
ADANX (SEE ADANL)										
ADDK			114	9/29/64			366	8	SMS	M
SUBK										
MULK										
DIVK										
XADDK										
XSUBK										
XMULK										
XDIVK										
XDVRK										
ADDKS										
SUBKS										
MULKS										
DIVKS										
XADDKS										
XSUBKS										
XMULKS										
XDIVKS										
XDVRKS										
ADDKS (SEE ADDK)										
AMPHZ			149	10/ 1/64			251	10	JFC	M
REIM		ATAN								
		SQRT								
		RND								
		COS								
		SIN								
ARBCOL			129	9/ 9/64			271	8	SMS	M
		INTOPR								

 * ARCTAN TO CMPARP *

PROGRAM STATISTICS

 * ARCTAN TO CMPARP *

ARCTAN	.	29	.	9/ 4/64	.	92	.	3	.	RAW	.	M
	. ATAN	.	.	.	.	.	.	.	.	.	.	.
ARG	(SEE LOCATE)	.	.	.	.	.	.	.	.	.	.	.
ASPECT	.	278	.	9/29/64	.	536	.	15	.	SMS	.	M
	. COLAPS	.	.	.	.	.	.	.	.	.	.	.
	. COSP	.	.	.	.	.	.	.	.	.	.	.
	. DUBLX	.	.	.	.	.	.	.	.	.	.	.
	. DUBLL	.	.	.	.	.	.	.	.	.	.	.
	. SPLIT	.	.	.	.	.	.	.	.	.	.	.
	. RVPRTS	.	.	.	.	.	.	.	.	.	.	.
ASPEC2	.	74	.	3/15/65	.	206	.	5	.	SMS	.	M
	. SEQSAC	.	.	.	.	.	.	.	.	.	.	.
	. NEXCOS	.	.	.	.	.	.	.	.	.	.	.
AVRAGE	.	24	.	9/29/64	.	79	.	3	.	SMS	.	M
BLKSUM	.	49	.	9/ 4/64	.	169	.	4	.	SMS	.	M
BOOST	.	34	.	9/29/64	.	147	.	3	.	SMS	.	M
	. XBOOST	.	.	.	.	.	.	.	.	.	.	.
	. DPRESS	.	.	.	.	.	.	.	.	.	.	.
	. XDPRSS	.	.	.	.	.	.	.	.	.	.	.
CALL	(SEE LOCATE)	.	.	.	.	.	.	.	.	.	.	.
CALL2	(SEE LOCATE)	.	.	.	.	.	.	.	.	.	.	.
CARIGE	.	47	.	9/29/64	.	98	.	4	.	SMS	.	F
	. (STH)	.	.	.	.	.	.	.	.	.	.	.
	. (FIL)	.	.	.	.	.	.	.	.	.	.	.
CHISQR	.	105	.	9/29/64	.	85	.	6	.	JNG	.	F
CHOOSE	.	17	.	9/ 4/64	.	84	.	2	.	SMS	.	M
CHPRTS	.	76	.	9/29/64	.	149	.	5	.	SMS	.	M
	. RVPRTS	.	.	.	.	.	.	.	.	.	.	.
CHSIGN	.	18	.	9/29/64	.	78	.	2	.	SMS	.	M
CHUSET	(SEE INDEX)	.	.	.	.	.	.	.	.	.	.	.
CLKON	.	46	.	9/29/64	.	42	.	4	.	RAW	.	F
	. CLOCK1	.	.	.	.	.	.	.	.	.	.	.
	. (SPH)	.	.	.	.	.	.	.	.	.	.	.
	. (FIL)	.	.	.	.	.	.	.	.	.	.	.
CLOCK1 (7090)	.	57	.	3/15/65	.	148	.	4	.	SMS	.	M
CMPARL	(SEE CMPARV)	.	.	.	.	.	.	.	.	.	.	.
CMPARP	.	53	.	9/29/64	.	151	.	4	.	SMS	.	M
	. CMPARS	.	.	.	.	.	.	.	.	.	.	.

 * CMPARS TO COSISP *

PROGRAM STATISTICS

 * CMPARS TO COSISP *

CMPARS (SEE CMPARP)							
CMPARV	50	9/ 4/64	156	4	SMS	M	
CMPARL							
CMPRA	18	9/ 4/64	104	2	RAW	M	
XCMPRA							
CMPRFL							
CMPRFL (SEE CMPRA)							
CNTRDB	550	9/ 9/64	251	27	SMS	F	
SETVEC							
LOG							
CONTUR							
EXP							
SAME							
(STH)							
(FIL)							
CNTRDW	802	9/ 9/64	521	39	SMS	F	
RNDON							
RNDUP							
QUFIT1							
CUFIT1							
FASCUB							
RND							
COLABL	185	9/ 4/64	124	10	SMS	F	
GENHOI							
(SPH)							
(FIL)							
(STH)							
COLAPS	50	9/29/64	128	4	JC	M	
CONTUR	587	9/ 9/64	642	29	SMS	F	
RNDON							
RNDUP							
(STH)							
(FIL)							
COLABL							
ARBCOL							
CNTRDW							
SWITCH							
(SPH)							
XSAME							
CONVLV	96	9/29/64	99	6	JFC	F	
CONVLV-11	56	10/ 2/64	149	4	JFC+	M	
					RAW		
COSISP (SEE COSP)							

 * COSIS1 TO CVSOUT *

PROGRAM STATISTICS

 * COSIS1 TO CVSOUT *

COSIS1	.	.	406	.	9/10/64	.	264	.	21	.	RAW	.	F
	IXCARG	.	.	.	.	.	.	.	.	.	.	.	.
	SPLIT	.	.	.	.	.	.	.	.	.	.	.	.
	MOVREV	.	.	.	.	.	.	.	.	.	.	.	.
	CHPRTS	.	.	.	.	.	.	.	.	.	.	.	.
	COSP	.	.	.	.	.	.	.	.	.	.	.	.
	SISP	.	.	.	.	.	.	.	.	.	.	.	.
	COSISP	.	.	.	.	.	.	.	.	.	.	.	.
COSP	.	.	504	.	9/29/64	.	878	.	27	.	SMS	.	M
SISP	.	.	.	.	.	.	.	.	.	.	.	.	.
COSISP	.	.	.	.	.	.	.	.	.	.	.	.	.
COSTBL	.	.	121	.	9/29/64	.	200	.	8	.	JFC	.	M
SINTBL	COS	.	.	.	.	.	.	.	.	.	.	.	.
COSTBX	SIN	.	.	.	.	.	.	.	.	.	.	.	.
SINTBX	.	.	.	.	.	.	.	.	.	.	.	.	.
COSTBX (SEE COSTBL)	.	.	.	.	.	.	.	.	.	.	.	.	.
CPYFL2	.	.	178	.	9/ 9/64	.	304	.	10	.	RAW	.	M
	(IOS)	.	.	.	.	.	.	.	.	.	.	.	.
	(TCO)	.	.	.	.	.	.	.	.	.	.	.	.
	(WRS)	.	.	.	.	.	.	.	.	.	.	.	.
	(RCH)	.	.	.	.	.	.	.	.	.	.	.	.
	(TRC)	.	.	.	.	.	.	.	.	.	.	.	.
	(ETT)	.	.	.	.	.	.	.	.	.	.	.	.
	(WEF)	.	.	.	.	.	.	.	.	.	.	.	.
	(BSR)	.	.	.	.	.	.	.	.	.	.	.	.
	(RDS)	.	.	.	.	.	.	.	.	.	.	.	.
CROSS	.	.	107	.	9/29/64	.	87	.	7	.	RAW	.	F
	STZ	.	.	.	.	.	.	.	.	.	.	.	.
	FDOT	.	.	.	.	.	.	.	.	.	.	.	.
CROST	.	.	134	.	9/29/64	.	99	.	8	.	RAW	.	F
	CROSS	.	.	.	.	.	.	.	.	.	.	.	.
	REVERS	.	.	.	.	.	.	.	.	.	.	.	.
CRSM	.	.	327	.	9/10/64	.	220	.	17	.	RAW	.	F
	SETKS	.	.	.	.	.	.	.	.	.	.	.	.
	MDOT3	.	.	.	.	.	.	.	.	.	.	.	.
	STZ	.	.	.	.	.	.	.	.	.	.	.	.
CSOUT	.	.	49	.	9/ 4/64	.	127	.	4	.	RAW	.	M
	CARIGE	.	.	.	.	.	.	.	.	.	.	.	.
	(STH)	.	.	.	.	.	.	.	.	.	.	.	.
	PRADJ	.	.	.	.	.	.	.	.	.	.	.	.
	(FIL)	.	.	.	.	.	.	.	.	.	.	.	.
CUFIT1	.	.	158	.	9/ 4/64	.	326	.	9	.	SMS	.	M
CVSOUT	.	.	84	.	9/29/64	.	221	.	6	.	SMS	.	M
	CARIGE	.	.	.	.	.	.	.	.	.	.	.	.

 * CVSOUT TO DUBLX *

PROGRAM STATISTICS

 * CVSOUT TO DUBLX *

	FMTOUT							
	VECOUT							
DADECK		100	9/ 4/64	70	6	JNG+	F	
	EOFSET					RAW		
	(TSH)							
	(RTN)							
	(STH)							
	(FIL)							
	RSKIP							
DELTA		17	9/ 4/64	141	2	SMS	M	
XDELTA								
STEPR								
XSTEPR								
STEPL								
XSTEPL								
STEPCL								
XSTEPCL								
DERIVA		61	9/29/64	160	5	SMS	M	
DETRM (SEE SIMEQ)								
DIFPRS		30	9/29/64	118	3	SMS	M	
XDFPRS								
DISPLA (709)		220	9/29/64	474	12	MIT	M	
(IOH)								
DISPLA (7090)		219	9/ 4/64	481	13	MIT	M	
(IOH)								
FRAME								
DIVIDE		23	9/29/64	88	3	SMS	M	
DIVK (SEE ADDK)								
DIVKS (SEE ADDK)								
DO (SEE SEVRAL)								
DOTJ		59	10/ 2/64	143	4	RAW	M	
DOTF		264	9/29/64	147	14	RAW	F	
DOTJ								
DPRESS (SEE BOOST)								
DSPFMT		194	9/29/64	313	11	SMS	M	
DUBLL (SEE DUBLX)								
DUBLX		45	9/29/64	129	4	SMS	M	
DUBLL								

 * DUBLX TO FLOATM *

PROGRAM STATISTICS

 * DUBLX TO FLOATM *

HALVX	.	.	.	.	.	.	.	.
HALVL	.	.	.	.	.	.	.	.
ENDFIL (SEE REREAD)	.	.	.	.	.	.	.	.
EOFSET (SEE REREAD)	.	.	.	.	.	.	.	.
EXCHVS	.	22	9/29/64	84	3	SMS	M	
EXPAND	.	189	9/ 4/64	380	11	SMS	M	
	INTOPR	.	.	.	.	.	.	.
FACTOR	.	308	9/ 8/64	489	17	JNG	M	
	MAXAB	.	.	.	.	.	.	.
	LOG	.	.	.	.	.	.	.
	COSTBL	.	.	.	.	.	.	.
	COSP	.	.	.	.	.	.	.
	EXP	.	.	.	.	.	.	.
FAPSUM	.	14	9/29/64	66	2	JFC	M	
FASCNI	.	107	9/29/64	199	7	SMS	M	
FASCOR (SEE PROCOR)	.	.	.	.	.	.	.	.
FASCR1 (SEE PROCOR)	.	.	.	.	.	.	.	.
FASCUB	.	141	9/ 4/64	260	9	SMS	M	
FASEPC (SEE PROCOR)	.	.	.	.	.	.	.	.
FASEP1 (SEE PROCOR)	.	.	.	.	.	.	.	.
FASTRK	.	26	9/ 8/64	119	3	SMS	M	
FDOT	.	40	9/ 4/64	101	3	RAW	M	
FDOTR	.	.	.	.	.	.	.	.
FDOTR (SEE FDOT)	.	.	.	.	.	.	.	.
FIRE2	.	271	9/ 8/64	152	14	RAW	F	
	IXCARG	.	.	.	.	.	.	.
	STZ	.	.	.	.	.	.	.
	DOTP	.	.	.	.	.	.	.
	MATML3	.	.	.	.	.	.	.
	DOTJ	.	.	.	.	.	.	.
FIXV	.	35	9/29/64	105	3	SMS	M	
FIXVR	.	.	.	.	.	.	.	.
FIXVR (SEE FIXV)	.	.	.	.	.	.	.	.
FLDATA (SEE FXDATA)	.	.	.	.	.	.	.	.
FLOATM	.	25	9/29/64	91	3	SMS	M	

 * FLCATV TO GNHOL2 *

PROGRAM STATISTICS

 * FLOATV TO GNHOL2 *

FLOATV	.	.	22	.	9/29/64	.	81	.	3	.	SMS	.	M
FMTOUT	.	.	51	.	9/29/64	.	71	.	4	.	SMS	.	F
	.	FNDFMT	.	.	.	.	.	.	.	.	.	.	.
	.	RPLFMT	.	.	.	.	.	.	.	.	.	.	.
	.	(STH)	.	.	.	.	.	.	.	.	.	.	.
	.	(FIL)	.	.	.	.	.	.	.	.	.	.	.
FNDFMT	.	.	88	.	9/29/64	.	203	.	6	.	SMS	.	M
	.	REVER	.	.	.	.	.	.	.	.	.	.	.
FRAME (709)	.	.	4	.	9/29/64	.	34	.	2	.	RAW	.	M
FRAME (7090)	.	.	9	.	9/ 4/64	.	47	.	2	.	MIT	.	M
FRQCT1	.	.	117	.	9/29/64	.	95	.	7	.	SMS	.	F
FRQCT2	.	.	117	.	9/29/64	.	212	.	7	.	JNG	.	M
FSKIP	.	.	50	.	9/ 4/64	.	104	.	4	.	JFC	.	M
	.	(IOS)	.	.	.	.	.	.	.	.	.	.	.
	.	(RDS)	.	.	.	.	.	.	.	.	.	.	.
	.	(BSR)	.	.	.	.	.	.	.	.	.	.	.
	.	(TCO)	.	.	.	.	.	.	.	.	.	.	.
	.	(TEF)	.	.	.	.	.	.	.	.	.	.	.
	.	(TRC)	.	.	.	.	.	.	.	.	.	.	.
FT24	.	.	777	.	9/29/64	.	848	.	40	.	CP	.	M
	.	FXDATA	.	.	.	.	.	.	.	.	.	.	.
	.	FLDATA	.	.	.	.	.	.	.	.	.	.	.
FT24 -II	.	.	818	.	9/29/64	.	147	.	39	.	RAW	.	F
FXDATA	.	.	102	.	10/ 1/64	.	248	.	7	.	SMS	.	M
FLDATA	.	.	.	.	.	.	.	.	.	.	.	.	.
GENHOL	.	.	48	.	3/15/65	.	145	.	4	.	RAW	.	M
	.	(IOH)	.	.	.	.	.	.	.	.	.	.	.
GETHOL	.	.	169	.	9/29/64	.	176	.	9	.	SMS	.	F
	.	XLOC	.	.	.	.	.	.	.	.	.	.	.
	.	REVERS	.	.	.	.	.	.	.	.	.	.	.
GETRD1	.	.	229	.	10/ 1/64	.	173	.	10	.	SMS	.	F
	.	(TSH)	.	.	.	.	.	.	.	.	.	.	.
	.	(RTN)	.	.	.	.	.	.	.	.	.	.	.
GETX	.	.	31	.	9/ 4/64	.	128	.	3	.	RAW	.	M
IGETX	.	.	.	.	.	.	.	.	.	.	.	.	.
GNFLT1	.	.	232	.	9/29/64	.	164	.	12	.	SMS	.	F
	.	COS	.	.	.	.	.	.	.	.	.	.	.
GNHOL2	.	.	74	.	9/29/64	.	158	.	5	.	RAW	.	M
	.	(IOH)	.	.	.	.	.	.	.	.	.	.	.

 * GNHOL2 TO IFNCTN *

PROGRAM STATISTICS

 * GNHOL2 TO IFNCTN *

GRAPH	(FIL)	1499	9/29/64	1103	72	SMS	F
	DISPLA						
	(SPH)						
	(FIL)						
	LINE						
	LOG						
	EXP(2						
	XFIXM						
	FLOATM						
	DSPFMT						
	FRAME						
	XLOC						
	MVBLOK						
	SCPSCL						
	HSTPLT						
GRAPHX		123	9/29/64	154	7	SMS	F
	GRAPH						
	FRAME						
GRUP2		201	10/ 1/64	141	11	JNG	F
HALVL	(SEE DUBLX)						
HALVX	(SEE DUBLX)						
HLADJ		46	9/29/64	111	4	SMS	M
HRADJ							
HRADJ	(SEE HLADJ)						
HSTPLT		145	9/29/64	346	9	JNG	M
	LINEH						
	LINEV						
HSTPLT-II		188	9/29/64	336	11	RAW	M
	LINEH						
	LINEV						
HSTPLT-III	(709)	256	9/29/64	438	14	RAW	M
	LINEH						
HSTPLT-III	(7090)	258	9/ 8/64	446	14	RAW	M
	LINEH						
HVTOIV		39	9/29/64	110	3	SMS	M
IDERIV		54	9/29/64	149	4	SMS	M
'IF'	(SEE SEVRAL)						
IFNCTN		208	9/ 4/64	444	12	SMS	M
	MONOCK						
	REVER						

 * IGETX TO KIINT1 *

PROGRAM STATISTICS

 * IGETX TO KIINT1 *

IGETX (SEE GETX)	.	.	.	.	.	.	.
IINTGR	.	49	9/29/64	157	4	SMS	M
INDATA	.	896	10/ 1/64	489	32	JFC	F
VARARG	.	.	.	.	.	.	.
FSKIP	.	.	.	.	.	.	.
(TSB)	.	.	.	.	.	.	.
(RLR)	.	.	.	.	.	.	.
FAPSUM	.	.	.	.	.	.	.
LOC	.	.	.	.	.	.	.
MVBLOK	.	.	.	.	.	.	.
XSAME	.	.	.	.	.	.	.
(SPH)	.	.	.	.	.	.	.
(FIL)	.	.	.	.	.	.	.
(STH)	.	.	.	.	.	.	.
UNPAKN	.	.	.	.	.	.	.
INDEX	.	50	9/ 4/64	270	4	SMS	M
INDEX	.	.	.	.	.	.	.
SETEST	.	.	.	.	.	.	.
SETAPT	.	.	.	.	.	.	.
CHUSET	.	.	.	.	.	.	.
INTGRA	.	47	9/29/64	175	4	SMS	M
INTHOL	.	72	9/ 9/64	156	5	RAW	M
FNDGMT	.	.	.	.	.	.	.
(IOH)	.	.	.	.	.	.	.
(RTN)	.	.	.	.	.	.	.
INTMSB (SEE TMSUB)	.	.	.	.	.	.	.
INTOPR	.	111	9/ 4/64	251	7	SMS	M
INTSUM	.	27	9/29/64	110	3	SMS	M
XNTSUM	.	.	.	.	.	.	.
IPLYEV	.	98	10/ 2/64	84	6	RAW	F
(IFMP)	.	.	.	.	.	.	.
ITOMLI	.	37	9/29/64	98	3	SMS	M
IVTOHV	.	70	3/15/65	148	5	SMS	M
IXCARG	.	35	9/29/64	67	3	SMS	F
XLGC	.	.	.	.	.	.	.
KIINT1	.	191	9/29/64	129	10	SMS	F
SQRT	.	.	.	.	.	.	.
EXP(3	.	.	.	.	.	.	.
NOINT1	.	.	.	.	.	.	.

 * KOLAPS TO LSSSI *

PROGRAM STATISTICS

 * KOLAPS TO LSSSI *

KOLAPS	.	100	9/29/64	219	6	JC	M
LIMITS	.	44	9/ 8/64	162	4	SMS	M
LINE (709)	.	91	9/29/64	193	6	SMS	M
LINE (7090)	.	95	9/ 4/64	208	6	SMS	M
LINEH (709)	.	34	9/29/64	158	3	JNG	M
LINEH (7090)	.	35	9/ 4/64	168	3	JNG	M
LINEV (709)	.	34	9/29/64	161	3	JNG	M
LINEV (7090)	.	35	9/ 4/64	169	3	JNG	M
LINIR1	.	96	9/29/64	93	6	SMS	F
LISTNG	.	755	9/29/64	221	38	RAW	F
	(RWT)	.	.	.	.	.	.
	(STH)	.	.	.	.	.	.
	(FIL)	.	.	.	.	.	.
	(TSB)	.	.	.	.	.	.
	(RLR)	.	.	.	.	.	.
	FAPSUM	.	.	.	.	.	.
	SAME	.	.	.	.	.	.
	XSAME	.	.	.	.	.	.
	(SPH)	.	.	.	.	.	.
	FSKIP	.	.	.	.	.	.
	SHFTR2	.	.	.	.	.	.
LOC	.	4	9/29/64	54	2	RAW	M
LOCATE	.	512	3/15/65	2008	28	SMS	M
WHERE	.	.	.	.	.	.	.
CALL	.	.	.	.	.	.	.
CALL2	.	.	.	.	.	.	.
SETSUBV	.	.	.	.	.	.	.
SETUP	.	.	.	.	.	.	.
RETURN	.	.	.	.	.	.	.
XINDEX	.	.	.	.	.	.	.
ARG	.	.	.	.	.	.	.
XARG	.	.	.	.	.	.	.
STORE	.	.	.	.	.	.	.
XNARGS	.	.	.	.	.	.	.
XNAME	.	.	.	.	.	.	.
LSHFT	.	12	9/29/64	72	2	RAW	M
XLSHFT	.	.	.	.	.	.	.
LSSLINE	.	117	10/ 1/64	82	7	RAW	F
LSSSI	.	122	9/29/64	116	7	RAW	F
	FDOT	.	.	.	.	.	.

 • MATINV TO MINSNM •

PROGRAM STATISTICS

 • MATINV TO MINSNM •

MATINV	.	SIMEQ	.	90	.	9/29/64	.	79	.	6	.	RAW	.	F
	.		.		.		.		.		.		.	
MATML1	.		.	61	.	9/29/64	.	137	.	5	.	RAW	.	M
	.		.		.		.		.		.		.	
MATML3	.		.	120	.	9/29/64	.	105	.	7	.	RAW	.	F
	.	DOTJ	.		.		.		.		.		.	
MATRA	.		.	92	.	9/29/64	.	177	.	5	.	RAW	.	M
	.		.		.		.		.		.	SMS	.	
MATRA1	.		.	42	.	9/29/64	.	95	.	4	.	RAW	.	M
MAXAB (SEE MAXSN)	.		.		.		.		.		.		.	
MAXABM (SEE MAXSNM)	.		.		.		.		.		.		.	
MAXSN	.		.	54	.	9/29/64	.	170	.	5	.	JFC	.	M
MINSN	.		.		.		.		.		.		.	
MAXAS	.		.		.		.		.		.		.	
MINAB	.		.		.		.		.		.		.	
MAXSNM	.		.	61	.	9/ 4/64	.	247	.	5	.	SMS	.	M
MINSNM	.		.		.		.		.		.		.	
MAXABM	.		.		.		.		.		.		.	
MINABM	.		.		.		.		.		.		.	
MDOT	.		.	109	.	9/29/64	.	94	.	7	.	RAW	.	F
	.	MATML1	.		.		.		.		.		.	
MDOT3	.		.	122	.	9/29/64	.	120	.	7	.	RAW	.	F
	.	MATML3	.		.		.		.		.		.	
MEMUSE	.		.	71	.	9/ 4/64	.	69	.	5	.	SMS	.	F
	.	XLCOMN	.		.		.		.		.		.	
	.	(STH)	.		.		.		.		.		.	
	.	(FIL)	.		.		.		.		.		.	
MFACT	.		.	167	.	9/29/64	.	103	.	10	.	RAW	.	F
	.	STZ	.		.		.		.		.		.	
	.	DOTJ	.		.		.		.		.		.	
	.	SQRT	.		.		.		.		.		.	
MIFLS	.		.	276	.	9/ 8/64	.	167	.	14	.	RAW	.	F
	.	MOVREV	.		.		.		.		.		.	
	.	MATML3	.		.		.		.		.		.	
MINAB (SEE MAXSN)	.		.		.		.		.		.		.	
MINABM (SEE MAXSNM)	.		.		.		.		.		.		.	
MINSN (SEE MAXSN)	.		.		.		.		.		.		.	
MINSNM (SEE MAXSNM)	.		.		.		.		.		.		.	

 * MIPLS TO MULK *

PROGRAM STATISTICS

 * MIPLS TO MULK *

MIPLS		571	9/29/64	254	28	RAW	F
	IXCARG						
	MATINV						
	MATML3						
	MATRA						
	MDOT3						
	MOVREV						
	STZ						
MISS		335	10/ 5/64	150	17	RAW	F
	MOVREV						
	MATML3						
	MDOT3						
MLISCL		47	9/29/64	115	4	SMS	M
MLI2A6		128	9/29/64	218	8	SMS	M
MONOCK		48	9/ 4/64	165	4	SMS	M
MOUT		130	9/ 8/64	101	8	RAW	F
	CARIGE						
	(SVH)						
	(FIL)						
MOUTAI		357	9/ 4/64	295	18	SMS	F
	EXP(2						
	CARIGE						
	GNHOL2						
	MAXABM						
	LOG						
	RND						
	(STH)						
	(FIL)						
	SAME						
	MOVE						
	MULPLY						
	FIXVR						
MOVE		32	9/29/64	92	3	JFC	M
MOVECS		24	9/29/64	106	3	SMS	M
	MOVE						
MOVREV		74	9/29/64	156	5	RAW	M
MPSEQ1		110	9/29/64	197	7	JNG	M
MRVRS		61	9/29/64	67	4	RAW	F
	REVERS						
MSCON1		238	9/29/64	108	11	JNG	F
MULK	(SEE ADDK)						

 * MULK TO NXALRM *

PROGRAM STATISTICS

 * MULK TO NXALRM *

MULK -II	.	76	.	9/29/64	.	78	.	5	.	SMS	.	F
	SETUP	.	.	.	.	.	.	.	.	.	.	.
	ARG	.	.	.	.	.	.	.	.	.	.	.
	STORE	.	.	.	.	.	.	.	.	.	.	.
	RETURN	.	.	.	.	.	.	.	.	.	.	.
MULKS (SEE ADDK)	.	.	.	.	.	.	.	.	.	.	.	.
MULLER	.	757	.	9/ 9/64	.	232	.	36	.	IH	.	F
	SQRT	.	.	.	.	.	.	.	.	.	.	.
MULPLY	.	34	.	9/29/64	.	114	.	3	.	SMS	.	M
	XMLPLY	.	.	.	.	.	.	.	.	.	.	.
MUVADD	.	129	.	9/29/64	.	245	.	8	.	SMS	.	M
MVBLOK	.	19	.	9/29/64	.	83	.	2	.	SMS	.	M
MVINAV	.	221	.	9/29/64	.	116	.	12	.	SMS	.	F
MVNSUM	.	71	.	9/ 4/64	.	202	.	5	.	SMS	.	M
MVNTIN	.	88	.	9/ 4/64	.	234	.	6	.	SMS	.	M
	MVNTNA	.	.	.	.	.	.	.	.	.	.	.
MVNTNA (SEE MVNTIN)	.	.	.	.	.	.	.	.	.	.	.	.
MVSQAV	.	236	.	9/29/64	.	116	.	13	.	SMS	.	F
MVRARE	.	302	.	9/29/64	.	250	.	16	.	SMS	.	F
	EXP(2	.	.	.	.	.	.	.	.	.	.	.
NEXCOS (SEE SEQSAC)	.	.	.	.	.	.	.	.	.	.	.	.
NEXSIN (SEE SEQSAC)	.	.	.	.	.	.	.	.	.	.	.	.
NMZMG1	.	34	.	9/29/64	.	97	.	3	.	RAW	.	M
NOINT1	.	369	.	9/29/64	.	375	.	20	.	SMS+	.	M
	NOINT2 LINTR1	.	.	.	.	.	.	.	.	JNG	.	.
NOINT2 (SEE NOINT1)	.	.	.	.	.	.	.	.	.	.	.	.
NRMVEC	.	112	.	9/29/64	.	100	.	7	.	RAW	.	F
	SQRT	.	.	.	.	.	.	.	.	.	.	.
	MAXAB	.	.	.	.	.	.	.	.	.	.	.
NTHA	.	11	.	10/ 6/64	.	93	.	2	.	SPS	.	M
	XNTHA	.	.	.	.	.	.	.	.	.	.	.
NURING	.	121	.	9/ 4/64	.	327	.	8	.	SMS	.	M
NXALRM	.	243	.	9/29/64	.	178	.	13	.	SMS	.	F
	FASCN1	.	.	.	.	.	.	.	.	.	.	.

 * ONLINE TO PLOTVS *

29

 * PLTVS1 TO PROCOR *

PROGRAM STATISTICS

 * PLTVS1 TO PROCOR *

PLTVS1	.	.	817	.	9/ 4/64	.	393	.	40	.	SMS	.	F
	.	VARARG	.	.	.	.	.	.	.	.	.	.	.
	.	SETKS	.	.	.	.	.	.	.	.	.	.	.
	.	SETVEC	.	.	.	.	.	.	.	.	.	.	.
	.	SETKVS	.	.	.	.	.	.	.	.	.	.	.
	.	XSTLIN	.	.	.	.	.	.	.	.	.	.	.
	.	XLOC	.	.	.	.	.	.	.	.	.	.	.
	.	XSAME	.	.	.	.	.	.	.	.	.	.	.
	.	RMSDEV	.	.	.	.	.	.	.	.	.	.	.
	.	(STH)	.	.	.	.	.	.	.	.	.	.	.
	.	(FIL)	.	.	.	.	.	.	.	.	.	.	.
	.	MAXSN	.	.	.	.	.	.	.	.	.	.	.
	.	MINSN	.	.	.	.	.	.	.	.	.	.	.
	.	MULPLY	.	.	.	.	.	.	.	.	.	.	.
	.	BOOST	.	.	.	.	.	.	.	.	.	.	.
	.	PLOTVS	.	.	.	.	.	.	.	.	.	.	.
	.	DPRESS	.	.	.	.	.	.	.	.	.	.	.
PLURAL (SEE SEVRAL)	.	.	.	.	.	.	.	.	.	.	.	.	.
PLURNS	.	.	73	.	9/29/64	.	247	.	5	.	SMS	.	M
PLYSYN	.	.	172	.	10/ 5/64	.	162	.	10	.	EAR	.	F
	.	COS	.	.	.	.	.	.	.	.	.	.	.
	.	CONVLV	.	.	.	.	.	.	.	.	.	.	.
POKCT1	.	.	219	.	9/29/64	.	134	.	11	.	SMS	.	F
	.	FRQCT1	.	.	.	.	.	.	.	.	.	.	.
POLYDV	.	.	130	.	9/ 9/64	.	102	.	7	.	JFC+	.	F
	.	MOVE	.	.	.	.	.	.	.	.	RAW	.	.
	.	STZ	.	.	.	.	.	.	.	.	.	.	.
POLYEV	.	.	54	.	9/29/64	.	62	.	4	.	JFC	.	F
POLYSN	.	.	256	.	9/ 8/64	.	167	.	14	.	RAW	.	F
	.	SQRT	.	.	.	.	.	.	.	.	.	.	.
	.	COS	.	.	.	.	.	.	.	.	.	.	.
	.	CONVLV	.	.	.	.	.	.	.	.	.	.	.
	.	MOVE	.	.	.	.	.	.	.	.	.	.	.
POWER	.	.	50	.	9/29/64	.	130	.	4	.	SMS	.	M
SMPREV	.	EXP12	.	.	.	.	.	.	.	.	.	.	.
PRBFIT	.	.	373	.	9/29/64	.	187	.	16	.	RJG	.	F
	.	SQRT	.	.	.	.	.	.	.	.	.	.	.
	.	EXP12	.	.	.	.	.	.	.	.	.	.	.
	.	FXP	.	.	.	.	.	.	.	.	.	.	.
PROB2	.	.	229	.	10/ 6/64	.	175	.	12	.	JNG	.	F
PROCOR	.	.	770	.	9/29/64	.	1499	.	40	.	SMS	.	M
FASCOR	.	.	.	.	.	.	.	.	.	.	.	.	.
FASEPC	.	.	.	.	.	.	.	.	.	.	.	.	.

 * PRCOR TO QXCOR1 *

PROGRAM STATISTICS

 * PROCOR TO QXCOP1 *

FASCR1	.	.	.	.	.	.	.
FASEP1	.	.	.	.	.	.	.
PSQRT	.	155	10/ 5/64	91	9	JFC	F
SQRT	.	.	.	.	.	.	.
PWMLIV	.	300	9/29/64	142	15	SMS	F
ML12A6	.	.	.	.	.	.	.
(STH)	.	.	.	.	.	.	.
(FIL)	.	.	.	.	.	.	.
(SPH)	.	.	.	.	.	.	.
QACORR	.	207	9/29/64	184	11	SMS	F
FXDATA	.	.	.	.	.	.	.
PROCOR	.	.	.	.	.	.	.
FASCOR	.	.	.	.	.	.	.
FLDATA	.	.	.	.	.	.	.
QCNVLV	.	569	9/29/64	294	27	SMS	F
XLOC	.	.	.	.	.	.	.
FXDATA	.	.	.	.	.	.	.
PROCOR	.	.	.	.	.	.	.
FASCOR	.	.	.	.	.	.	.
FASEPC	.	.	.	.	.	.	.
FLDATA	.	.	.	.	.	.	.
QFURRY	.	244	9/29/64	181	13	SMS	F
ST2	.	.	.	.	.	.	.
MOVE	.	.	.	.	.	.	.
COSTBL	.	.	.	.	.	.	.
SINTBL	.	.	.	.	.	.	.
XSPECT	.	.	.	.	.	.	.
QIFURY	.	280	9/29/64	206	14	SMS	F
COSTBL	.	.	.	.	.	.	.
SINTBL	.	.	.	.	.	.	.
COSISP	.	.	.	.	.	.	.
XLOC	.	.	.	.	.	.	.
QINTR1	.	229	9/ 4/64	192	12	JTP	F
RNDUP	.	.	.	.	.	.	.
QUFIT1	.	.	.	.	.	.	.
QUFIT1	.	79	9/ 4/64	200	5	SMS	M
QXCORR	.	283	9/29/64	249	15	SMS	F
XLOC	.	.	.	.	.	.	.
FXDATA	.	.	.	.	.	.	.
PROCOR	.	.	.	.	.	.	.
FASCOR	.	.	.	.	.	.	.
FLDATA	.	.	.	.	.	.	.
QXCOR1	.	502	3/15/65	198	25	RAW	F
SETKS	.	.	.	.	.	.	.
IXCARG	.	.	.	.	.	.	.

 * QXCOR1 TO RLSPR2 *

PROGRAM STATISTICS

 * QXCOR1 TO RLSPR2 *

	• LIMITS •	•	•	•	•	•	•
	• STZ •	•	•	•	•	•	•
	• REVERS •	•	•	•	•	•	•
	• PROCOR •	•	•	•	•	•	•
	• FASCRI •	•	•	•	•	•	•
	• FASEPI •	•	•	•	•	•	•
RDATA	•	645	3/15/65	396	31	RAW	F
	• SETUP •	•	•	•	•	•	•
	• RETURN •	•	•	•	•	•	•
	• IXCARG •	•	•	•	•	•	•
	• (TSH) •	•	•	•	•	•	•
	• (RTN) •	•	•	•	•	•	•
	• (STH) •	•	•	•	•	•	•
	• (FIL) •	•	•	•	•	•	•
	• HVTIOV •	•	•	•	•	•	•
	• IVTOHV •	•	•	•	•	•	•
	• CMPRA •	•	•	•	•	•	•
	• ARG •	•	•	•	•	•	•
	• INTNOL •	•	•	•	•	•	•
	• STORE •	•	•	•	•	•	•
REFIT (SEE SPLIT)	•	•	•	•	•	•	•
REFLEC	•	28	9/29/64	108	3	SMS	M
XRFLEC	•	•	•	•	•	•	•
REIM (SEE AMPHZ)	•	•	•	•	•	•	•
REMAV	•	36	9/29/64	106	3	SMS	M
REREAD	•	114	9/ 9/64	283	7	RAW	M
EOFSET	• (IOH) •	•	•	•	•	•	•
ENDFIL	• (RDS) •	•	•	•	•	•	•
(TSH)	• (RDC) •	•	•	•	•	•	•
(TSHM)	• (RCH) •	•	•	•	•	•	•
	• (TCO) •	•	•	•	•	•	•
	• (TEF) •	•	•	•	•	•	•
	• EXIT •	•	•	•	•	•	•
	• (RER) •	•	•	•	•	•	•
RETURN (SEE LOCATE)	•	•	•	•	•	•	•
REVER	•	30	9/29/64	98	3	SMS	M
REVERS	•	29	9/29/64	77	3	RAW	M
RLSPR	•	142	10/ 5/64	121	8	RAW	F
	• FDOTR •	•	•	•	•	•	•
RLSPR2	•	700	9/ 9/64	281	34	RAW	F
	• IXCARG •	•	•	•	•	•	•
	• STZ •	•	•	•	•	•	•
	• MOVREV •	•	•	•	•	•	•
	• DOTP •	•	•	•	•	•	•

 * RLSPR2 TO SEARCH *

PROGRAM STATISTICS

 * RLSPR2 TO SEARCH *

	MATML3						
	DOTJ						
	SIMEQ						
RLSSR		82	9/29/64	115	5	RAW	F
	FDOTR						
RMSDAV (SEE RMSDEV)							
RMSDEV		50	9/ 4/64	160	4	SMS	M
RMSDAV	SQRT						
RND		15	9/29/64	79	2	RAW	M
RNDUP							
RNDDN							
RNDDN (SEE RND)							
RNDUP (SEE RND)							
RNDV		34	9/29/64	118	3	SMS	M
RNDVUP	RND						
RNDVDN	RNDUP						
	RNDDN						
RNDVDN (SEE RNDV)							
RNDVUP (SEE RNDV)							
ROAR2		174	9/10/64	114	9	RAW	F
	MATRA						
	MOVREV						
	REVERS						
ROTAT1		46	9/ 4/64	110	4	RAW+	M
						JC	
RPLFMT		17	9/29/64	85	2	SMS	M
RSKIP		37	9/29/64	90	3	RAW	M
	(IOS)						
	(TRC)						
	(TCO)						
	(TEF)						
	(RDS)						
	(BSR)						
RVPRTS (SEE CHPRTS)							
SAME		1	9/29/64	40	2	JFC	M
XSAME							
SCPSCL		33	9/29/64	111	3	SMS	M
SEARCH		25	9/29/64	95	3	RAW	M

 * SECSAC TO SETVEC *

PROGRAM STATISTICS

 * SECSAC TO SETVEC *

SECSAC	.	94	.	9/ 8/64	.	278	.	6	.	SMS	.	M
NEXCOS	COS	.	.	.	.	.	.	.	.	.	.	.
NEXSIN	SIN	.	.	.	.	.	.	.	.	.	.	.
SETAPT	(SEE INDEX)	.	.	.	.	.	.	.	.	.	.	.
SETEST	(SEE INDEX)	.	.	.	.	.	.	.	.	.	.	.
SETINO	.	84	.	9/ 8/64	.	92	.	6	.	SMS	.	F
	XLIMIT	.	.	.	.	.	.	.	.	.	.	.
	(RWT)	.	.	.	.	.	.	.	.	.	.	.
	(TSB)	.	.	.	.	.	.	.	.	.	.	.
	(RLR)	.	.	.	.	.	.	.	.	.	.	.
	FSKIP	.	.	.	.	.	.	.	.	.	.	.
SETK	.	37	.	9/29/64	.	190	.	3	.	SMS	.	M
SETKS	.	.	.	.	.	.	.	.	.	.	.	.
SETVEC	.	.	.	.	.	.	.	.	.	.	.	.
SETK -II	.	63	.	9/29/64	.	73	.	4	.	SMS	.	F
	SETUP	.	.	.	.	.	.	.	.	.	.	.
	STORE	.	.	.	.	.	.	.	.	.	.	.
	RETURN	.	.	.	.	.	.	.	.	.	.	.
SETKP	.	40	.	9/29/64	.	124	.	3	.	SMS	.	M
SETVCP	SETK	.	.	.	.	.	.	.	.	.	.	.
	SETVEC	.	.	.	.	.	.	.	.	.	.	.
SETKS (SEE SETK)	.	.	.	.	.	.	.	.	.	.	.	.
SETKS -II	.	91	.	9/29/64	.	86	.	6	.	SMS	.	F
	SETUP	.	.	.	.	.	.	.	.	.	.	.
	ARG	.	.	.	.	.	.	.	.	.	.	.
	STORE	.	.	.	.	.	.	.	.	.	.	.
	RETURN	.	.	.	.	.	.	.	.	.	.	.
SETKV	.	15	.	9/29/64	.	75	.	2	.	SMS	.	M
SETKVS	.	25	.	9/29/64	.	106	.	3	.	SMS	.	M
SETLIN	.	27	.	9/29/64	.	95	.	3	.	SMS	.	M
XSTLIN	.	.	.	.	.	.	.	.	.	.	.	.
SETLNS	.	39	.	9/29/64	.	124	.	3	.	SMS	.	M
	SETLIN	.	.	.	.	.	.	.	.	.	.	.
	XSTLIN	.	.	.	.	.	.	.	.	.	.	.
SETSBV (SEE LOCATE)	.	.	.	.	.	.	.	.	.	.	.	.
SETUP (SEE LOCATE)	.	.	.	.	.	.	.	.	.	.	.	.
SETVCP (SEE SETKP)	.	.	.	.	.	.	.	.	.	.	.	.
SETVEC (SEE SETK)	.	.	.	.	.	.	.	.	.	.	.	.

 * SEVRAL TO SQROOT *

PROGRAM STATISTICS

 * SEVRAL TO SQROOT *

SEVRAL	.	416	9/29/64	949	22	SMS	M
PLURAL	LOCATE	.	.	.	.	.	.
'DO'	WHERE	.	.	.	.	.	.
'IF'	.	.	.	.	.	.	.
SHFTR1	.	70	9/29/64	158	5	SMS	M
SHFTR2	.	72	9/29/64	163	5	SMS+	M
.	.	.	.	.	.	RAW	.
SHUFFL	.	101	9/ 8/64	125	6	SMS	F
.	GETR01	.	.	.	.	.	.
.	SEARCH	.	.	.	.	.	.
.	SIZEUP	.	.	.	.	.	.
SIFT	.	30	9/ 4/64	118	3	SMS	M
SINEQ	.	441	9/ 9/64	642	24	JTO+	M
DETRM	.	.	.	.	.	AMN+	.
.	.	.	.	.	.	RAW	.
SINTBL (SEE COSTBL)	.	.	.	.	.	.	.
SINTBX (SEE COSTBL)	.	.	.	.	.	.	.
SISP (SEE COSP)	.	.	.	.	.	.	.
SIZEUP	.	136	3/15/65	247	8	RAW+	M
SIZUPL	.	.	.	.	.	SMS	.
SIZUPL (SEE SIZEUP)	.	.	.	.	.	.	.
SMPROV (SEE POWER)	.	.	.	.	.	.	.
SMPSON	.	317	9/ 4/64	197	17	JNG	F
SPCOR2	.	291	9/ 8/64	181	15	RAW	F
.	XLOC	.	.	.	.	.	.
.	STZ	.	.	.	.	.	.
.	FXDATA	.	.	.	.	.	.
.	QXCOR1	.	.	.	.	.	.
.	FLDATA	.	.	.	.	.	.
SPLIT	.	224	9/29/64	395	13	SMS	M
REFIT	.	.	.	.	.	.	.
SQRDEV (SEE SQRDFR)	.	.	.	.	.	.	.
SQRDFR	.	36	9/29/64	111	3	SMS	M
SQRDEV	.	.	.	.	.	.	.
SQRMLI	.	55	9/29/64	128	4	SMS	M
SQROOT	.	24	9/29/64	83	3	SMS	M
.	SQRT	.	.	.	.	.	.

 * SQRSUM TO TINGL *

PROGRAM STATISTICS

 * SQRSUM TO TINGL *

SQRSUM	.	36	.	9/29/64	.	107	.	3	.	SMS	.	M
XSQSUM	.	.	.	.	.	.	.	.	.	.	.	.
SQUARE	.	32	.	9/29/64	.	111	.	3	.	SMS	.	M
XSQUAR	.	.	.	.	.	.	.	.	.	.	.	.
SRCH1	.	93	.	9/ 8/64	.	93	.	6	.	RAW	.	F
XACTEQ	.	.	.	.	.	.	.	.	.	.	.	.
STPC (SEE DELTA)	.	.	.	.	.	.	.	.	.	.	.	.
STEPL (SEE DELTA)	.	.	.	.	.	.	.	.	.	.	.	.
STEPR (SEE DELTA)	.	.	.	.	.	.	.	.	.	.	.	.
(STH) (SEE ONLINE)	.	.	.	.	.	.	.	.	.	.	.	.
(STHD) (SEE ONLINE)	.	.	.	.	.	.	.	.	.	.	.	.
(STHM) (SEE ONLINE)	.	.	.	.	.	.	.	.	.	.	.	.
STORE (SEE LOCATE)	.	.	.	.	.	.	.	.	.	.	.	.
STZ	.	14	.	9/29/64	.	60	.	2	.	JFC	.	M
STZS	.	24	.	9/29/64	.	97	.	3	.	SMS	.	M
SUBK (SEE ADDK)	.	.	.	.	.	.	.	.	.	.	.	.
SUBKS (SEE ADDK)	.	.	.	.	.	.	.	.	.	.	.	.
SUM	.	23	.	9/29/64	.	92	.	3	.	SMS	.	M
XSUM	.	.	.	.	.	.	.	.	.	.	.	.
SUMDEV (SEE SUMOFR)	.	.	.	.	.	.	.	.	.	.	.	.
SUMOFR	.	44	.	9/29/64	.	156	.	4	.	SMS	.	M
XSUMOFR	.	.	.	.	.	.	.	.	.	.	.	.
SUMDEV	.	.	.	.	.	.	.	.	.	.	.	.
XSUMDEV	.	.	.	.	.	.	.	.	.	.	.	.
SWITCH	.	15	.	9/ 4/64	.	84	.	2	.	SMS	.	M
TAMVL	.	63	.	9/ 4/64	.	189	.	5	.	SMS	.	M
TAMVR	.	.	.	.	.	.	.	.	.	.	.	.
TAMVR (SEE TAMVL)	.	.	.	.	.	.	.	.	.	.	.	.
TIMA2B	.	124	.	9/ 9/64	.	258	.	8	.	SMS+	.	M
	.	.	.	.	.	.	.	.	.	RAW	.	.
TIMSUB	.	229	.	9/ 8/64	.	450	.	13	.	SMS+	.	M
INTMSB	.	.	.	.	.	.	.	.	.	RAW	.	.
TIMA2B	.	.	.	.	.	.	.	.	.	.	.	.
TINGL	.	43	.	9/ 8/64	.	147	.	4	.	SMS	.	M
TINGLA	.	.	.	.	.	.	.	.	.	.	.	.

 * TINGLA TO WAC *

PROGRAM STATISTICS

 * TINGLA TO WAC *

TINGLA (SEE TINGL)	.	.	.	.	.	.	.
TRMINO	.	67	.	9/ 4/64	.	77	.
	XLIMIT	.	.	.	.	.	.
	OUADATA	.	.	.	.	.	.
	FSKIP	.	.	.	.	.	.
	(RWT)	.	.	.	.	.	.
(TSH) (SEE REREAD)	.	.	.	.	.	.	.
(TSHM) (SEE REREAD)	.	.	.	.	.	.	.
UNPAKN	.	78	.	9/ 9/64	.	150	.
	.	.	.	.	.	.	.
VARARG	.	44	.	9/29/64	.	132	.
	.	.	.	.	.	.	.
VDDTV	.	25	.	9/ 4/64	.	121	.
	.	.	.	.	.	.	.
VDVBYV	.	22	.	9/29/64	.	90	.
	.	.	.	.	.	.	.
VECOUT	.	66	.	9/29/64	.	91	.
	FMDfmt	.	.	.	.	.	.
	RPLfmt	.	.	.	.	.	.
	(STH)	.	.	.	.	.	.
	(FIL)	.	.	.	.	.	.
VINDEX (SEE INDEX)	.	.	.	.	.	.	.
VMNUSV (SEE VPLUSV)	.	.	.	.	.	.	.
VOUT	.	104	.	9/29/64	.	111	.
	CARIGE	.	.	.	.	.	.
	HRACJ	.	.	.	.	.	.
	(STH)	.	.	.	.	.	.
	(FIL)	.	.	.	.	.	.
	VECOUT	.	.	.	.	.	.
VPLUSV	.	34	.	9/29/64	.	127	.
XVPLSV	.	.	.	.	.	.	.
VMNUSV	.	.	.	.	.	.	.
XVMNSV	.	.	.	.	.	.	.
VRROUT	.	47	.	9/29/64	.	138	.
	CARIGE	.	.	.	.	.	.
	VECOUT	.	.	.	.	.	.
VSOUT	.	37	.	9/29/64	.	125	.
	VOUT	.	.	.	.	.	.
VTIMSV	.	34	.	9/29/64	.	112	.
XVTMSV	.	.	.	.	.	.	.
WAC	.	107	.	9/29/64	.	83	.
	.	.	.	.	.	.	.

 * WHERE TO XDPRSS *

PROGRAM STATISTICS

 * WHERE TO XDPRSS *

WHERE (SEE LOCATE).	.	.	.	.	.	.
WHICH	.	4	9/ 4/64	77	2	SMS M
XWHICH	.	.	.	.	.	.
WLLSFP	.	217	10/ 6/64	264	11	RAW F
FOOTR	.	.	.	.	.	.
FOOT	.	.	.	.	.	.
MOVE	.	.	.	.	.	.
WRTDAT	.	77	9/ 8/64	126	5	RAW M
(IOS)	.	.	.	.	.	.
(TCO)	.	.	.	.	.	.
(WRS)	.	.	.	.	.	.
(RCH)	.	.	.	.	.	.
(TRC)	.	.	.	.	.	.
(ETT)	.	.	.	.	.	.
XACTEO	.	11	9/ 4/64	76	2	SMS M
XADDK (SEE ADDK)	.	.	.	.	.	.
XADDKS (SEE ADDK)	.	.	.	.	.	.
XARG (SEE LOCATE)	.	.	.	.	.	.
XAVRGE	.	34	9/29/64	104	3	SMS M
XAVRGR XDIV	.	.	.	.	.	.
XDIVR	.	.	.	.	.	.
XAVRGR (SEE XAVRGE)	.	.	.	.	.	.
XBOOST (SEE BOOST)	.	.	.	.	.	.
XCMPRA (SEE CMPRA)	.	.	.	.	.	.
XDANL (SEE ADANL)	.	.	.	.	.	.
XDANX (SEE ADANL)	.	.	.	.	.	.
XDELTA (SEE DELTA)	.	.	.	.	.	.
XDFPRS (SEE DIFPRS)	.	.	.	.	.	.
XDIV	.	27	9/29/64	109	3	SMS M
XDIVR	.	.	.	.	.	.
XDIVK (SEE ADDK)	.	.	.	.	.	.
XDIVKS (SEE ADDK)	.	.	.	.	.	.
XDIVR (SEE XDIV)	.	.	.	.	.	.
XDPRSS (SEE BOOST)	.	.	.	.	.	.

 * XDVIDE TO XSPECT *

PROGRAM STATISTICS

 * XDVIDE TO XSPECT *

XDVIDE	.	33	.	9/29/64	.	105	.	3	.	SMS	.	M
XDVIDR	.		.		.		.		.		.	
	.		.		.		.		.		.	
	.		.		.		.		.		.	
XDVIDR (SEE XDVIDE)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XDVRK (SEE ADDK)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XDVRKS (SEE ADDK)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XFIXM	.	31	.	9/29/64	.	98	.	3	.	SMS	.	M
	.		.		.		.		.		.	
XINDEX (SEE LOCATE)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XLCOMN	.	14	.	9/ 4/64	.	76	.	2	.	RAW	.	M
	.		.		.		.		.		.	
XLIMIT	.	25	.	9/ 4/64	.	101	.	3	.	SMS	.	M
	.		.		.		.		.		.	
XLOCV	.	24	.	9/ 4/64	.	100	.	3	.	SMS	.	M
	.		.		.		.		.		.	
XLSHFT (SEE LSHFT)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XMLPLY (SEE MULPLY)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XMULK (SEE ADDK)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XMULKS (SEE ADDK)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XNAME (SEE LOCATE)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XNARGS (SEE LOCATE)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XNTHA (SEE NTHA)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XNTSUM (SEE INTSUM)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XOOZE	.	4	.	9/ 4/64	.	61	.	2	.	SMS	.	M
	.		.		.		.		.		.	
XREMAV	.	31	.	9/29/64	.	112	.	3	.	SMS	.	M
	.		.		.		.		.		.	
	.		.		.		.		.		.	
XRFLEC (SEE REFLEC)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XSAME (SEE SAME)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XSMDEV (SEE SUMDFR)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XSUMDFR (SEE SUMDFR)	.		.		.		.		.		.	
	.		.		.		.		.		.	
XSPECT	.	523	.	9/29/64	.	239	.	26	.	SMS	.	F
	.		.		.		.		.		.	
	.		.		.		.		.		.	
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 * XSCDEV TO ZEFBIN *

PROGRAM STATISTICS

 * XSCDEV TO ZEFBIN *

XSCDEV (SEE XSQDFR).	.	.	.	.	.	.	.
XSQDFR	.	37	9/29/64	113	3	SMS	M
XSQDEV	.	.	.	.	.	.	.
XSQRUT	.	37	9/29/64	103	3	SMS	M
FIXVR	.	.	.	.	.	.	.
SQRT	.	.	.	.	.	.	.
XSQSUM (SEE SQRSUM).	.	.	.	.	.	.	.
XSQUAR (SEE SQUARE).	.	.	.	.	.	.	.
XSTEPC (SEE DELTA).	.	.	.	.	.	.	.
XSTEPL (SEE DELTA).	.	.	.	.	.	.	.
XSTEPR (SEE DELTA).	.	.	.	.	.	.	.
XSTLIN (SEE SETLIN).	.	.	.	.	.	.	.
XSUBK (SEE ADDK).	.	.	.	.	.	.	.
XSUBKS (SEE ADDK).	.	.	.	.	.	.	.
XSUM (SEE SUM).	.	.	.	.	.	.	.
XVDRBV (SEE XVDVBV).	.	.	.	.	.	.	.
XVDVBV	.	34	9/29/64	109	3	SMS	M
XVDRBV	.	.	.	.	.	.	.
XDIV	.	.	.	.	.	.	.
XDIVR	.	.	.	.	.	.	.
XVMNSV (SEE VPLUSV).	.	.	.	.	.	.	.
XVPLSV (SEE VPLUSV).	.	.	.	.	.	.	.
XVTMSV (SEE VTMSV).	.	.	.	.	.	.	.
XWHICH (SEE WHICH).	.	.	.	.	.	.	.
ZEFBCD	.	54	9/ 8/64	129	4	JNG	M
ZEFBIN	.	.	.	.	.	.	.
(IOS)	.	.	.	.	.	.	.
(RDS)	.	.	.	.	.	.	.
(RCH)	.	.	.	.	.	.	.
(TCO)	.	.	.	.	.	.	.
(TEF)	.	.	.	.	.	.	.
(TRC)	.	.	.	.	.	.	.
(BSR)	.	.	.	.	.	.	.
ZEFBIN (SEE ZEFBCD).	.	.	.	.	.	.	.

4. Conventions Used in Program Writeups

The general format of preparation of symbolic decks we have adhered to is illustrated by the sample listings shown on the next few pages for the two very short routines CONVLV and RND (File 28 of Tape 1 and File 79 of Tape 2). In all cases the general sequence is 1) Control Cards, 2) Subroutine or Entry cards, 3) Comment cards giving Abstract (including language, equipment, length, speed, and author), 4) Comment cards giving Usage (including FORTRAN usage, transfer vector, input-output descriptions, and examples), and 5) Program proper. All cards are serialized after the first one, in columns 76-79. The following observations should assist the interpretation of our comment cards.

1. All programs are designed to operate under the FORTRAN-II system.
2. In general we adhere to FORTRAN conventions in naming fixed, floating point, octal, and hollerith variables regardless of whether the program is FAP or FORTRAN. This convention should always be assumed for subroutine arguments unless otherwise noted.
3. The term "FORTRAN INTEGER" or FORTRAN-II INTEGER" or sometimes just "INTEGER" is used to refer to a fixed point integer in the decrement (binary point between bits 17 and 18,

Sample program listings

```
• CONV LV (SUBROUTINE) 9/29/64 LAST CARD IN DECK IS NO. 0098
• LABEL 0001
C CONV LV 0002
  SUBROUTINE CONV LV(LX,XX,LY,YY,CC) 0003
C 0004
C      ----ABSTRACT---- 0005
C 0006
C TITLE - CONV LV 0007
C   COMPLETE CONVOLUTION OF TWO TRANSIENTS 0008
C 0009
C   CONV LV CONVOLVES TWO TRANSIENTS, X(I) I=0,1,...,LX-1 0010
C   AND Y(I) I=0,1,...,LY-1 , TO PRODUCE THE COMPLETE 0011
C   CONVOLUTION FUNCTION 0012
C 0013
C           LX-1 0014
C   C(I) = SUM ( X(J)*Y(I-J) ) 0015
C           J=0 0016
C 0017
C   FOR I = 0,1,...,LX+LY-2 0018
C   WHERE 0019
C       LX AND LY ARE INPUT PARAMETERS 0020
C       Y(K) IS ASSUMED = 0.0 FOR K OUTSIDE OF 0021
C       THE RANGE 0 TO LY-1 0022
C   NOTE THAT THE CONVOLUTION IS INDEPENDENT OF THE ORDER 0023
C   OF THE INPUTS X AND Y. 0024
C 0025
C   TECHNIQUE USED IS AN ALGORITHM BASED ON ANALOGY TO 0026
C   MULTIPLICATION OF POLYNOMIALS 0027
C 0028
C LANGUAGE - FORTRAN II SUBROUTINE 0029
C EQUIPMENT - 709 OR 7090 (MAIN FRAME ONLY) 0030
C STORAGE - 96 REGISTERS 0031
C SPEED - ABOUT .49 * (LX*LY) MILLISEC ON THE 709 0032
C   ABOUT .082 * (LX*LY) MILLISEC ON THE 7090 0033
C AUTHOR - J. CLAERBOUT 0034
C 0035
C      ----USAGE---- 0036
C 0037
C TRANSFER VECTOR CONTAINS ROUTINES - (NONE) 0038
C   AND FORTRAN SYSTEM ROUTINES - (NONE) 0039
C 0040
C FORTRAN USAGE 0041
C   CALL CONV LV(LX,XX LY,YY,CC) 0042
C 0043
C INPUTS 0044
C 0045
C   LX IS NO. OF TERMS IN X VECTOR 0046
C   MUST EXCEED ZERO (PROGRAM EXITS IF ZERO OR LESS) 0047
C 0048
C   XX(I) I=1,...,LX CONTAINS X(0),...,X(LX-1) RESPECTIVELY 0049
C 0050
```

Sample program listings

```

C      LY      IS NO. OF TERMS IN Y VECTOR                                0051
C      MUST EXCEED ZERO (PROGRAM EXITS IF ZERO OR LESS)                    0052
C                                                                 0053
C      YY(I)    I=1...LY  CONTAINS Y(0),...,Y(LY-1) RESPECTIVELY          0054
C      EQUIVALENCE (XX,YY  IS PERMITTED                                   0055
C                                                                 0056
C  OUTPUTS                                           0057
C                                                                 0058
C      CC(I)    I=1,...,LX+LY-1 CONTAINS C(0),...,C(LX+LY-2) RESPECTIVELY 0059
C      WHERE C(I) IS GIVEN IN ABSTRACT                                0060
C                                                                 0061
C  EXAMPLES                                           0062
C                                                                 0063
C  1. SHOWING REVERSIBILITY OF X AND Y                                0064
C      INPUTS - LX = 3  XX(1...3) = 1.,2.,3.                            0065
C              LY = 2  YY(1...2) = 10.,1.                               0066
C                                                                 0067
C  USAGE -      CALL CONVLV(LX,XX,LY,YY,CC1)                             0068
C              CALL CONVLV(LY,YY,LX,XX,CC2)                             0069
C      OUTPUTS - CC1(1...4) = CC2(1...4) = 10.,21.,32.,3.              0070
C                                                                 0071
C  2. ILLEGAL INPUT CASES (NO OUTPUT)                                0072
C      INPUTS - SAME AS EXAMPLE 1. EXCEPT START WITH OUTPUT VECTORS    0073
C              CLEANED, I.E. CC1(1...4) = CC2(1...4) = 0.,0.,0.,0.      0074
C      USAGE -      CALL CONVLV(-2,XX,LY,YY,CC1)                         0075
C              CALL CONVLV(LX,XX,0,YY,CC2)                               0076
C      OUTPUTS - CC1(1...4) = 0.,0.,0.,0. (ILLEGAL LX)                  0077
C              CC2(1...4) = 0.,0.,0.,0. (ILLEGAL LY)                     0078
C                                                                 0079
C  PROGRAM FOLLOWS BELOW                                           0080
C                                                                 0081
C  DIMENSION STATEMENTS                                           0082
C      DIMENSION XX(2),YY(2),CC(2)                                       0083
C  CHECK LEGALITIES                                                0084
C      IF (LX) 9999,9999,10                                             0085
C      10 IF (LY) 9999,9999,20                                           0086
C  CLEAR OUTPUT VECTOR                                           0087
C      20 LC=LX+LY-1                                                    0088
C      DO 30 I=1,LC                                                    0089
C      30 CC(I)=0.0                                                      0090
C  CONVOLVE                                                         0091
C      DO 40 I=1,LX                                                     0092
C      DO 40 J=1,LY                                                     0093
C      K=I+J                                                            0094
C      40 CC(K-1)=CC(K-1)+XX(I)+YY(J)                                    0095
C  EXIT                                                             0096
C      9999 RETURN                                                       0097
C      END                                                                0098

```

Sample program listings

```
• RND (FUNCTION) 9/29/64 LAST CARD IN DECK IS NO. 0078
• FAP 0001
•RNC 0002
COUNT 60 0003
LBL RND 0004
ENTRY RND F(Y) 0005
ENTRY RNDUP F(Y) 0006
ENTRY RNDN F(Y) 0007
• 0008
• ----ABSTRACT---- 0009
• 0010
• TITLE - RND , WITH SECONDARY ENTRY POINTS RNDUP, RNDN 0011
• ROUNDS FLTG. PT. NO. UP, DOWN, OR TO NEAREST FLTG. PT. INTEGER 0012
• 0013
• RND ROUNDS A FLOATING POINT NUMBER TO THE NEAREST FLOATING 0014
• POINT INTEGER. 0015
• 0016
• RNDUP ROUNDS A POSITIVE (NEGATIVE) FLOATING POINT NUMBER 0017
• TO THE NEXT HIGHER (LOWER) FLOATING POINT INTEGER. 0018
• 0019
• RNDN ROUNDS A POSITIVE (NEGATIVE) FLOATING POINT NUMBER 0020
• TO THE NEXT LOWER (HIGHER) FLOATING POINT INTEGER. 0021
• 0022
• LANGUAGE - FAP, FORTRAN II FUNCTION 0023
• EQUIPMENT - 709 OR 7090 (MAIN FRAME ONLY) 0024
• STORAGE - 15 REGISTERS 0025
• SPEED - 26 MACHINE CYCLES FOR RND 0026
• AUT-OR - R.A. WIGGINS, 15/9/62 0027
• 0028
• ----USAGE---- 0029
• 0030
• TRANSFER VECTOR CONTAINS ROUTINES - NONE 0031
• AND FORTRAN SYSTEM ROUTINES - NONE 0032
• 0033
• FORTRAN USAGE 0034
• X1 = RND(Y) 0035
• X2 = RNDUP(Y) 0036
• X3 = RNDN(Y) 0037
• 0038
• INPLTS 0039
• 0040
• Y IS A FLOATING POINT NUMBER 0041
• MUST BE LSTHN= 10.**9 0042
• 0043
• OUTPUTS 0044
• 0045
• X1 IS A FLOATING POINT INTEGER 0046
• 0047
• X2 IS A FLOATING POINT INTEGER 0048
• 0049
• X3 IS A FLOATING POINT INTEGER 0050
```

Sample program listings

•		0051
•	EXAMPLES	0052
•		0053
•	1. INPUT - Y=104.2	0054
•	CUTPUTS - X1=104. X2=105. X3=104.	0055
•		0056
•	2. INPUT - Y=.5	0057
•	CUTPUTS - X1=1. X2=1. X3=0.	0058
•		0059
•	3. INPUT - Y=-49.7	0060
•	CUTPUTS - X1=-50. X2=-50. X3=-49.	0061
•		0062
•	4. INPUT - Y=1015.	0063
•	CUTPUTS - X1=1015. X2=1015. X3=1015.	0064
•		0065
	BCI 1,RND	0066
RNDUP	TMI A	0067
	FAD =017777777777	0068
	FAD =.5	0069
RNCDN	UFA =023300000000	0070
	FAD =023300000000	0071
	TRA 1,4	0072
A	FSR =017777777777	0073
	FSB =.5	0074
	TRA RNCDN	0075
RND	TMI A+1	0076
	TRA RNDUP+2	0077
	END	0078

maximum magnitude = 2^{17-1}).

4. The term "MACHINE LANGUAGE INTEGER" or "MACHINE INTEGER", or sometimes "MLI" is used to refer to fixed point integers in the address (binary point beyond bit 35, maximum magnitude = 2^{35-1}).
5. The terms "LSTHN" and "LSTHN=" are equivalent to "<" and "≤". The terms "GRTHN" and "GRTHN=" are equivalent to ">" and "≥".
6. The names of all our subprogram-type routines (subroutines, functions) are always the same as their entry point (in the case of multiple entry point routines the first entry point listed is equated with the name). A serial number "-II" or "-III" following the name indicates that this program is one of a series, all of which have identical calling sequences and essentially the same functions, but the user must choose the appropriate one in terms of his requirements. A "(709)" following the name indicates that this routine can only be used on the 709. A "(7090)" indicates the program works on either the 7090 or the 7094. All the routines without such specification can be used on any of the three machines.
7. Expressions appearing under "ABSTRACT" may deviate from FORTRAN conventions. The emphasis here has been to produce expressions which are visually

close to those of ordinary mathematics.

8. In the listings of required routines as found in the transfer vectors we list separately the FORTRAN system routines (which can be ignored) and non-FORTRAN-system routines (which cannot be ignored). All of the non-FORTRAN system routines required are included somewhere in the program set. In this connection the word "NONE" or "(NONE)" means "none required" and does not refer to routines by those names.
9. It should be stressed that the transfer vector as listed is only the first level of subprogram requirements and the subprograms listed should be checked for further subprogram requirements. The table in Section 3 is probably the most rapid and accurate for determining the complete requirements.
10. In the usage of these programs it should be assumed that none of the subprogram arguments can be safely equated (either by equivalence statements or repeated use of the same name) except as specifically noted.
11. The numerical examples given involve some notation conventions which should be fairly obvious.

Thus

- A) "IX(1...5) = 2,4,6,8,10" or
"IX(1,2,...,5) = 2,4,6,8,10" stands for
"IX(1) = 2", "IX(2) = 4," etc.

- B) "OCT" stands for octal data
- C) "MLI" is machine language integer

The representation of hollerith data is not too satisfactory or consistent as given here. In most cases we use either

$$\begin{aligned} X(1...) &= 6H(\text{something}) \\ &= 6H\text{something} \end{aligned}$$

to imply that the "something" is a string of hollerith characters stored 6 to a register (i.e. `FORMAT(A6)`). However, in some cases the "something" may be split into groups of six characters separated by commas to conform to a representation such as A) above. The reader will have to use his judgment from the context.

- 12. In the examples, if no "USAGE" is given, the user is to assume that, following the setting up of the "INPUTS", a "CALL" statement is to be executed in the exact literal form as given under "FORTRAN USAGE".
- 13. In the case of programs with scope output, blank comment cards are inserted at appropriate places in the example outputs so that photographs of the actual outputs can be pasted there on the listings.
- 14. Instructions equivalent to the linkage director have been inserted in many of the FAP programs so that they may operate properly with systems which do not have the standard error procedure. The pro-

grams will, of course, operate with systems which do have the standard error procedure option operative but the error tracing scheme will not be able to function completely since index register four will be stored in the "artificial linkage" director rather than in the one constructed by the assembler. In many cases the error procedure may be made completely operative by removing the PZE 0 and BCI 1, NAME cards appearing at the beginning of the program.

5. Magnetic Tape Copies

The following steps have been taken in the production of the master tape from which copies will be made.

1. All programs to be included had special test programs written which tested, among other things, all examples given in the program comment cards. These tests were passed individually.
2. The symbolic decks were divided into groups, each group being loaded on a separate tape.
3. Each such tape was then serialized and dated by a special program and then the serialized tapes were compiled to produce sets of binary decks.
4. The binary decks thus compiled were rerun through the test programs, and the test results compared with earlier test results.
5. The serialized tapes were merged by program to form the master tape.
6. The master tape was then compiled and the binaries from this compilation compared by the 519 reproducing punch against the binary decks used in step 4.

VELA UNIFORM associates desiring a copy of these programs should write their request to

Headquarters, USAF/AFTAC
VELA Seismological Center
Washington 25, D. C. 20330
ATTN: Major J. J. Connor

The letter should request

"MIT Geophysics Program Set II".

By separate mail the requester should also send two
2400' blank tapes.

6. KWIC Index to Programs

The remaining pages are a KWIC (Key Work in Context) index of the 267 programs in the program set (produced by the routine ROKWIC). Our coding in this index is as follows

Column	65	F means FORTRAN program M means FAP program
	66	Blank means FORTRAN-type subroutine or functions * means main program
	67-80	give the program name

KWIC Index

SQUARES PREDICTOR BY RECURSION, 1-DIMENSION \$REALIZABLE LEAST F	RLSPR
\$DISPLACED DOT PRODUCT OF 2-DIMENSIONAL ARRAYS F	DOTP
ENTRO-SYMMETRIC OR ANTISYMMETRIC 2-DIMENSIONAL ARRAY \$ROTATE C F	ROAR2
\$SPATIAL CROSSCORRELATION OF 2-DIMENSIONAL SPATIAL ARRAYS F	SPCOR2
SQUARES PREDICTOR BY RECURSION, 2-DIMENSIONS \$REALIZABLE LEAST F	RLSPR2
\$HIGH SPEED 24 POINT SPECTRUM F	FT24 -II
\$HIGH SPEED 24 POINT SPECTRUM M	FT24
\$FAST ABSOLUTE VALUE OF A VECTOR M	ABSVAL
\$MOVING TRAPEZOIDAL INTEGRAL OR ABSOLUTE VALUE INTEGRAL M	MVNTIN
NGTH \$SUMMATION OF VECTOR OVER ABUTTING BLOCKS OF CONSTANT LE M	BLKSUM
MILLION RANDOM DIGITS FROM TAPE \$ACCESS ROUTINE FOR RAND CORP. F	GETRD1
FORMAT \$ACCESS TO LITERAL OR ORDINARY M	FNDGMT
TIME OF NEXT SUBROUTINE TO GIVEN ACCURACY \$FIND OPERATION M	TIMSUB
GE \$REAL TIME, TO SPECIFIED ACCURACY, OF GIVEN PROGRAM RAN M	709TIMA2B
TOCORRELATIONS FOR LONG, LIMITED ACCURACY SERIES \$FAST AU F	QACORR
T CONVOLUTIONS FOR LONG, LIMITED ACCURACY SERIES \$FAS F	QCNVLV
S-CORRELATIONS FOR LONG, LIMITED ACCURACY SERIES \$FAST CROS F	QXCORR
E \$INITIALIZED FOR ADDING TO AN INDATA-OUTDATA TAP F	SETINO
ST \$CREATE VECTOR OF MACHINE ADDRESSES OF VARIABLES IN A LI M	XLQCV
\$HOLLERITH LEFT ADJUST OR RIGHT ADJUST FUNCTION M	HLADJ
N \$HOLLERITH LEFT ADJUST OR RIGHT ADJUST FUNCTIO M	HLADJ
\$ADVANCE FILM FRAME ON SCOPE M	7090FRAME
\$ADVANCE FILM FRAME ON SCOPE M	709FRAME
PWARDS OR DOWNWARDS AN ARBITRARY AMOUNT \$ROTATE A VECTOR U M	ROTAT1
AND IMAGINARY, OR REVERSE \$AMPLITUDE AND PHASE FROM REAL M	AMPHZ
TE SYMMETRICAL FILTER WITH GIVEN AMPLITUDE RESPONSE \$GENERA F	GNFLT1
RAY \$ROTATE CENTRO-SYMMETRIC OR ANTISYMMETRIC 2-DIMENSIONAL AR F	ROAR2
\$ARCTANGENT FUNCTION M	ARCTAN
\$SCORE LOCATION WITH INDEXABLE ARGUMENT M	LOC
N \$LOCATE ARGUMENT WITH RESPECT TO COMMO F	IXCARG
\$RETURN N-TH ARGUMENT BEYOND THE FIRST M	NTHA
TING VALUES \$FIND IF ARGUMENT FALLS INSIDE TWO LIM M	XLIMIT
WITH REAL COEFFICIENTS FOR REAL ARGUMENT \$EVALUATE A POLYNOMIAL F	POLYEV
EVALUATE CUBIC FOR EVENLY SPACED ARGUMENTS \$FAST M	FASCUB
-0 IS LESS THAN +0 \$COMPARE ARITHMETICALLY TWO WORDS WHERE M	CMPRA
\$SHIFT VECTOR ELEMENTS ARITHMETICALLY LEFT OR RIGHT M	SHFTR1
C OR ANTISYMMETRIC 2-DIMENSIONAL ARRAY \$ROTATE CENTRO-SYMMETRI F	ROAR2
ED DOT PRODUCT OF 2-DIMENSIONAL ARRAYS \$DISPLA F	DOTP
ELATION OF 2-DIMENSIONAL SPATIAL ARRAYS \$SPATIAL CROSSCORR F	SPCOR2
R DANIELL SPECTRA \$MODIFY AUTO- OR CROSS-CORRELATIONS FO M	ADANL
OSPECTRUM BY COSINE TRANSFORM OF AUTOCORRELATION \$AUT M	ASPEC2
\$WIENER AUTOCORRELATION F	WAC
T COSINE TRANSFORMS OF ONE-SIDED AUTOCORRELATIONS \$FAS M	ASPECT
ITED ACCURACY SERIES \$FAST AUTOCORRELATIONS FOR LONG, LIM F	QACORR
RM OF AUTOCORRELATION \$AUTOSPECTRUM BY COSINE TRANSFO M	ASPEC2
NDATA-OUTDATA TYPE TAPE \$LIST AUXILIARY INFORMATION FOR AN I F	LISTING
\$FIND AVERAGE OF FLOATING VECTOR M	AVRAGE
ION FROM GIVEN BASE OR FROM TRUE AVERAGE \$R.M.S. DEVIAT M	RMSDEV
\$MOVING AVERAGE OF A VECTOR F	MVINAV
\$MOVING MEAN SQUARE AVERAGE OF A VECTOR F	MVSQAV

T END	\$FIND AVERAGE OF FIXED PT VECTOR	M	XAVRGE
GES	\$TRIANGULAR AVERAGING, MOVING LEFT OR RIGHT	M	TAMVL
	\$DIVIDE THE X AXIS INTO EQUALLY PROBABLE RANGES	F	GRUP2
INE GRAPH	\$SKIP FORWARD OR BACKWARD OVER FILES ON TAPE	M	FSKIP
OR SUM POWER OF DEVIATIONS FROM BASE	\$BAR GRAPH PLOTTING FOR SUBROUTINE	M	HSTPLT-II
\$R.V.S. DEVIATION FROM GIVEN BASE OR FROM TRUE AVERAGE	\$RAISE VECTOR TO POWER	M	POWER
\$OPTIONAL ONLINE MONITOR OF BCD TAPE WRITING		M	RMSDEV
\$WRITE BINARY DATA ON TAPE		M	ONLINE
\$READ EVERY N-TH WORD FROM BINARY TAPE		N	WRTDAT
\$CHANGE ALL SIGN BITS OF A VECTOR		M	PACDAT
\$MOVE DATA BLOCK		M	CHSIGN
N LEVEL\$SCAN VECTOR FOR POSSIBLE BLOCK OF VALUES ALL ABOVE GIVEN		M	MVBLOK
UMINATION OF VECTOR OVER ABUTTING BLOCKS OF CONSTANT LENGTH	\$S	M	NXALRM
AND OPERATE SUBROUTINES BY PROXY CALL STATEMENTS	\$LOCATE	M	BLKSUM
\$GET HOLLERITH DATA FROM CALLING SEQUENCE		F	LOCATE
\$ENABLE FORTRAN VARIABLE LENGTH CALLING SEQUENCES		M	GETHOL
GE	\$SPACE CARRIAGE N LINES OR RESTORE PAGE	F	VARARG
RIC 2-DIMENSIONAL ARRAY	\$ROTATE CENTRO-SYMMETRIC OR ANTISYMMETRIC	F	CARIGE
OR	\$CHANGE ALL SIGN BITS OF A VECTOR	M	ROAR2
MOVE, REVERSE, CHANGE SPACING, OR CHANGE SIGN OF A VECTOR	\$	M	CHSIGN
	\$MOVE, REVERSE, CHANGE SPACING, OR CHANGE SIGN	M	MOVREV
	\$GENERATE HOLLERITH CHARACTERS	M	MOVREV
MAKING ON-LINE REQUEST IF NOT	\$CHECK IF INTERVAL TIMER IS ON	F	GNHOL2
FALL WITHIN GIVEN LIMITS	\$CHECK THAT VARIABLES FROM LIST	M	CLKON
EASING OR DECREASING BEHAVIOR	\$CHECK VECTOR FOR MONOTONE INCREASING	M	LIMITS
ILITY CASE	\$COMPUTE CHI-SQUARE FOR CONSTANT PROBABILITY	F	MONOCK
VALUE	\$PROBABILITY THAT A CHI-SQUARED VARIATE EXCEEDS A GIVEN VALUE	F	CHISQR
Y A THIRD ONE BEING ZERO	\$CHOOSE BETWEEN TWO VARIABLES	M	KIINT1
LE VECTOR TO INTEGERS FOR SCOPE, CLIPPING EXCESSIVE VALUES	\$SCALE	M	WHICH
G IN SECONDS USING 7090 INTERVAL CLOCK	\$FOR REAL TIME TIMING	M	SCPSCL
SEVALUATE A POLYNOMIAL WITH REAL COEFFICIENTS FOR REAL ARGUMENT		F	7090CLOCK1
BOUT ITS MIDPOINT	\$COLLAPSE ODD-LENGTHED VECTOR	M	POLYEV
SMALLER RANGE	\$COLLAPSE ONE-SIDED VECTOR INTO	M	KOLAPS
TERAL FORMATS	\$OUTPUT COLUMN VECTORS BY NORMAL OR LOGICAL	M	COLAPS
INTERPOLATION	\$FIND A MATRIX COLUMN WITH ARBITRARY INDEX BY	M	CVSOUT
T INTEGERS	\$LABEL PRINTER COLUMNS WITH INCREASING 3-DIGIT	F	ARBCOL
\$LOCATE ARGUMENT WITH RESPECT TO COMMON		F	COLABL
NT OF MEMORY USAGE - PROGRAM AND COMMON	\$OFF-LINE PRINT	F	IXCARG
	\$FIND LENGTH OF COMMON STORAGE	M	MEMUSE
DS WHERE -0 IS LESS THAN +0	\$COMPARE ARITHMETICALLY TWO WORDS	M	XLCOMN
A SET OF VARIABLES FOR EQUALITY	\$COMPARE PAIRS OF VARIABLES OR	M	CMPRA
TORS FOR IDENTITY	\$FAST COMPARE TWO ARBITRARY MODE VECTORS	M	CMPARP
	\$COMPLEX POLYNOMIAL EVALUATION	F	CMPARV
YNOMIAL SYNTHESIS FROM REAL AND COMPLEX ROOTS	\$POLYNOMIAL	F	IPLYEV
AL SYNTHESIZED FROM ITS REAL AND COMPLEX ROOTS	\$TEST THE CONDITION OF ANY SENSE SWITCH	M	POLYSN
	\$DIVIDE A FLOATING VECTOR BY A CONSTANT	M	PLYSYN
VARIABLES BY A SINGLE FLTG. PT. CONSTANT	\$MULTIPLY ANY NO. OF	F	SWITCH
F VECTOR OVER ABUTTING BLOCKS OF CONSTANT LENGTH	\$SUMMATION	M	DIVIDE
			MULK -II
			BLKSUM

\$MODIFY A SET OF VARIABLES BY A CONSTANT OR BY CONSTANTS	M	ADDK
\$COMPUTE CHI-SQUARE FOR CONSTANT PROBABILITY CASE	F	CHISQK
OR FLTG VECTOR \$ADD A CONSTANT TO ELEMENTS OF A FXD	M	BOOST
\$DIVIDE A FXD VECTOR BY A CONSTANT	M	XDVIDE
OF TWO VECTORS WITH DIVISION BY CONSTANT \$DOT PRODUCT	M	VDOTV
ING SUMMATION WITH DIVISION BY A CONSTANT \$MOV	M	MVNSUM
IPLY VECTOR BY FLOATING OR FIXED CONSTANT \$MULT	M	MULPLY
XED OR FLOATING VECTOR THROUGH A CONSTANT \$REFLECT A FI	M	REFLEC
OF VECTOR FROM ANOTHER OR FROM A CONSTANT \$SUM DIFFERENCE	M	SUMDFR
LL ELEMENTS OF VECTOR EQUAL TO A CONSTANT (ANY MODE) \$SET A	M	SETKV
TG VECTOR FROM ANOTHER OR FROM A CONSTANT \$SUM SQUARE DIF. OF FL	M	SQRDRF
D. VECTOR FROM ANOTHER OR FROM A CONSTANT \$SUM SQUARE DIF. OR FX	M	XSQDRF
OF VARIABLES BY A CONSTANT OR BY CONSTANTS \$MODIFY A SET	M	ADDK
M PROBABILITY DENSITY \$MEAN SQUARE CONTINGENCY AND DEPENDENCY PRO	F	MSCON1
R IN DECIBELS \$CONTOUR A MATRIX ON THE PRINTE	F	CNTRDB
ROW OF DATA \$FIND CONTOUR LEVELS FOR PLOTTING A	F	CNTROW
F-LINE PRINTER \$CONTOUR OF MATRIX SUBSET ON OF	F	CONTUR
E INTEGERS OR CONVERSELY \$SCALE, CONVERT FLTG. VECTOR TO MACHIN	M	FXDATA
TO MLI VECTOR \$FAST CONVERT FORTRAN INTEGER VECTOR	M	ITOMLI
ER TO EQUIVALENT HOLLERITH \$CONVERT MACHINE LANGUAGE INTEG	M	MLI2A6
\$COMPLETE CONVOLUTION OF TWO TRANSIENTS	M	CONVLV-II
\$COMPLETE CONVOLUTION OF TWO TRANSIENTS	F	CONVLV
\$FAST CONVOLUTIONS FOR LONG, LIMITED	F	QCNVLV
\$FAST COPY FILE FROM ONE TAPE TO ANO	M	CPYFL2
\$SCORE LOCATION WITH INDEXABLE A	M	LOC
COSINE, SINE TRANSFORMS OF CROSS-CORRELATION FUNCTIONS \$FAST	F	XSPECT
RA \$MODIFY AUTO- OR CROSS-CORRELATIONS FOR DANIELL SPECT	M	ADANL
ACCURACY SERIES \$FAST CROSS-CORRELATIONS FOR LONG, LIMITED	F	QXCORR
F FIXED POINT INTEGERS \$FAST CORRELATIONS FOR LONG SERIES O	M	PROCOR
FROM 2 OR 4 EVEN-ODD PARTS \$FAST COSINE AND/OR SINE TRANSFORMS	M	COSPC
OF ODD-LENGTH SERIES \$FAST COSINE AND/OR SINE TRANSFORMS	F	COSIS1
S, FIXED OR FLOATING \$GENERATE COSINE OR SINE HALF-WAVE TABLE	M	COSTBL
ATION \$AUTOSPECTRUM BY COSINE TRANSFORM OF AUTOCORREL	M	ASPEC2
AUTOCORRELATIONS \$FAST COSINE TRANSFORMS OF ONE-SIDED	M	ASPECT
SS-CORRELATION FUNCTIONS \$FAST COSINE, SINE TRANSFORMS OF CRO	F	XSPECT
NCTIONS FOR SEQUENTIAL SINES AND COSINES \$FAST FU	M	SEQSAC
SERIES IN GIVEN RANGES \$FREQUENCY COUNT OF NUMBER OF VALUES OF A	M	FRQCT2
WITH NEW RANGE AND INCREMENT \$CREATE ONE VECTOR FROM ANOTHER	M	NURINC
SSSES OF VARIABLES IN A LIST \$CREATE VECTOR OF MACHINE ADDRE	M	XLOCV
\$FAST COSINE, SINE TRANSFORMS OF CROSS-CORRELATION FUNCTIONS	F	XSPECT
SPECTRA \$MODIFY AUTO- OR CROSS-CORRELATIONS FOR DANIELL	M	ADANL
IMITED ACCURACY SERIES \$FAST CROSS-CORRELATIONS FOR LONG, L	F	QXCORR
VECTORS OF MATRICES \$CROSSCORRELATION OF TRANSIENT	F	CRSVM
BEGINNING WITH ANY LAG \$CROSSCORRELATION OF TRANSIENTS	F	CROST
BEGINNING WITH ZERO LAG \$CROSSCORRELATION OF TRANSIENTS	F	CROSS
NAL SPATIAL ARRAYS \$SPATIAL CROSSCORRELATION OF 2-DIMENSIO	F	SPCOR2
ENTS \$QUICK CROSSCORRELATION OF MLI TRANSI	F	QXCOR1
SUBROUTINE GRAPH \$CUBIC CURVE SCOPE PLOTTING FOR	M	HSTPLT-III
SUBROUTINE GRAPH \$CUBIC CURVE SCOPE PLOTTING FOR	M	HSTPLT-III
NTS \$FAST EVALUATE CUBIC FOR EVENLY SPACED ARGUME	M	FASCUB

PEED EXPANSION OF A VECTOR UNDER CUBIC INTERPOLATION	\$HI-S M	EXPAND
ALLY SPACED POINTS	\$FIND CURIC WHICH EXACTLY FITS 4 EQU M	CUFIT1
UTINE GRAPH	\$CUBIC CURVE SCOPE PLOTTING FOR SUBRO M	HSTPLT-III
UTINE GRAPH	\$CUBIC CURVE SCOPE PLOTTING FOR SUBRO M	HSTPLT-III
AUTO- OR CROSS-CORRELATIONS FOR DANIELL SPECTRA	\$MODIFY M	ADANL
	\$MOVE DATA BLOCK M	MVBLOK
	\$READ DATA IN GENERALIZED FORMAT F	RDATA
	\$WRITE BINARY DATA ON TAPE M	WRTDAT
CALE AND FIX DATA VECTOR, PACK N DATA POINTS PER REGISTER	\$S M	PAKN
OR	\$REREAD DATA RECORD AND END FILE MONIT M	REREAD
	\$FAST AND CONVIENT DATA STORAGE ON TAPE F	OUADATA
	\$UNPACK AND RESCALE A PACKED DATA VECTOR M	UNPAKN
S PER REGISTER	\$SCALE AND FIX DATA VECTOR, PACK N DATA POINT M	PAKN
NTOUR A MATRIX ON THE PRINTER IN DECIBELS	\$CO F	CNTRDB
AND REPOSITION TAPE TO FRONT OF DECK	\$LIST DATA DECK F	DADECK
ONT OF DECK	\$LIST DATA DECK AND REPOSITION TAPE TO FR F	DADECK
ECTOR FOR MOMOTONE INCREASING OR DECREASING BEHAVIOR	\$CHECK V M	MONOCK
OF FUNCTION OR ITS MAGNITUDE	\$DEFINITE TRAPEZOIDAL INTEGRAL M	TINGL
ONS, FLOATING AND FIXED POINT	\$DELTA FUNCTION AND STEP FUNCTI M	DELTA
AND DEPENDENCY FROM PROBABILITY DENSIT\$MEAN SQUARE CONTINGENCY F		M\$CON1
IVEN LAG	\$SECONDN PROBABILITY DENSITY OF INTEGER SERIES AT G F	PROB2
NSIT\$MEAN SQUARE CONTINGENCY AND DEPENDENCY FROM PROBABILITY DE F		M\$CON1
ERENCING	\$DERIVATIVE OF A VECTOR OF DIFF M	DERIVA
ON OF SIMULTANEOUS EQUATIONS AND DETERMINANT EVALUATION	\$SOLUTI M	SIMEQ
ROM TRUE AVERAGE	\$R.M.S. DEVIATION FROM GIVEN BASE OR F M	RMSDEV
VECTOR TO POWER OR SUM POWER OF DEVIATIONS FROM BASE	\$RAISE M	POWER
ECTOR ELEMENTS IN PAIRS	\$DIFFERENCE FIXED OR FLOATING V M	DIFPRS
IF SAME INCLUDING SIGN	\$SIGN OF DIFFERENCE OF 2 VARIABLES OR 0 M	XACTEQ
HER OR FROM A CONSTANT	\$SUM DIFFERENCE OF VECTOR FROM ANOT M	SUMDFR
ER OR FROM A CONSTANT	\$SUM SQUARE DIF. OF FLTG VECTOR FROM ANOTH M	SQRDFR
ER OR FROM A CONSTANT	\$SUM SQUARE DIF. OR FXD. VECTOR FROM ANOTH M	XSQDFR
	\$DERIVATIVE OF A VECTOR OF DIFFERENCING M	DERIVA
	\$INVERSION OF DIFFERENTIATION BY DIFFERENCING M	IDERIV
G	\$INVERSION OF DIFFERENTIATION BY DIFFERENCIN M	IDERIV
RINTER COLUMNS WITH INCREASING 3-DIGIT INTEGERS	\$LABEL P F	COLABL
NE FOR RAND CORP. MILLION RANDOM DIGITS FROM TAPE	\$ACCESS ROUTI F	GETRDI
QUARES PREDICTOR BY RECURSION, 1-DIMENSION	\$REALIZABLE LEAST S F	RLSPR
	\$DISPLACED DOT PRODUCT OF 2-DIMENSIONAL ARRAYS F	DOTP
N	\$TWO-DIMENSIONAL FILTER BY RECURSIO F	FIRE2
TRO-SYMMETRIC OR ANTISYMMETRIC 2-DIMENSIONAL ARRAY	\$ROTATE CEN F	ROAR2
	\$SPATIAL CROSSCORRELATION OF 2-DIMENSIONAL SPATIAL ARRAYS F	SPCOR2
	\$FAST TWO-DIMENSIONAL SPATIAL SPECTRUM F	PLANSF
QUARES PREDICTOR BY RECURSION, 2-DIMENSIONS	\$REALIZABLE LEAST S F	RLSPR2
T GENERATOR FOR SCOPE SUBROUTINE DISPLA	\$VARIABLE ORIGIN FORMA M	DSPFMT
ENSIONAL ARRAYS	\$DISPLACED DOT PRODUCT OF 2-DIM F	DOTP
VECTOR	\$FREQUENCY DISTRIBUTION OF A FIXED POINT F	FRQCT1
EQUALLY LIKELY SECTIONS	\$NORMAL DISTRIBUTION AND DIVISION INTO M	NOINT1
\$REGION TO MAXIMIZE RATIO OF TWO DISTRIBUTION FUNCTIONS	F	MXRARE
MENTS	\$GENERATE PROBABILITY DISTRIBUTION WITH SPECIFIED MO F	PRBFIT
CONSTANT	\$DIVIDE A FLOATING VECTOR BY A M	DIVIDE

PROBABLE RANGES	\$DIVIDE THE X AXIS INTO EQUALLY	F	GRUP2
ANT	\$DIVIDE A FXD VECTOR BY A CONST	M	XDIVIDE
BY THOSE OF ANOTHER	\$DIVIDE ELEMENTS OF ONE VECTOR	M	VDVBV
FACTORS WITH OR WITHOUT ROUNDING	\$DIVIDE ELEMENTS OF TWO FIXED V	M	XDVVBV
DING TO FORTRAN-II INTEGERS	\$FXD PT DIVIDE WITH TRUNCATION OR ROUN	M	XDIV
	\$MOVING SUMMATION WITH DIVISION BY A CONSTANT	M	MVNSUM
\$DOT PRODUCT OF TWO VECTORS WITH DIVISION BY CONSTANT		M	VDOTV
CTIONS \$NORMAL DISTRIBUTION AND DIVISION INTO EQUALLY LIKELY S	M		NOINT1
	\$PERFORM LONG DIVISION OF TWO POLYNOMIALS	F	POLYDV
RRAYS	\$DISPLACED DOT PRODUCT OF 2-DIMENSIONAL A	F	DOTP
	\$FAST DOT PRODUCT OF TWO VECTORS	M	FDOT
ICES	\$DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTORS OF MATR	F	MDOT3
ICES	\$DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTORS OF MATR	F	MDOT
ODUCT OF VECTORS OF MATRICES	\$DOT PRODUCT OR REVERSED DOT PR	F	MDOT3
ODUCT OF VECTORS OF MATRICES	\$DOT PRODUCT OR REVERSED DOT PR	F	MDOT
REMENTS	\$VECTOR DOT PRODUCT WITH ARBITRARY INC	M	DOTJ
H DIVISION BY CONSTANT	\$DOT PRODUCT OF TWO VECTORS WIT	M	VDOTV
R (FIXED OR FLOATING)	\$FAST DOUBLING OR HALVING OF A VECTO	M	DUBLX
GIVEN VALUES	\$FAST SCAN VECTOR FOR ELEMENT EQUAL OR GREATER THAN	M	FASCN1
	\$EXTREMAL VALUES OF MATRIX ELEMENTS	M	MAXSNM
ERENCE FIXED OR FLOATING VECTOR ELEMENTS IN PAIRS	\$DIF	M	DIFPRS
OR	\$ADD A CONSTANT TO ELEMENTS OF A FXD OR FLTG VECT	M	BOOST
R RIGHT	\$SHIFT VECTOR ELEMENTS ARITHMETICALLY LEFT O	M	SHFTR1
KE INDEX (BY INCREASING SIZE) OF ELEMENTS IN A VECTOR	\$FAST MA	M	SIZEUP
HT	\$SHIFT VECTOR ELEMENTS LOGICALLY LEFT OR RIG	M	SHFTR2
OR	\$SUM THE SQUARED ELEMENTS OF A FLTG OR FXD VECT	M	SQRSUM
INTEGER VECTOR	\$FAST SQUARE ELEMENTS OF A MACHINE LANGUAGE	M	SORMLI
VECTOR	\$SUM ELEMENTS OF FLOATING OR FIXED	M	SUM
	\$SQUARE ELEMENTS OF FXD OR FLTG VECTOR	M	SQUARE
E OF ANOTHER	\$DIVIDE ELEMENTS OF ONE VECTOR BY THOS	M	VDVBV
WITH OR WITHOUT ROUNDING	\$DIVIDE ELEMENTS OF TWO FIXED VECTORS	M	XDVVBV
OR FLOATING	\$MULTIPLY ELEMENTS OF TWO VECTORS FIXFD	M	VTIMSV
CONSTANT (ANY MODE)	\$SET ALL ELEMENTS OF VECTOR EQUAL TO A	M	SETKV
CALLING SEQUENCES	\$ENABLE FORTRAN VARIABLE LENGTH	M	VARARG
RTRAN	\$ENABLE MIXED EXPRESSIONS IN FO	M	SAME
AVERAGING, MOVING LEFT OR RIGHT	END		\$TRIANGULAR
	\$REREAD DATA RECORD AND	M	TAMVL
E	\$TEST IF NEXT TAPE RECORD IS	M	REREAD
LUES	\$FAST SCAN VECTOR FOR ELEMENT	M	ZEBCD
	\$PRINTER PLOT OF A SET OF	F	FASCN1
	\$SET ALL ELEMENTS OF VECTOR	M	PLTVS1
	\$ SET FXD OR FLTG VECTOR	M	SETKV
R FLTG)	\$SET ANY NO. OF VARIABLES	F	SETLIN
OR FLTG)	\$SET ANY NO. OF VECTORS	M	SETK -11
OR FLTG)	\$SET ANY NO. OF VARIABLES	F	SETKVS
IABLES OR A SET OF VARIABLES FOR	EQUALITY \$COMPARE PAIRS OF VAR	M	SETKS -11
	\$DIVIDE THE X AXIS INTO	F	CMPARP
\$FIND CUBIC WHICH EXACTLY FITS 4	EQUALLY SPACED POINTS	M	GRUP2
L DISTRIBUTION AND DIVISION INTO	EQUALLY LIKELY SECTIONS \$NORMA	M	CUFIT1
D QUADRATIC WHICH EXACTLY FITS 5	EQUALLY SPACED POINTS	M	NOINT1
	\$FIN	M	CUFIT1

UATION \$SOLUTION OF SIMULTANEOUS EQUATIONS AND DETERMINANT EVAL	M	SIMEQ
VERT MACHINE LANGUAGE INTEGER TO EQUIVALENT HOLLERITH	\$CON M	MLI2A6
SWIENER-LEVINSON LEAST SQUARE ERROR FILTER OR PREDICTOR	F	WLLSFP
ED ARGUMENTS \$FAST EVALUATE CUBIC FOR EVENLY SPAC	M	FASCUB
L COEFFICIENTS FOR REAL ARGUMENTS\$EVALUATE A POLYNOMIAL WITH REA	F	POLYEV
\$COMPLEX POLYNOMIAL EVALUATION	F	IPLYEV
ANEOUS EQUATIONS AND DETERMINANT EVALUATION \$SOLUTION OF SIMULT	M	SIMEQ
IN GROUPS OF FIVE AS POKER HAND\$EVALUATION OF INTEGER SEQUENCE	F	POKCT1
) \$SPLIT A VECTOR INTO ITS EVEN AND ODD PARTS (OR INVERSE	M	SPLIT
M A VECTOR BY SIFTING ANOTHER AT EVEN INCREMENTS	\$FOR M	SIFT
NE WHETHER FORTRAN-II !NTEGER IS EVEN OR ODD	\$DETERMI M	XOOZE
D/OR SINE TRANSFORMS FROM 2 OR 4 EVEN-ODD PARTS \$FAST COSINE AN	M	COSP
\$FAST EVALUATE CUBIC FOR EVENLY SPACED ARGUMENTS	M	FASCUB
INTERPOLATION OPERATOR FOR 1 TO 4 EVENLY SPACED DATA VALUES	\$I M	INTOPR
TO INTEGERS FOR SCOPE, CLIPPING EXCESSIVE VALUES \$SCALE VECTOR	M	SCPSCL
\$EXCHANGE ANY TWO VECTORS	M	EXCHVS
\$SUBROUTINE GRAPH EXPANDED OVER VERTICAL FRAMES	F	GRAPHX
BIC INTERPOLATION \$HI-SPEED EXPANSION OF / VECTOR UNDER CU	M	EXPAND
\$ENABLE MIXED EXPRESSIONS IN FORTRAN	M	SAME
\$FIND SIGNED OR UNSIGNED EXTREMAL VALUES OF A VECTOR	M	MAXSN
ENTS \$EXTREMAL VALUES OF MATRIX ELEM	M	MAXSNM
FINITE MATRIX \$FACTOR A SYMMETRIC POSITIVE DE	F	MFACT
MINIMUM PHASE WAVELET \$FACTOR POWER SPECTRUM TO FIND	M	FACIO
R \$FAST ABSOLUTE VALUE OF A VECTO	M	ABS
OF DATA FROM A SPECIAL TAPE \$FAST A' CONVENIENT RETRIEVAL	F	INDATA
EGMENT ON SCOPE \$FAST ARBITRARY STRAIGHT LINE	S M	7090LINE
EGMENT ON SCOPE \$FAST ARBITRARY STRAIGHT LINE	S M	709LINE
E VECTORS FOR IDENTITY \$FAST COMPARE TWO ARBITRARY MOD	M	CMPARV
ECTOR TO MLI VECTOR \$FAST CONVERT FORTRAN INTEGER V	M	ITOMLI
O ANOTHER - VERSION 2 \$FAST COPY FILE FROM ONE TAPE T	M	OPYFL2
CRMS FROM 2 OR 4 EVEN-ODD PARTS \$FAST COSINE AND/OR SINE TRANSF	M	COSP
ORMS OF ODD-LENGTH SERIES \$FAST COSINE AND/OR SINE TRANSF	F	COSIS1
SIDED AUTOCORRELATIONS \$FAST COSINE TRANSFORMS OF ONE-	M	ASPECT
S \$FAST DOT PRODUCT OF TWO VECTOR	M	FDOT
VECTOR (FIXED OR FLOATING) \$FAST DOUBLING OR HALVING OF A	M	DUBLX
SPACED ARGUMENTS \$FAST EVALUATE CUBIC FOR EVENLY	M	FASCUB
\$PLOT FAST HORIZONTAL LINE ON SCOPE	M	7090LINEH
\$PLOT FAST HORIZONTAL LINE ON SCOPE	M	709LINEH
RS ,AS PRODUCED BY SPLIT. \$FAST REVERSAL OF SPECIAL VECTO	M	CHPRTS
QUAL OR GREATER THAN GIVEN VALUES\$FAST SCAN VECTOR FOR ELEMENT	E M	FASCN1
INDICES \$FAST TRACK THROUGH A VECTOR OF	M	FASTRK
\$PLOT FAST VERTICAL LINE ON SCOPE	M	7090LINEV
\$PLOT FAST VERTICAL LINE ON SCOPE	M	709LINEV
ON TAPE \$FAST AND CONVIENT DATA STORAGE	F	QUDATA
, LIMITED ACCURACY SERIES \$FAST AUTOCORRELATIONS FOR LONG	F	QACORR
MITED ACCURACY SERIES \$FAST CONVOLUTIONS FOR LONG, LI	F	QCNVLV
IES OF FIXED POINT INTEGERS \$FAST CORRELATIONS FOR LONG SER	M	PROCOR
F CROSS-CORRELATION FUNCTIONS \$FAST COSINE, SINE TRANSFORMS O	F	XSPECT
NG, LIMITED ACCURACY SERIES \$FAST CROSS-CORRELATIONS FOR LO	F	QXCORR
SIENT WITH ARBITRARY TIME ORIGINS\$FAST FOURIER TRANSFORM OF TRAN	F	QFURRY

SINES AND COSINES	\$FAST FUNCTIONS FOR SEQUENTIAL	M	SEQSAC
SIZE) OF ELEMENTS IN A VECTOR	\$FAST MAKE INDEX (BY INCREASING	M	SIZEUP
ED POINT VECTOR	\$FAST MOVING SUMMATION OF A FIX	M	MUVADD
A VECTOR	\$FAST REVERSE STORAGE ORDER OF	M	REVERS
	\$FAST SET VECTOR TO ZERO	M	STZ
INE LANGUAGE INTEGER VECTOR	\$FAST SQUARE ELEMENTS OF A MACH	M	SQRLI
PECTRUM	\$FAST TWO-DIMENSIONAL SPATIAL	S F	PLANSF
	\$GENERATE HOLLERITH FIELD	M	GENHOL
- VERSION 2	\$FAST COPY FILE FROM ONE TAPE TO ANOTHER	M	CPYFL2
ST IF NEXT TAPE RECORD IS END OF	FILE AND REPOSITION TAPE	\$TE M	ZEFBCD
\$REREAD DATA RECORD AND END	FILE MONITOR	M	REREAD
\$SKIP FORWARD OR BACKWARD OVER	FILES ON TAPE	M	FSKIP
	\$ADVANCE FILM FRAME ON SCOPE	M	7090FRAME
	\$ADVANCE FILM FRAME ON SCOPE	M	709FRAME
	\$MULTI-INPUT FILTER BY LEAST SQUARES	F	MIFLS
	\$TWO-DIMENSIONAL FILTER BY RECURSION	F	FIRE2
SPONSE	\$GENERATE SYMMETRICAL FILTER WITH GIVEN AMPLITUDE	RE F	GNFLT1
ENER-LEVINSON LEAST SQUARE ERROR	FILTER OR PREDICTOR	\$WI F	WLLSFP
	\$FIND CUBIC WHICH EXACTLY FITS 4 EQUALLY SPACED POINTS	M	CUFIT1
	\$FIND QUADRATIC WHICH EXACTLY FITS 3 EQUALLY SPACED POINTS	M	QUFIT1
WITHOUT ROUNDING	\$FIX A FLOATING VECTOR WITH OR	M	FIXV
POINTS PER REGISTER	\$SCALE AND FIX DATA VECTOR, PACK N DATA	P M	PAKN
DOUBLING OR HALVING OF A VECTOR (FIXED OR FLOATING)	\$FAST	M	DOBLX
COSINE OR SINE HALF-WAVE TABLES, FIXED OR FLOATING	\$GENERATE	M	COSBL
ENTS IN PAIRS	\$DIFFERENCE FIXED OR FLOATING VECTOR ELEME	M	DIFPRS
AND STEP FUNCTIONS, FLOATING AND FIXED POINT	\$DELTA FUNCTION	M	DELTA
TIPLY AN MLI VECTOR BY A FORTRAN	FIXED POINT INTEGER	\$MUL M	MLISCL
\$FREQUENCY DISTRIBUTION OF A	FIXED POINT VECTOR	F	FRQCT1
RATED SUMMATION OF A FLOATING OF	FIXED VECTOR	\$INTEG M	INTSUM
	\$SET LINEAR VECTORS, FIXED AND/OR FLOAT+NG	M	SETLNS
\$MULTIPLY VECTOR BY FLOATING OR	FIXED CONSTANT	M	MULPLY
MULTIPLY ELEMENTS OF TWO VECTORS	FIXED OR FLOATING	\$ M	VTIMSV
GH A CONSTAN	\$REFLECT A FIXED OR FLOATING VECTOR THROU	M	REFLEC
CORRELATIONS FOR LONG SERIES OF	FIXED POINT INTEGERS	\$FAST M	PROCOR
\$FAST MOVING SUMMATION OF A	FIXED POINT VECTOR	M	MUVADD
	\$FIND AVERAGE OF FIXED PT VECTOR	M	XAVRGE
\$REMOVE THE MEAN FROM A	FIXED VECTOR	M	XREMAV
\$SUM FLEMENTS OF FLOATING OR	FIXED VECTOR	M	SUM
	\$SQUARE ROOT OF A FIXED VECTOR WITH ROUNDING	M	XSQRUT
\$ADD OR SUBTRACT TWO FLOATING OR	FIXED VECTORS	M	VPLUSV
ROUNDING \$DIVIDE FLEMENTS OF TWO	FIXED VECTORS WITH OR WITHOUT	M	XVDVBV
	\$FLOAT A VECTOR	M	FLOATV
EGER	\$FLOAT ANY MACHINE LANGUAGE INT	M	FLOATM
OR HALVING OF A VECTOR (FIXED OR FLOATING)	\$FAST DOUBLING	M	DUBLX
SINE HALF-WAVE TABLES, FIXED OR FLOATING	\$GENERATE COSINE OR	M	COSTRL
LTA FUNCTION AND STEP FUNCTIONS, FLOATING AND FIXED POINT	\$DE	M	DELTA
\$INTEGRATED SUMMATION OF A	FIXED VECTOR	M	INTSUM
	\$FIND AVERAGE OF FLOATING VECTOR	M	AVRAGE
	\$DIVIDE A FLOATING VECTOR BY A CONSTANT	M	DIVIDE
IRS	\$DIFFERENCE FIXED OR FLOATING VECTOR ELEMENTS IN PA	M	DIFPRS

T ROUN	\$FIX A	FLOATING VECTOR WITH OR WITHOUT	M	FIXV
SET LINEAR VECTORS, FIXED AND/OR	FLOAT+NG		\$ M	SETLNS
ELEMENTS OF TWO VECTORS FIXED OR	FLOATING		\$MULTIPLY M	VTIMSV
	\$MULTIPLY VECTOR BY	FLOATING OR FIXED CONSTANT	M	MULPLY
	\$SUM ELEMENTS OF	FLOATING OR FIXED VECTOR	M	SUM
	\$ADD OR SUBTRACT TWO	FLOATING OR FIXED VECTORS	M	VPLUSV
INTEGER	\$TRUNCATE OR ROUND	FLOATING PT. NUMBER TO MACHINE	M	XFIXM
	\$REMOVE THE MEAN FROM A	FLOATING VECTOR	M	REMAV
ROUND, ROUND UP, OR ROUND DOWN A	FLOATING VECTOR		\$ M	RNDV
	\$SQUARE ROOT OF A	FLOATING VECTOR	M	SQROOT
TANT	\$REFLECT A FIXED OR	FLOATING VECTOR THROUGH A CONS	M	REFLEC
CONSTANT TO ELEMENTS OF A FXD OR	FLTG VECTOR		\$ADD A M	BOOST
ANY NO. OF VARIABLES BY A SINGLE	FLTG. PT. CONSTANT	\$MULTIPLY	F	MULK -II
RS OR CONVERSELY \$SCALE, CONVERT	FLTG. VECTOR TO MACHINE INTEGE	M		FXDATA
EQUAL TO A SINGLE VALUE (FXD OR	FLTG)\$SET ANY NO. OF VARIABLES	F		SETK -II
EQUAL TO SEPARATE VALUES (FXD OR	FLTG) \$SET ANY NO. OF VECTORS	M		SETKVS
	\$SUM THE SQUARED ELEMENTS OF A	FLTG OR FXD VECTOR	M	SQRSUM
	\$SQUARE ELEMENTS OF FXD OR	FLTG VECTOR	M	SQUARE
SEGMENT	\$ SET FXD OR	FLTG VECTOR EQUAL TO A LINEAR	M	SETLIN
OM A CONSTANT\$SUM SQUARE DIF. OF	FLTG VECTOR FROM ANOTHER OR FR	M		SQRDR
EQUAL TO SEPARATE VALUES (FXD OR	FLTG)\$SET ANY NO. OF VARIABLES	F		SETKS -II
PT. NO. UP, DOWN, OR TO NEAREST	FLTG. PT. INTEGER \$ROUND FLTG.	M		RND
NEAREST FLTG. PT. INTEGER \$ROUND	FLTG. PT. NO. UP, DOWN, OR TO	M		RND
\$ACCESS TO LITERAL OR ORDINARY	FORMAT		M	FNDFT
	\$MATRIX OUTPUT IN G	FORMAT	F	MOUT
PUT VARIABLES FIVE PER LINE IN G	FORMAT		\$OUT M	CSOUT
ROUTINE DISPLA	\$VARIABLE ORIGIN	FORMAT GENERATOR FOR SCOPE SUB	M	DSPFMT
TPUT TAPE WITH NORMAL OR LITERAL	FORMAT VECTOR		\$WRITE OU F	FMTOUT
OR OUTPUT WITH NORMAL OR LITERAL	FORMAT		\$OFFLINE VECT F	VECTOUT
T VARIABLES BY NORMAL OR LITERAL	FORMAT		\$OUTPU M	VRSOUT
	\$READ DATA IN GENERALIZED	FORMAT	F	RDATA
R OUTPUT STATEMENT	\$REPLACE THE	FORMAT OF A SUCCEEDING INPUT O	M	RPLFMT
AMED VECTOR BY NORMAL OR LITERAL	FORMAT WITH SPACING	\$OUTPUT N	F	VOUT
UMN VECTORS BY NORMAL OR LITERAL	FORMATS		\$OUTPUT COL M	CVSOUT
MED VECTORS BY NORMAL OR LITERAL	FORMATS WITH SPACINGS\$OUTPUT NA	M		VSOUT
	\$MULTIPLY AN MLI VECTOR BY A	FORTAN FIXED POINT INTEGFR	M	MLISCL
ERITH VECTOR	\$PACK UP	FORTAN INTEGER VECTOR AS HOLL	M	IVTOHV
VECTOR	\$FAST CONVERT	FORTAN INTEGER VECTOR TO MLI	M	ITOMLI
	\$SPREAD OUT HOLLERITH VECTOR AS	FORTAN INTEGERS	M	HVTOIV
	\$ENABLE MIXED EXPRESSIONS IN	FORTAN	M	SAME
F WITH TRUNCATION OR ROUNDING TO	FORTAN-II INTEGE\$FXD PT DIVID	M		XDIV
ODD	\$DETERMINE WHETHER	FORTAN-II INTEGER IS EVEN OR	M	XOOZE
G SEQUENCES	\$ENABLE	FORTAN VARIABLE LENGTH CALLIN	M	VARARG
WITH ARBITRARY TIME ORIGINS\$FAST	FOURIER TRANSFORM OF TRANSIENT	F		QFURRY
RY TIME ORIGIN	\$QUICK INVERSE	FOURIER TRANSFORM WITH ARBITRA	F	QIFURY
	\$ADVANCE FILM	FRAME ON SCOPE	M	7090FRAME
	\$ADVANCE FILM	FRAME ON SCOPE	M	709FRAME
TS	\$MULTIPLE	FRAME SCOPE PLOTS OF VECTOR SE	F	GRAPH
INE GRAPH EXPANDED OVER VERTICAL	FRAMES		\$SUBROUT F	GRAPHX
ALUES OF A SERIES IN GIVEN RANGES	\$FREQUENCY COUNT OF NUMBER OF V	M		FRQCT2

FIXED POINT VECTOR	\$FREQUENCY DISTRIBUTION OF A FI	F	FRQCT1
	\$ARCTANGENT FUNCTION	M	ARCTAN
WITH LEFT ADJUST OR RIGHT ADJUST FUNCTION	\$HOLLE	M	HLADJ
	\$LOGICAL SHIFT FUNCTION	M	LSHFT
LOADING AND FIXED POINT	\$DELTA FUNCTION AND STEP FUNCTIONS,	F M	DELTA
ON	\$INVERSION OF A MONOTONE FUNCTION BY LINEAR INTERPOLATI	M	IFNCTN
DEFINITE TRAPEZOIDAL INTEGRAL OF FUNCTION OR ITS MAGNITUDE	\$	M	TINGL
POINT	\$DELTA FUNCTION AND STEP FUNCTIONS, FLOATING AND FIXED	M	DELTA
TRANSFORMS OF CROSS-CORRELATION FUNCTIONS	\$FAST COSINE, SINE	F	XSPECT
MINIMIZE RATIO OF TWO DISTRIBUTION FUNCTIONS	\$REGION TO MA	F	MXRARE
AND COSINES	\$FAST FUNCTIONS FOR SEQUENTIAL SINES	M	SEQSAC
\$ADD A CONSTANT TO ELEMENTS OF A FXD OR FLTG VECTOR		M	BOOST
VECTORS EQUAL TO SEPARATE VALUES (FXD OR FLTG)	\$SET ANY NO. OF V	M	SETKVS
VARIABLES EQUAL TO A SINGLE VALUE (FXD OR FLTG)	\$SET ANY NO. OF VA	F	SETK -II
	\$SQUARE ELEMENTS OF FXD OR FLTG VECTOR	M	SQUARE
LINEAR SEGMENT	\$ SET FXD OR FLTG VECTOR EQUAL TO A	M	SETLIN
VARIABLES EQUAL TO SEPARATE VALUES (FXD OR FLTG)	\$SET ANY NO. OF VAR	F	SETKS -II
OR ROUNDING TO FORTRAN-II INTEGERS	\$FXD PT DIVIDE WITH TRUNCATION	M	XDIV
THE SQUARED ELEMENTS OF A FLTG OR FXD VECTOR	\$SUM	T M	SQRSUM
	\$DIVIDE A FXD VECTOR BY A CONSTANT	M	XDVIDE
FROM A CONSTANT	\$SUM SQUARE DIF. OR FXD. VECTOR FROM ANOTHER OR FR	M	XSQDFR
	\$MATRIX OUTPUT IN G FORMAT	F	MOUT
OUTPUT VARIABLES FIVE PER LINE IN G FORMAT		SO M	CSOUT
AVERAGE TABLES, FIXED OR FLOATING	\$GENERATE COSINE OR SINE HALF-W	M	COSTBL
	\$GENERATE HOLLERITH CHARACTERS	M	GNHOL2
	\$GENERATE HOLLERITH FIELD	M	GENHOL
WITH GIVEN AMPLITUDE RESPONSE	\$GENERATE SYMMETRICAL FILTER WI	F	GNFLT1
ION WITH SPECIFIED MOMENTS	\$GENERATE PROBABILITY DISTRIBUT	F	PRBFT
DISPLA	\$VARIABLE ORIGIN FORMAT GENERATOR FOR SCOPE SUBROUTINE	M	DSPFMT
AR GRAPH PLOTTING FOR SUBROUTINE	GRAPH	\$B M	HSTPLT-II
VE SCOPE PLOTTING FOR SUBROUTINE	GRAPH	\$CUBIC CUR M	HSTPLT-III
VE SCOPE PLOTTING FOR SUBROUTINE	GRAPH	\$CUBIC CUR M	HSTPLT-III
HISTOGRAM PLOTTING FOR SUBROUTINE	GRAPH	\$H M	HSTPLT
RAMES	\$SUBROUTINE GRAPH EXPANDED OVER VERTICAL	F	GRAPHX
GRAPH	\$BAR GRAPH PLOTTING FOR SUBROUTINE	M	HSTPLT-II
EVALUATION OF INTEGER SEQUENCE IN GROUPS OF FIVE AS POKER HAND	\$E	F	POKCT1
ATING	\$GENERATE COSINE OR SINE HALF-WAVE TABLES, FIXED OR FLO	M	COSTBL
FLOATING)	\$FAST DOUBLING OR HALVING OF A VECTOR (FIXED OR	M	DUBLX
UENCE IN GROUPS OF FIVE AS POKER HAND	\$EVALUATION OF INTEGER SEQ	F	POKCT1
UNDER CUBIC INTERPOLATION	\$HI-SPEED EXPANSION OF A VECTOR	M	EXPAND
	\$HIGH SPEED 24 POINT SPECTRUM	F	FT24 -II
	\$HIGH SPEED 24 POINT SPECTRUM	M	FT24
INE GRAPH	\$HISTOGRAM PLOTTING FOR SUBROUT	M	HSTPLT
E LANGUAGE INTEGER TO EQUIVALENT HOLLERITH	\$CONVERT MACHIN	M	MLI2A6
	\$INTERPRET HOLLERITH	M	INTHOL
	\$GENERATE HOLLERITH CHARACTERS	M	GNHOL2
QUENCE	\$GET HOLLERITH DATA FROM CALLING SE	F	GETHOL
	\$GENERATE HOLLERITH FIELD	M	GENHOL
ADJUST FUNCTION	\$HOLLERITH LEFT ADJUST OR RIGHT	M	HLADJ
	\$WRITE HOLLERITH TEXT ON SCOPE	M	7090DISPLA

ACK UP FORTRAN INTEGER VECTOR AS	\$WRITE HOLLERITH TEXT ON SCOPE	M	709DISPLA
TEGERS	\$SPREAD OUT HOLLERITH VECTOR AS FORTRAN IN	SP M	IVTOH
E TWO ARBITRARY MODE VECTORS FOR	IDENTITY	M	HVTOIV
MPLITUDE AND PHASE FROM REAL AND	IMAGINARY, OR REVERSE	\$FAST COMPAR M	CMPARV
\$LABEL PRINTER COLUMNS WITH	INCREASING 3-DIGIT INTEGERS	\$A M	AMPHZ
FOR \$CHECK VECTOR FOR MONOTONE	INCREASING OR DECREASING BEHAV	F	COLABL
N A VECTOR \$FAST MAKE INDEX (BY	INCREASING SIZE) OF ELEMENTS I	M	MONOCK
FROM ANOTHER WITH NEW RANGE AND	INCREMENT \$CREATE ONE VECTOR	M	SIZEUP
TING \$HYBRID SUBPROGRAMS FOR	INCREMENTING, TESTING, AND SET	M	NURINC
ECTOR DOT PRODUCT WITH ARBITRARY	INCREMENTS	\$V M	INDEX
ECTOR BY SIFTING ANOTHER AT EVEN	INCREMENTS	\$FORM A V M	DOTJ
IST AUXILIARY INFORMATION FOR AN	INDATA-OUTDATA TYPE TAPE	\$L F	SIFT
SINITIALIZED FOR ADDING TO AN	INDATA-OUTDATA TAPE	F	LISTING
STERMINATE AN INDATA-OUTDATA TAPE		F	SETINO
IDAL RULE	\$INDEFINITE INTEGRAL BY TRAPEZO	M	TRMINO
D A MATRIX COLUMN WITH ARBITRARY	INDEX BY INTERPOLATION	\$FIN M	INTGRA
ELEMENTS IN A VECTOR \$FAST MAKE	INDEX (BY INCREASING SIZE) OF	M	ARBCOL
SCORE LOCATION WITH INDEXABLE	ARGUMENT	M	SIZEUP
\$ALLOWS VARIABLE DEPTH	INDEXING OF VECTORS	M	LOC
\$FAST TRACK THROUGH A VECTOR OF	INDICES	M	GETX
NDATA-OUTDATA TAPE	SINITIALIZED FOR ADDING TO AN I	F	FASTRK
ES	\$MULTI-INPUT FILTER BY LEAST SQUARES	F	SETINO
	\$MULTI-INPUT PREDICTOR BY LEAST SQUAR	F	MIFLS
	\$MULTI-INPUT SIDEWARDS ITERATION	F	MIPLS
PLACE THE FORMAT OF A SUCCEEDING	INPUT OR OUTPUT STATEMENT	\$RE M	MISS
\$FLOAT ANY MACHINE LANGUAGE	INTEGER	M	RPLFMT
VECTOR BY A FORTRAN FIXED POINT	INTEGER	\$MULTIPLY AN MLI M	FLOATM
AP A SEQUENCE OF NUMBERS INTO AN	INTEGER SERIES	\$M M	MLISCL
H \$CONVERT MACHINE LANGUAGE	INTEGER TO EQUIVALENT HOLLERIT	M	MPSEQ1
CTOF \$PACK UP FORTRAN	INTEGER VECTOR AS HOLLERITH VE	M	MLI2A6
\$FAST CONVERT FORTRAN	INTEGER VECTOR TO MLI VECTOR	M	IVTOHV
ATION OR ROUNDING TO FORTRAN-II	INTEGER \$FXD PT DIVIDE WITH TRUN	M	ITOMLI
P, DOWN, OR TO NEAREST FLTG. PT.	INTEGER \$ROUND FLTG. PT. NO. U	M	XDIV
D FLOATING PT. NUMBER TO MACHINE	INTEGER	\$TRUNCATE OR ROUN M	RND
\$DETERMINE WHETHER FORTRAN-II	INTEGER IS EVEN OR ODD	M	XFIXM
FIVE AS POKER HANDSEVALUATION OF	INTEGER SEQUENCE IN GROUPS OF	F	XOOZE
\$SECODM PROBABILITY DENSITY OF	INTEGER SERIES AT GIVEN LAG	F	POKCT1
E ELEMENTS OF A MACHINE LANGUAGE	INTEGER VECTOR	\$FAST SQUAR M	PROB2
E OUTPUT TAPE A MACHINE LANGUAGE	INTEGER VECTOR	\$PRINT OR WRIT F	SQRML1
COLUMNS WITH INCREASING 3-DIGIT	INTEGERS	\$LABEL PRINTER F	PWML11
OUT HOLLERITH VECTOR AS FORTRAN	INTEGERS	\$SPREAD M	COLABL
ME \$OUTPUT A MATRIX AS	INTEGERS DENSELY PACKED OFF-LI	F	HVTOIV
CONVERT FLTG. VECTOR TO MACHINE	INTEGERS OR CONVERSELY \$SCALE, M		MOUTA1
S FOR LONG SERIES OF FIXED POINT	INTEGERS	\$FAST CORRELATION M	FXDATA
XCESSIVE VALUES \$SCALE VECTOR TO	INTEGERS FOR SCOPE, CLIPPING E	M	PRUCOR
\$SHUFFLE A LIST OF	INTEGERS FROM 1 TO N	F	SCPSCL
\$INVERSION OF TRAPEZOIDAL	INTEGRAL	M	SHUFFL
OIDAL INTEGRAL OR ABSOLUTE VALUE	INTEGRAL BY TRAPEZOIDAL RULE	M	IINTGR
	\$MOVING TRAPEZ	M	INTGRA
			MVNTIN

SCALE OR SCALE VECTOR FOR SIMPSON INTEGRAL AND/OR INTEGRATE \$UNSCALE	F	SIMPSON
AMNITUDE \$DEFINITE TRAPEZOIDAL INTEGRAL OF FUNCTION OR ITS MAXIMUM	M	TINGL
TEGRAL \$MOVING TRAPEZOIDAL INTEGRAL OR ABSOLUTE VALUE INTEGRAL	M	MVNTIN
CTOR FOR SIMPSON INTEGRAL AND/OR INTEGRATE \$UNSCALE OR SCALE VECTOR	F	SIMPSON
TING OF FIXED VECTOR \$INTEGRATED SUMMATION OF A FLOATING	M	INTSUM
X COLUMN WITH ARBITRARY INDEX BY INTERPOLATION \$FIND A MATRIX	M	ARBCOL
XPANSION OF A VECTOR UNDER CUBIC INTERPOLATION \$HI-SPEED	M	EXPAND
OF A MONOTONE FUNCTION BY LINEAR INTERPOLATION \$INVERSION	M	IFNCTN
\$LINEAR INTERPOLATION IN A TABLE	F	LINTR1
0 4 EVENLY SPACED DATA VALUES \$INTERPOLATION OPERATOR FOR 1 TO 4	M	INTOPR
\$QUADRATIC INTERPOLATION IN A TABLE	F	QINTR1
\$INTERPRET HOLLERITH	M	INTHOL
IME TIMING IN SECONDS USING 7090 INTERVAL CLOCK \$FOR REAL TIME	M	7090CLOCK1
-LINE REQUEST IF NOT \$CHECK IF INTERVAL TIMER IS ON MAKING ON	F	CLKON
\$INVERSE OF A MATRIX	F	MATINV
INTO ITS EVEN AND ODD PARTS (OR INVERSE) \$SPLIT A VECTOR	M	SPLIT
ARBITRARY TIME ORIGIN \$QUICK INVERSE FOURIER TRANSFORM WITH	F	QIFURY
ON BY LINEAR INTERPOLATION \$INVERSION OF A MONOTONE FUNCTION	M	IFNCTN
Y DIFFERENCING \$INVERSION OF DIFFERENTIATION	M	IDERIV
RAL \$INVERSION OF TRAPEZOIDAL INTEGRAL	M	IINTGR
LEAST SQUARES SHAPER BY SIDEWAYS ITERATION	F	LSSS1
\$MULTI-INPUT SIDEWAYS ITERATION	F	MISS
REASING 3-DIGIT INTEGERS \$LABEL PRINTER COLUMNS WITH INCREASING	F	COLABL
OF TRANSIENTS BEGINNING WITH ANY LAG \$CROSSCORRELATION	F	CROST
F TRANSIENTS BEGINNING WITH ZERO LAG \$CROSSCORRELATION	F	CROSS
\$FLOAT ANY MACHINE LANGUAGE INTEGER	M	FLOATM
HOLLERITH \$CONVERT MACHINE LANGUAGE INTEGER TO EQUIVALENT	M	MLI2A6
AST SQUARE ELEMENTS OF A MACHINE LANGUAGE INTEGER VECTOR	F	SQRMLI
T OR WRITE OUTPUT TAPE A MACHINE LANGUAGE INTEGER VECTOR \$PRINT	F	PWMLIV
\$MULTI-INPUT FILTER BY LEAST SQUARES	F	MIFLS
\$MULTI-INPUT PREDICTOR BY LEAST SQUARES	F	MIPLS
\$LEAST SQUARES LINE	F	LSLINE
YS ITERATION \$LEAST SQUARES SHAPER BY SIDEWAYS ITERATION	F	LSSS1
PREDICTOR \$WIENER-LEVINSON LEAST SQUARE ERROR FILTER OR PREDICTOR	F	WLLSFP
ERSION: 1-DIMENSION \$REALIZABLE LEAST SQUARES PREDICTOR BY RECURRENCE	F	RLSPR
ERSION: 2-DIMENSIONS \$REALIZABLE LEAST SQUARES PREDICTOR BY RECURRENCE	F	RLSPR2
ION \$REALIZABLE LEAST SQUARES SHAPER BY RECURRENCE	F	RLSSR
NCTION \$HOLLERITH LEFT ADJUST OR RIGHT ADJUST FUNCTION	M	HLADJ
\$SHIFT VECTOR ELEMENTS LOGICALLY LEFT OR RIGHT	M	SHFTR2
T VECTOR ELEMENTS ARITHMETICALLY LEFT OR RIGHT \$SHIFT	M	SHFTR1
\$TRIANGULAR AVERAGING: MOVING LEFT OR RIGHT END	M	TAMVL
BLOCK OF VALUES ALL ABOVE GIVEN LEVEL \$SCAN VECTOR FOR POSSIBLE	F	NXALRM
ATA \$FIND CONTOUR LEVELS FOR PLOTTING A ROW OF DATA	F	CNTROW
LTER OR PREDICTOR \$WIENER-LEVINSON LEAST SQUARE ERROR FILTER	F	WLLSFP
\$FAST AUTOCORRELATIONS FOR LONG, LIMITED ACCURACY SERIES	F	QACORR
\$FAST CONVOLUTIONS FOR LONG, LIMITED ACCURACY SERIES	F	QCNVLV
AST CROSS-CORRELATIONS FOR LONG, LIMITED ACCURACY SERIES	F	QXCORR
IND IF ARGUMENT FALLS INSIDE TWO LIMITING VALUES	F	XLIMIT
BLES FROM LIST FALL WITHIN GIVEN LIMITS \$CHECK THAT VARIABLES	M	LIMITS
\$LEAST SQUARES LINE	F	LSLI IE

X AS INTEGERS DENSELY PACKED OFF-LINE	\$OUTPUT A MATRI	F	MOUTAI
\$OUTPUT VARIABLES FIVE PER LINE IN G FORMAT		M	CSOUT
\$PLOT FAST HORIZONTAL LINE ON SCOPE		M	7090LINEH
\$PLOT FAST HORIZONTAL LINE ON SCOPE		M	709LINEH
\$PLOT FAST VERTICAL LINE ON SCOPE		M	7090LINEV
\$PLOT FAST VERTICAL LINE ON SCOPE		M	709LINEV
ROGRAM AND COMMON	\$OFF-LINE PRINT OF MEMORY USAGE - P	F	MEMUSE
\$CONTOUR OF MATRIX SUBSET ON OFF-LINE PRINTER		F	CONTUR
F INTERVAL TIMER IS ON MAKING ON-LINE REQUEST IF NOT	\$CHECK I	F	CLKCN
\$FAST ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE		M	7090LINE
\$FAST ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE		M	709LINE
ERSION OF A MONOTONE FUNCTION BY LINEAR INTERPOLATION	\$INV	M	IFNCTN
E	\$LINEAR INTERPOLATION IN A TABL	F	LINTR1
ET FXD OR FLTG VECTOR EQUAL TO A LINEAR SEGMENT	\$ S	M	SETLIN
LOCAT+NG	\$SET LINEAR VECTORS, FIXED AND/OR	F M	SETLNS
	\$SPACE CARRIAGE N LINES OR RESTORE PAGE	F	CARIGE
AN INDATA-OUTDATA TYPE TAPE	\$LIST AUXILIARY INFORMATION FOR	F	LISTING
TAPE TO FRONT OF DECK	\$LIST DATA DECK AND REPOSITION	F	DADECK
\$CHECK THAT VARIABLES FROM LIST FALL WITHIN GIVEN LIMITS		M	LIMITS
O SETS OF VALUES	\$SET A LIST OF VARIABLES TO ONE OF TW	M	CHOOSE
HINE ADDRESSES OF VARIABLES IN A LIST	\$CREATE VECTOR OF MAC	M	XLOCV
	\$SHUFFLE A LIST OF INTEGERS FROM 1 TO N	F	SHUFFL
	\$SET A LIST OF VECTORS TO ZERO	M	STZS
WRITE OUTPUT TAPE WITH NORMAL OR LITERAL FORMAT VECTOR	\$	F	FMTOUT
TPUT COLUMN VECTORS BY NORMAL OR LITERAL FORMATS	\$OU	M	CVSOUT
	\$ACCESS TO LITERAL OR ORDINARY FORMAT	M	FNDFMT
INE VECTOR OUTPUT WITH NORMAL OR LITERAL FORMAT	\$OFFL	F	VECOUT
\$OUTPUT VARIABLES BY NORMAL OR LITERAL FORMAT		M	VRROUT
OUTPUT NAMED VECTOR BY NORMAL OR LITERAL FORMAT WITH SPACING	\$	F	VOUT
UTPUT NAMED VECTORS BY NORMAL OR LITERAL FORMATS WITH SPACING	\$O	M	VSOUT
BY PROXY CALL STATEMENTS	\$LOCATE AND OPERATE SUBROUTINES	M	LOCATE
O COMMON	\$LOCATE ARGUMENT WITH RESPECT T	F	IXCARG
\$MOVE A VECTOR TO A DIFFERENT LOCATION		M	MOVE
NT	\$TORE LOCATION WITH INDEXABLE ARGUME	M	LOC
	\$LOGICAL SHIFT FUNCTION	M	LSHFT
	\$COMPUTE A LOGICAL SUMCHECK	M	FAPSUM
\$SHIFT VECTOR ELEMENTS LOGICALLY LEFT OR RIGHT		M	SHFTR2
LS	\$PERFORM LONG DIVISION OF TWO POLYNOMIA	F	POLYDV
\$SCALE, CONVERT FLTG. VECTOR TO MACHINE INTEGERS OR CONVERSELY		M	FXDATA
\$FLOAT ANY MACHINE LANGUAGE INTEGER		M	FLOATM
UIVALENT HOLLERITH	\$CONVERT MACHINE LANGUAGE INTEGER TO EQ	M	MLI2A6
IN A LIST	\$CREATE VECTOR OF MACHINE ADDRESSES OF VARIABLES	M	XLOCV
OR ROUND FLOATING PT. NUMBER TO MACHINE INTEGER	\$TRUNCATE	M	XFIXM
R	\$FAST SQUARE ELEMENTS OF A MACHINE LANGUAGE INTEGER VECTO	M	SQRMLI
R	\$PRINT OR WRITE OUTPUT TAPE A MACHINE LANGUAGE INTEGER VECTO	F	PWMLIV
IDAL INTEGRAL OF FUNCTION OR ITS MAGNITUDE	\$DEFINITE TRAPEZO	M	TINGL
AN INTEGER SERIES	\$MAP A SEQUENCE OF NUMBERS INTO	M	MPSEQ1
RELATION OF TRANSIENT VECTORS OF MATRICES	\$CROSSCOR	F	CRSVM
VERSED DOT PRODUCT OF VECTORS OF MATRICES	\$DOT PRODUCT OR RE	F	MDOT3
VERSED DOT PRODUCT OF VECTORS OF MATRICES	\$DOT PRODUCT OR RE	F	MDOT

	\$REVERSE VECTOR OF MATRICES	F	MRVRS
OR A SYMMETRIC POSITIVE DEFINITE MATRIX	\$FACT	F	MFACT
	\$INVERSE OF A MATRIX	F	MATINV
KED OFF-LINE	\$OUTPUT A MATRIX AS INTEGERS DENSELY PAC	F	MOUTAI
ICATION	\$N X M MATRIX BY M X L MATRIX MULTIPL	F	MATML3
NDEX BY INTERPOLATION	\$FIND A MATRIX COLUMN WITH ARBITRARY I	M	ARBCOL
	\$EXTREMAL VALUES OF MATRIX ELEMENTS	M	MAXSNM
	\$N X M MATRIX BY M X L MATRIX MULTIPLICATION	F	MATML3
	\$SQUARE MATRIX MULTIPLICATION	M	MATML1
ELS	\$CONTOUR A MATRIX ON THE PRINTER IN DECIB	F	CNTRDB
	\$MATRIX OUTPUT IN G FORMAT	F	MOUT
TER	\$CONTOUR OF MATRIX SUBSET ON OFF-LINE PRIN	F	CONTUR
	\$MATRIX TRANSPOSE	M	MATRA
	\$SQUARE MATRIX TRANSPOSE	M	MATRA1
TION FUNCTIONS	\$REGION TO MAXIMIZE RATIO OF TWO DISTRIBU	F	MXRARE
	\$NORMALIZE A VECTOR TO GIVEN MAXIMUM VALUE	M	NMZMG1
PENDENCY FROM PROBABILITY DENSIT	\$MEAN SQUARE CONTINGENCY AND DE	F	MSCON1
	\$REMOVE THE MEAN FROM A FIXED VECTOR	M	XREMAV
	\$REMOVE THE MEAN FROM A FLOATING VECTOR	M	REMAV
	\$NORMALIZE AND CHANGE MEAN OF A VECTOR	F	NRMVEC
R	\$MOVING MEAN SQUARE AVERAGE OF A VECTO	F	MVSQAV
MON	\$OFF-LINE PRINT OF MEMORY USAGE - PROGRAM AND COM	F	MEMUSE
SE ODD-LENGTHED VECTOR ABOUT ITS MIDPOINT	\$COLLAP	M	KOLAPS
F \$ACCESS ROUTINE FOR RAND CORP. MILLION RANDOM DIGITS FROM TAP		F	GETR01
	\$FACTOR POWER SPECTRUM TO FIND MINIMUM PHASE WAVELET	M	FACTOR
	\$ENABLE MIXED EXPRESSIONS IN FORTRAN	M	SAME
ONVERT FORTRAN INTEGER VECTOR TO MLI VECTOR	\$FAST C	M	ITOMLI
POINT INTEGER	\$MULTIPLY AN MLI VECTOR BY A FORTRAN FIXED	M	MLISCL
	\$QUICK CROSSCORRELATION OF MLI TRANSIENTS	F	QXCORI
	\$FAST COMPARE TWO ARBITRARY MODE VECTORS FOR IDENTITY	M	CMPARV
VECTOR EQUAL TO A CONSTANT (ANY MODE)	\$SET ALL ELEMENTS OF	M	SETKV
CONSTANT OR BY CONSTANTS	\$MODIFY A SET OF VARIABLES BY A	M	ADOK
IONS FOR DANIELL SPECTRA	\$MODIFY AUTO- OR CROSS-CORRELAT	M	ADANL
LITY DISTRIBUTION WITH SPECIFIED MOMENTS	\$GENERATE PROBAB	F	PRBFIT
\$REREAD DATA RECORD AND END FILE MONITOR		M	REREAD
	\$OPTIONAL ONLINE MONITOR OF BCD TAPE WRITING	M	ONLINE
ING BEHAVIOR	\$CHECK VECTOR FOR MONOTONE INCREASING OR DECREAS	M	MONOCK
TERPOLATION	\$INVERSION OF A MONOTONE FUNCTION BY LINEAR IN	M	IFNCTN
OCATION	\$MOVE A VECTOR TO A DIFFERENT L	M	MOVE
RS	\$MOVE AN ARBITRARY SET OF VECTO	M	MOVECS
OR CHANGE SIGN OF A VECTOR	\$MOVE-REVERSE- CHANGE SPACING-	M	MOVREV
	\$MOVE DATA BLOCK	M	MVBLOK
	\$MOVING AVERAGE OF A VECTOR	F	MVINAV
	\$TRIANGULAR AVERAGING- MOVING LEFT OR RIGHT END	M	TAMVL
A VECTOR	\$MOVING MEAN SQUARE AVERAGE OF	F	MVSQAV
INT VECTOR	\$FAST MOVING SUMMATION OF A FIXED PO	M	MUVADD
BY A CONSTANT	\$MOVING SUMMATION WITH DIVISION	M	MVNSUM
ABSOLUTE VALUE INTEGRAL	\$MOVING TRAPEZOIDAL INTEGRAL OR	M	MVNTIN
UARES	\$MULTI-INPUT FILTER BY LEAST SQ	F	MIFLS
SQUARES	\$MULTI-INPUT PREDICTOR BY LEAST	F	MIPLS

N		\$MULTI-INPUT SIDEWARDS ITERATIO	F	MISS
SN X M MATRIX BY M X L MATRIX		MULTIPLICATION	F	MATML3
		\$SQUARE MATRIX MULTIPLICATION	M	MATML1
TRAN FIXED POINT INTEGER		\$MULTIPLY AN MLI VECTOR BY A FO	M	MLISCL
BY A SINGLE FLTG. PT. CONSTANT		\$MULTIPLY ANY NO. OF VARIABLES	F	MULK -II
RS FIXED OR FLOATING		\$MULTIPLY ELEMENTS OF TWO VECTO	M	VTIMSV
FIXED CONSTANT		\$MULTIPLY VECTOR BY FLOATING OR	M	MULPLY
ON INTO EQUALLY LIKELY SECTIONS		\$NORMAL DISTRIBUTION AND DIVISI	M	NOINT1
XIMUM VALUE		\$NORMALIZE A VECTOR TO GIVEN MA	M	NMZMG1
VECTOR		\$NORMALIZE AND CHANGE MEAN OF A	F	NRMVEC
N GIVEN RANGES		\$FREQUENCY COUNT OF NUMBER OF VALUES OF A SERIES	I	FRQCT2
LAST TERM		\$SEARCH VECTOR FOR NUMBER, STARTING FROM FIRST OR	F	SRCH1
\$TRUNCATE OR ROUND FLOATING PT. NUMBER TO MACHINE INTEGER			M	XFIXM
		\$MAP A SEQUENCE OF NUMBERS INTO AN INTEGER SERIES	M	MPSEQ1
ER FORTRAN-II INTEGER IS EVEN OR ODD		\$DETERMINE WHETH	M	XOOZE
SPLIT A VECTOR INTO ITS EVEN AND ODD PARTS (OR INVERSE)			\$	SPLIT
COSINE AND/OR SINE TRANSFORMS OF ODD-LENGTH SERIES		\$FAST	F	COSIS1
MIDPOINT		\$COLLAPSE ODD-LENGTHED VECTOR ABOUT ITS	M	KOLAPS
SINE TRANSFORMS FROM 2 OR 4 EVEN-ODD PARTS		\$FAST COSINE AND/OR	M	COSP
NAL OR LITERAL FORMAT		\$OFFLINE VECTOR OUTPUT WITH NOR	F	VECOUT
ATRIX AS INTEGERS DENSELY PACKED OFF-LINE		\$OUTPUT A	M	MOUTAI
- PROGRAM AND COMMON		\$OFF-LINE PRINT OF MEMORY USAGE	F	MEMUSE
\$CONTOUR OF MATRIX SUBSET ON OFF-LINE PRINTER			F	CONTUR
		\$FAST COSINE TRANSFORMS OF ONE-SIDED AUTOCORRELATIONS	M	ASPECT
RANGE		\$COLLAPSE ONE-SIDED VECTOR INTO SMALLER	M	COLAPS
TING		\$OPTIONAL ONLINE MONITOR OF BCD TAPE WRI	M	ONLINE
ALL STATEMENTS		\$LOCATE AND OPERATE SUBROUTINES BY PROXY	C	LOCATE
CFD DATA VALUES		\$INTERPOLATION OPERATOR FOR 1 TO 4 EVENLY SPA	M	INTOPR
ONE SUBROUTINE REPEATEDLY		\$OPERATE SEVERAL SUBROUTINES OR	M	SEVRAL
INE TO GIVEN ACCURACY		\$FIND OPERATION TIME OF NEXT SUBROUT	M	TIMSUB
		\$FAST REVERSE STORAGE ORDER OF A VECTOR	M	REVERS
OPE SUBROUTINE DISPLA		\$VARIABLE ORIGIN FORMAT GENERATOR FOR SC	M	DSPFMT
FR TRANSFORM WITH ARBITRARY TIME ORIGIN		\$QUICK INVERSE FOURI	F	QIFURY
OF TRANSIENT WITH ARBITRARY TIME ORIGINS		\$FAST FOURIER TRANSFORM	F	QFURRY
ILIARY INFORMATION FOR AN INDATA-OUTDATA TYPE TAPE		\$LIST AUX	F	LISTING
TIALIZED FOR ADDING TO AN INDATA-OUTDATA TAPE		\$INI	F	SETINO
		\$TERMINATE AN INDATA-OUTDATA TAPE	F	TRMINO
NSELY PACKED OFF-LINE		\$OUTPUT A MATRIX AS INTEGERS DE	F	MOUTAI
L OR LITERAL FORMATS		\$OUTPUT COLUMN VECTORS BY NORMA	M	CVSOUT
		\$MATRIX OUTPUT IN G FORMAT	F	MOUT
FRAL FORMAT VECTOR		\$WRITE OUTPUT TAPE WITH NORMAL OR LIT	F	FMTOUT
IN G FORMAT		\$OUTPUT VARIABLES FIVE PER LINE	M	CSOUT
OR LITERAL FORMAT WITH SPACING		\$OUTPUT NAMED VECTOR BY NORMAL	F	VOUT
OR LITERAL FORMATS WITH SPACINGS		\$OUTPUT NAMED VECTORS BY NORMAL	M	VSOUT
FORMAT OF A SUCCEEDING INPUT OR OUTPUT STATEMENT		\$REPLACE THE	M	RPLFMT
INTEGER VECTOR		\$PRINT OR WRITE OUTPUT TAPE A MACHINE LANGUAGE	F	PWMLIV
LITERAL FORMAT		\$OUTPUT VARIABLES BY NORMAL OR	M	VRROUT
FORMAT		\$OFFLINE VECTOR OUTPUT WITH NORMAL OR LITERAL	F	VECOUT
AS HOLLERITH VECTOR		\$PACK UP FORTRAN INTEGER VECTOR	M	IVTOHV
R		\$SCALE AND FIX DATA VECTOR, PACK N DATA POINTS PER REGISTE	M	PAKN

PUT A MATRIX AS INTEGERS DENSELY PACKED OFF-LINE	\$OUT F	MOUTAI
SUNPACK AND RESCALE A PACKED DATA VECTOR	M	UNPAKN
PAGE CARRIAGE N LINES OR RESTORE PAGE	SS F	CARIGE
D OR FLOATING VECTOR ELEMENTS IN PAIRS	\$DIFFERENCE FIXE M	DIFPRS
VARIABLES FOR EQUALITY \$COMPARE PAIRS OF VARIABLES OR A SET OF	M	CMPARP
TRANSFORMS FROM 2 OR 4 EVEN-ODD PARTS \$FAST COSINE AND/OR SINE	M	COSP
T A VECTOR INTO ITS EVEN AND ODD PARTS (OR INVERSE)	SSPLI M	SPLIT
OR REVERSE \$AMPLITUDE AND PHASE FROM REAL AND IMAGINARY	M	AMPHZ
R POWER SPECTRUM TO FIND MINIMUM PHASE WAVELET	SFACTO M	FACTOR
COPE \$PLOT FAST HORIZONTAL LINE ON S	M 7090LINEH	
COPE \$PLOT FAST HORIZONTAL LINE ON S	M 709LINEH	
PE \$PLOT FAST VERTICAL LINE ON SCO	M 7090LINEV	
PE \$PLOT FAST VERTICAL LINE ON SCO	M 709LINEV	
VECTORS \$SPRINTER PLOT OF A SET OF EQUAL LENGTH	F	PLTVS1
RS \$SPRINTER-PLOT OF ARBITRARY SET OF VECTO	F	PLOTVS
\$MULTIPLE FRAME SCOPE PLOTS OF VECTOR SETS	F	GRAPH
\$FIND CONTOUR LEVELS FOR PLOTTING A ROW OF DATA	F	CNTROW
\$BAR GRAPH PLOTTING FOR SUBROUTINE GRAPH	M	HSTPLT-11
\$CUBIC CURVE SCOPE PLOTTING FOR SUBROUTINE GRAPH	M	HSTPLT-111
\$CUBIC CURVE SCOPE PLOTTING FOR SUBROUTINE GRAPH	M	HSTPLT-1111
\$HISTOGRAM PLOTTING FOR SUBROUTINE GRAPH	M	HSTPLT
\$PLURALIZE THE NEXT SUBROUTINE	M	PLURNS
\$PLURALIZED FORMS OF SUBROUTINE	M	SETKP
CH EXACTLY FITS 3 EQUALLY SPACED POINTS \$FIND QUADRATIC WHI	M	QUFIT1
AND FIX DATA VECTOR, PACK N DATA POINTS PER REGISTER	SSCALE M	PAKN
ER SEQUENCE IN GROUPS OF FIVE AS POKER HAND\$EVALUATION OF INTEG	F	POKCT1
\$COMPLEX POLYNOMIAL EVALUATION	F	IPLYEV
HE POWER SERIES SQUARE ROOT OF A POLYNOMIAL	\$FIND T F	PSQRT
\$POLYNOMIAL ROOT FINDER	F	MULLER
AND COMPLEX ROOTS \$POLYNOMIAL SYNTHESIS FROM REAL	F	POLYSN
S REAL AND COMPLEX ROOTS \$POLYNOMIAL SYNTHESIZED FROM IT	F	PLYSYN
NTS FOR REAL ARGUMENT\$EVALUATE A POLYNOMIAL WITH REAL COEFFICIE	F	POLYEV
\$PERFORM LONG DIVISION OF TWO POLYNOMIALS	F	POLYDV
\$FACTOR A SYMMETRIC POSITIVE DEFINITE MATRIX	F	MFACT
PHASE WAVELET \$FACTOR POWER SPECTRUM TO FIND MINIMUM	M	FACTOR
\$RAISE VECTOR TO POWER OR SUM POWER OF DEVIATIONS FROM BASE	M	POWER
NS FROM BASE \$RAISE VECTOR TO POWER OR SUM POWER OF DEVIATIO	M	POWER
POLYNOMIAL \$FIND THE POWER SERIES SQUARE ROOT OF A	F	PSQRT
\$MULTI-INPUT PREDICTOR BY LEAST SQUARES	F	MIPLS
SON LEAST SQUARE ERROR FILTER OR PREDICTOR \$WIENER-LEVIN	F	WLLSFP
NSION \$REALIZABLE LEAST SQUARES PREDICTOR BY RECURSION, 1-DIME	F	RLSPR
NSIONS \$REALIZABLE LEAST SQUARES PREDICTOR BY RECURSION, 2-DIME	F	RLSPR2
M AND COMMON \$OFF-LINE PRINT OF MEMORY USAGE - PROGRA	F	MEMUSE
ACHINE LANGUAGE INTEGER VECTOR \$PRINT OR WRITE OUTPUT TAPE A	M F	PWMLIV
OUR OF MATRIX SUBSET ON OFF-LINE PRINTER	\$CONT F	CONTUR
G 3-DIGIT INTEGERS \$LABEL PRINTER COLUMNS WITH INCREASIN	F	COLABL
\$CONTOUR A MATRIX ON THE PRINTER IN DECIBELS	F	CNTRDB
LENGTH VECTORS \$SPRINTER PLOT OF A SET OF EQUAL	F	PLTVS1
OF VECTORS \$SPRINTER-PLOT OF ARBITRARY SET	F	PLOTVS
\$COMPUTE CHI-SQUARE FOR CONSTANT PROBABILITY CASE	F	CHISQR

CONTINGENCY AND DEPENDENCY FROM PROBABILITY DENSITY	\$MEAN SQUARE	F	MSCON1
VARIATE EXCEEDS A VALUE	\$PROBABILITY THAT A CHI-SQUARED	F	KIINT1
SERIES AT GIVEN LAG	\$SECONDN PROBABILITY DENSITY OF INTEGER	F	PROB2
SPECIFIED MOMENTS	\$GENERATE PROBABILITY DISTRIBUTION WITH	F	PRBFIT
\$DIVIDE THE X AXIS INTO EQUALLY PROBABLE RANGES		F	GRUP2
S	\$DISPLACED DOT PRODUCT OF 2-DIMENSIONAL ARRAY	F	DOTP
	\$FAST DOT PRODUCT OF TWO VECTORS	M	FDOT
\$DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTORS OF MATRICES		F	MDOT3
\$DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTORS OF MATRICES		F	MDOT
T OF VECTORS OF MATRICES	\$DOT PRODUCT OR REVERSED DOT PRODUCT	F	MDOT3
T OF VECTORS OF MATRICES	\$DOT PRODUCT OR REVERSED DOT PRODUCT	F	MDOT
NTS	\$VECTOR DOT PRODUCT WITH ARBITRARY INCREMENT	M	DOTJ
VISION BY CONSTANT	\$DOT PRODUCT OF TWO VECTORS WITH DIM	M	VDOTV
OCATE AND OPERATE SUBROUTINES BY PROXY CALL STATEMENTS	\$L	M	LOCATE
ABLE	\$QUADRATIC INTERPOLATION IN A T	F	QINTR1
EQUALLY SPACED POINTS	\$FIND QUADRATIC WHICH EXACTLY FITS 3	M	QUFIT1
TRANSIENTS	\$QUICK CROSSCORRELATION OF MLI	F	QXCOR1
M WITH ARBITRARY TIME ORIGIN	\$QUICK INVERSE FOURIER TRANSFORM	F	QIFURY
OWER OF DEVIATIONS FROM BASE	\$RAISE VECTOR TO POWER OR SUM P	M	POWER
TS FROM TAPE	\$ACCESS ROUTINE FOR RAND CORP. MILLION RANDOM DIGIT	F	GETRD1
S ROUTINE FOR RAND CORP. MILLION RANDOM DIGITS FROM TAPE	\$ACCESS	F	GETRD1
SE ONE-SIDED VECTOR INTO SMALLER RANGE	\$COLLAP	M	COLAPS
R OF VALUES OF A SERIES IN GIVEN RANGE	\$FREQUENCY COUNT OF NUMBE	M	FRQCT2
IFIED ACCURACY, OF GIVEN PROGRAM RANGE	\$REAL TIME, TO SPEC	M	709TIMA2B
ONE VECTOR FROM ANOTHER WITH NEW RANGE AND INCREMENT	\$CREATE	M	NURINC
THE X AXIS INTO EQUALLY PROBABLE RANGES	\$DIVIDE	F	GRUP2
TIONS	\$REGION TO MAXIMIZE RATIO OF TWO DISTRIBUTION FUNC	F	MXRARE
T	\$READ DATA IN GENERALIZED FORM	F	RDATA
RY TAPE	\$READ EVERY N-TH WORD FROM BINA	N	PACDAT
	\$AMPLITUDE AND PHASE FROM REAL AND IMAGINARY, OR REVERSE	M	AMPHZ
ING 7090 INTERVAL CLOCK	\$FOR REAL TIME TIMING IN SECONDS US	M	7090CLOCK1
\$POLYNOMIAL SYNTHESIS FROM REAL AND COMPLEX ROOTS		F	POLYSN
\$POLYNOMIAL SYNTHESIZED FROM ITS REAL AND COMPLEX ROOTS		F	PLYSYN
OMIAL WITH REAL COEFFICIENTS FOR REAL ARGUMENT	\$EVALUATE A POLYN	F	POLYEV
UMENT\$EVALUATE A POLYNOMIAL WITH REAL COEFFICIENTS FOR REAL ARG		F	POLYEV
CY, OF GIVEN PROGRAM RANGE	\$REAL TIME, TO SPECIFIED ACCURA	M	709TIMA2B
CTOR BY RECURSION, 2-DIMENSIONS	\$REALIZABLE LEAST SQUARES PREDI	F	RLSPR2
CTOR BY RECURSION, 1-DIMENSION	\$REALIZABLE LEAST SQUARES PREDI	F	RLSPR
R BY RECURSION	\$REALIZABLE LEAST SQUARES SHAPE	F	RLSSR
	\$REREAD DATA RECORD AND END FILE MONITOR	M	REREAD
SITION TAPE	\$TEST IF NEXT TAPE RECORD IS END OF FILE AND REPO	M	ZEFBCD
\$SKIP FORWARD OR BACKWARD OVER RECORDS ON TAPE		M	RSKIP
\$TWO-DIMENSIONAL FILTER BY RECURSION		F	FIRE2
ALIZABLE LEAST SQUARES SHAPER BY RECURSION	\$RE	F	RLSSR
ZABLE LEAST SQUARES PREDICTOR BY RECURSION, 1-DIMENSION	\$REALI	F	RLSPR
ZABLE LEAST SQUARES PREDICTOR BY RECURSION, 2-DIMENSIONS	\$REALI	F	RLSPR2
CTOR THROUGH A CONSTANT	\$REFLECT A FIXED OR FLOATING VE	M	REFLEC
O DISTRIBUTION FUNCTIONS	\$REGION TO MAXIMIZE RATIO OF TW	F	MXRARE
A VECTOR, PACK N DATA POINTS PER REGISTER	\$SCALE AND FIX DAT	M	PAKN
ECTOR	\$REMOVE THE MEAN FROM A FIXED V	M	XREMAV

G VECTOR	\$REMOVE THE MEAN FROM A FLOATIN M	REMAV
DING INPUT OR OUTPUT STATEMENT	\$REPLACE THE FORMAT OF A SUCCEE M	RPLFMT
CK	\$LIST DATA DECK AND REPOSITION TAPE TO FRONT OF DE F	DADECK
T TAPE RECORD IS END OF FILE AND REPOSITION TAPE	\$TEST IF NEX M	ZEFBCD
E MONITOR	\$REREAD DATA RECORD AND END FIL M	REREAD
ERVAL TIMER IS ON MAKING ON-LINE REQUEST IF NOT	\$CHECK IF INT F	CLKON
	\$UNPACK AND RESCALE A PACKED DATA VECTOR M	UNPAKN
ICAL FILTER WITH GIVEN AMPLITUDE RESPONSE	\$GENERATE SYMMETR F	GNFL11
\$SPACE CARRIAGE N LINES OR RESTORE PAGE	F	CARIGE
AL TAPE	\$FAST AND CONVENIENT RETRIEVAL OF DATA FROM A SPECI F	INDATA
E FIRST	\$RETURN N-TH ARGUMENT BEYOND TH M	NTHA
S PRODUCED BY SPLIT.	\$FAST REVERSAL OF SPECIAL VECTORS ,A M	CHPRTS
HASE FROM REAL AND IMAGINARY, OR REVERSE	\$AMPLITUDE AND P M	AMPHZ
ANGE SIGN OF A VECTOR	\$MOVE, REVERSE, CHANGE SPACING, OR CH M	MOVREV
	\$REVERSE VECTOR OF MATRICES F	MRVRS
IN PLACE	\$REVERSE A VECTOR ELSEWHERE OR M	REVER
TOR	\$FAST REVERSE STORAGE ORDER OF A VEC M	REVERS
S OF MATRICES	\$DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTOR F	MDOT3
S OF MATRICES	\$DOT PRODUCT OR REVERSED DOT PRODUCT OF VECTOR F	MDO1
	\$HOLLERITH LEFT ADJUST OR RIGHT ADJUST FUNCTION M	HLADJ
ELEMENTS ARITHMETICALLY LEFT OR RIGHT	\$SHIFT VECTOR M	SHFTR1
CTOR ELEMENTS LOGICALLY LEFT OR RIGHT	\$SHIFT V M	SHFTR2
NGULAR AVERAGING, MOVING LEFT OR RIGHT END	\$STRIA M	TAMVL
SE OR FROM TRUE AVERAGE	\$R.M.S. DEVIATION FROM GIVEN BA M	RMSDEV
	\$POLYNOMIAL ROOT FINDER F	MULLER
UNDING	\$SQUARE ROOT OF A FIXED VECTOR WITH PO M	XSQRUT
	\$SQUARE ROOT OF A FLOATING VECTOR M	SQROOT
	\$FIND THE POWER SERIES SQUARE ROOT OF A POLYNOMIAL F	PSQRT
SYNTHESIS FROM REAL AND COMPLEX ROOTS	\$POLYNOMIAL F	POLYSN
FSIZED FROM ITS REAL AND COMPLEX ROOTS	\$POLYNOMIAL SYNTH F	PLYSYN
NWARDS AN ARBITRARY AMOUNT	\$ROTATE A VECTOR UPWARDS OR DOW M	ROTAT1
ISYMMETRIC 2-DIMENSIONAL ARRAY	\$ROTATE CENTRO-SYMMETRIC OR ANT F	ROAR2
	\$ROUND, ROUND UP, OR ROUND DOWN A FLOATING VECTOR M	RNDV
ACHINE INTEGER	\$TRUNCATE OR ROUND FLOATING PT. NUMBER TO M M	XFIXM
OR TO NEAREST FLTG. PT. INTEGER	\$ROUND FLTG. PT. NO. UP, DOWN, M	RND
A FLOATING VECTOR	\$ROUND, ROUND UP, OR ROUND DOWN M	RNDV
TING VECTOR	\$ROUND, ROUND UP, OR ROUND DOWN A FLOA M	RNDV
FLOATING VECTOR WITH OR WITHOUT ROUNDING	\$FIX A M	FIXV
WO FIXED VECTORS WITH OR WITHOUT ROUNDING	\$DIVIDE ELEMENTS OF T M	XVDVBV
UARE ROOT OF A FIXED VECTOR WITH ROUNDING	\$SQ M	XSQRUT
FXD PT DIVIDE WITH TRUNCATION OR ROUNDING TO FORTRAN-II INTEGERS	\$ M	XDIV
ND CONTOUR LEVELS FOR PLOTTING A ROW OF DATA	\$FI F	CNTROW
DEFINITE INTEGRAL BY TRAPEZOIDAL RULE	\$IN M	INTGRA
MACHINE INTEGERS OR CONVERSELY	\$SCALE, CONVERT FLTG. VECTOR TO M	FXDATA
K N DATA POINTS PER REGISTER	\$SCALE AND FIX DATA VECTOR, PAC M	PAKN
RAL AND/OR INTEGRATE	\$UNSCALE OR SCALE VECTOR FOR SIMPSON INTEG F	SMPSON
COPE, CLIPPING EXCESSIVE VALUES	\$SCALE VECTOR TO INTEGERS FOR S M	SCPSCL
OR GREATER THAN GIVEN VALUES	\$FAST SCAN VECTOR FOR ELEMENT EQUAL M	FASCN1
OF VALUES ALL ABOVE GIVEN LEVEL	\$SCAN VECTOR FOR POSSIBLE BLOCK F	NXALRM
\$ADVANCE FILM FRAME ON SCOPE	M 7090FRAME	

\$ADVANCE FILM FRAME ON SCOPE		M	709FRAME
ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE	\$FAST AR	M	7090LINE
ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE	\$FAST AR	M	709LINE
\$PLOT FAST HORIZONTAL LINE ON SCOPE		M	7090LINEH
\$PLOT FAST HORIZONTAL LINE ON SCOPE		M	709LINEH
\$PLOT FAST VERTICAL LINE ON SCOPE		M	7090LINEV
\$PLOT FAST VERTICAL LINE ON SCOPE		M	709LINEV
\$WRITE HOLLERITH TEXT ON SCOPE		M	7090DISPLA
\$WRITE HOLLERITH TEXT ON SCOPE		M	709DISPLA
\$MULTIPLE FRAME SCOPE PLOTS OF VECTOR SETS		F	GRAPH
GRAPH \$CUBIC CURVE SCOPE PLOTTING FOR SUBROUTINE		M	HSTPLT-III
GRAPH \$CUBIC CURVE SCOPE PLOTTING FOR SUBROUTINE		M	HSTPLT-III
ABLE ORIGIN FORMAT GENERATOR FOR SCOPE SUBROUTINE DISPLA \$VARI		M	DSPFMT
ES \$SCALE VECTOR TO INTEGERS FOR SCOPE, CLIPPING EXCESSIVE VALU		M	SCPSCL
\$SEARCH A VECTOR FOR A VALUE		M	SEARCH
TING FROM FIRST OR LAST TERM \$SEARCH VECTOR FOR NUMBER, STAR		F	SRCH1
INTEGER SERIES AT GIVEN LAG \$SECOND PROBABILITY DENSITY OF		F	PROB2
CLOCK \$FOR REAL TIME TIMING IN SECONDS USING 7090 INTERVAL CL		M	7090CLOCK1
AND DIVISION INTO EQUALLY LIKELY SECTIONS \$NORMAL DISTRIBUTION		M	NOINT1
\$FAST ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE		M	7090LINE
\$FAST ARBITRARY STRAIGHT LINE SEGMENT ON SCOPE		M	709LINE
OR FLTG VECTOR EQUAL TO A LINEAR SEGMENT \$SET FXD		M	SETLIN
\$TEST THE CONDITION OF ANY SENSE SWITCH		M	SWITCH
\$GET HOLLERITH DATA FROM CALLING SEQUENCE		F	GETHOL
TEGER SERIES \$MAP A SEQUENCE OF NUMBERS INTO AN IN		M	MPSEQ1
POKER HAND\$EVALUATION OF INTEGER SEQUENCE IN GROUPS OF FIVE AS		F	POKCT1
FORTRAN VARIABLE LENGTH CALLING SEQUENCES \$ENABLE		M	VARARG
\$FAST FUNCTIONS FOR SEQUENTIAL SINES AND COSINES		M	SEQSAC
OR SINE TRANSFORMS OF ODD-LENGTH SERIES \$FAST COSINE AND/		F	COSIS1
UENCE OF NUMBERS INTO AN INTEGER SERIES \$MAP A SEQ		M	MPSEQ1
Y COUNT OF NUMBER OF VALUES OF A SERIES IN GIVEN RANGES\$FREQUENC		M	FRQCT2
TIONS FOR LONG, LIMITED ACCURACY SERIES \$FAST AUTOCORRELA		F	QACORR
TIONS FOR LONG, LIMITED ACCURACY SERIES \$FAST CONVOLU		F	QCNVLV
TIONS FOR LONG, LIMITED ACCURACY SERIES \$FAST CROSS-CORRELA		F	QXCORR
N PROBABILITY DENSITY OF INTEGER SERIES AT GIVEN LAG \$SECON		F	PROB2
\$FAST CORRELATIONS FOR LONG SERIES OF FIXED POINT INTEGERS		M	PROCOR
MIAL \$FIND THE POWER SERIES SQUARE ROOT OF A POLYNO		F	PSQRT
OF TWO SETS OF VALUES \$SET A LIST OF VARIABLES TO ONE		M	CHOOSE
OR BY CONSTANTS \$MODIFY A SET OF VARIABLES BY A CONSTANT		M	ADDK
\$COMPARE PAIRS OF VARIABLES OR A SET OF VARIABLES FOR EQUALITY		M	CMPARP
\$MOVE AN ARBITRARY SET OF VECTORS		M	MOVECS
\$SET A LIST OF VECTORS TO ZERO		M	STZS
AL TO A CONSTANT (ANY MODF) \$SET ALL ELEMENTS OF VECTOR EQU		M	SETKV
TO SEPARATE VALUES (FXD OR FLTG)\$SET ANY NO. OF VARIABLES EQUAL		F	SETKS -II
TO A SINGLE VALUE (FXD OR FLTG)\$SET ANY NO. OF VARIABLES EQUAL		F	SETK -II
O SEPARATE VALUES (FXD OR FLTG) \$SET ANY NO. OF VECTORS EQUAL T		M	SETKVS
O A LINEAR SEGMENT \$SET FXD OR FLTG VECTOR EQUAL T		M	SETLIN
OR FLOAT+NG \$SET LINEAR VECTORS, FIXED AND/		M	SETLNS
\$SPRINTER PLOT OF A SET OF EQUAL LENGTH VECTORS		F	PLTVS1
\$SPRINTER-PLOT OF ARBITRARY SET OF VECTORS		F	PLOTVS

VEN VALUES	\$SET VARIABLES OR VECTORS TO GI	M	SETK
	\$FAST SET VECTOR TO ZERO	M	STZ
IPLE FRAME SCOPE PLOTS OF VECTOR	SETS	\$MULT F	GRAPH
LIST OF VARIABLES TO ONE OF TWO	SETS OF VALUES	\$SET A M	CHOOSE
\$PLURALIZED FORMS OF SUBROUTINES	SETK AND SETVEC	M	SETKP
ED FORMS OF SUBROUTINES SETK AND	SETVEC	\$PLURALIZ M	SETKP
S FOR INCREMENTING, TESTING, AND	SETTING	\$HYBRID SUBPROGRAM M	INDEX
	\$LEAST SQUARES SHAPER BY SIDEWAYS ITERATION	F	LSSS1
\$REALIZABLE LEAST SQUARES	SHAPER BY RECURSION	F	RLSSR
	\$LOGICAL SHIFT FUNCTION	M	LSHFT
ICALLY LEFT OR RIGHT	\$SHIFT VECTOR ELEMENTS ARITHMET	M	SHFTR1
Y LEFT OR RIGHT	\$SHIFT VECTOR ELEMENTS LOGICALL	M	SHFTR2
M 1 TO N	\$SHUFFLE A LIST OF INTEGERS FRO	F	SHUFFL
	\$MULTI-INPUT SIDEWARDS ITERATION	F	MISS
	\$LEAST SQUARES SHAPER BY SIDEWAYS ITERATION	F	LSSS1
ENTS	\$FORM A VECTOR BY SIFTING ANOTHER AT EVEN INCREM	M	SIFT
	\$CHANGE ALL SIGN BITS OF A VECTOR	M	CHSIGN
VERSE, CHANGE SPACING, OR CHANGE	SIGN OF A VECTOR	\$MOVE,RE M	MOVREV
VARIABLES OR 0 IF SAME INCLUDING	SIGN \$SIGN OF DIFFERENCE OF 2	M	XACTEQ
LES OR 0 IF SAME INCLUDING SIGN	\$SIGN OF DIFFERENCE OF 2 VARIAB	M	XACTEQ
LUES OF A VECTOR	\$FIND SIGNED OR UNSIGNED EXTREMAL VA	M	MAXSN
ATE \$UNSCALE OR SCALE VECTOR FOR	SIMPSON INTEGRAL AND/OR INTEGR	F	SMPSON
EKMINANT EVALUATION \$SOLUTION OF	SIMULTANEOUS EQUATIONS AND DET	M	SIMEQ
R FLOATING	\$GENERATE COSINE OR SINE HALF-WAVE TABLES, FIXED 0	M	COSTBL
EN-ODD PARTS \$FAST COSINE AND/OR	SINE TRANSFORMS FROM 2 OR 4 EV	M	COSP
SERIES	\$FAST COSINE AND/OR SINE TRANSFORMS OF ODD-LENGTH	F	COSIS1
LATION FUNCTIONS	\$FAST COSINE, SINE TRANSFORMS OF CROSS-CORRE	F	XSPECT
	\$FAST FUNCTIONS FOR SEQUENTIAL SINES AND COSINES	M	SEQSAC
\$FAST MAKE INDEX (BY INCREASING	SIZE) OF ELEMENTS IN A VECTOR	M	SIZEUP
FILES ON TAPE	\$SKIP FORWARD OR BACKWARD OVER	M	FSKIP
RECORDS ON TAPE	\$SKIP FORWARD OR BACKWARD OVER	M	RSKIP
ORE PAGE	\$SPACE CARRIAGE N LINES OR REST	F	CARIGE
	\$FAST EVALUATE CUBIC FOR EVENLY SPACED ARGUMENTS	M	FASCUB
ATION OPERATOR FOR 1 TO 4 EVENLY	SPACED DATA VALUES	\$INTERPOL M	INTOPR
BIC WHICH EXACTLY FITS 4 EQUALLY	SPACED POINTS	\$FIND CU M	CUFIT1
ECTOR	\$MOVE, REVERSE, CHANGE SPACING, OR CHANGE SIGN OF A V	M	MOVREV
ROSSCORRELATION OF 2-DIMENSIONAL	SPATIAL ARRAYS	\$SPATIAL C F	SPCOR2
DIMENSIONAL SPATIAL ARRAYS	\$SPATIAL CROSSCORRELATION OF 2-	F	SPCOR2
	\$FAST TWO-DIMENSIONAL SPATIAL SPECTRUM	F	PLANSP
R CROSS-CORRELATIONS FOR DANIELL	SPECTRA	\$MODIFY AUTO- 0 M	ADANL
	\$HIGH SPEED 24 POINT SPECTRUM	F	FT24 -II
	\$HIGH SPEED 24 POINT SPECTRUM	M	FT24
WAVELET	\$FACTOR POWER SPECTRUM TO FIND MINIMUM PHASE	M	FACTOR
	\$FAST TWO-DIMENSIONAL SPATIAL SPECTRUM	F	PLANSP
	\$HIGH SPEED 24 POINT SPECTRUM	F	FT24 -II
	\$HIGH SPEED 24 POINT SPECTRUM	M	FT24
DER CUBIC INTERPOLATION	\$HI-SPEED EXPANSION OF A VECTOR UN	M	EXPAND
SPECIAL VECTORS ,AS PRODUCED BY SPLIT,	\$FAST REVERSAL OF	M	CHPRTS
ND ODD PARTS (OR INVERSE)	\$SPLIT A VECTOR INTO ITS EVEN A	M	SPLIT
FORTRAN INTEGERS	\$SPREAD OUT HOLLERITH VECTOR AS	M	HVTOIV

NCY FROM PROBABILITY DENSITY CASE	\$MEAN SQUARE	CONTINGENCY AND DEPENDENCE	F	MSCON1
	\$COMPUTE CHI-SQUARE	FOR CONSTANT PROBABILITY	F	CHISQR
	\$SQUARE	MATRIX MULTIPLICATION	M	MATML1
	\$SQUARE	MATRIX TRANSPOSE	M	MATRA1
	\$MOVING MEAN SQUARE	AVERAGE OF A VECTOR	F	MVSQAV
M ANOTHER OR FROM A CONSTANT	\$SUM SQUARE	DIF. OF FLTG VECTOR FROM	M	SQRDER
M ANOTHER OR FROM A CONSTANT	\$SUM SQUARE	DIF. OR FXD. VECTOR FROM	M	XSQDER
LANGUAGE INTEGER VECTOR	\$FAST SQUARE	ELEMENTS OF A MACHINE L	M	SQRML1
VECTOR	\$SQUARE	ELEMENTS OF FXD OR FLTG	M	SQUARE
OR	\$WIENER-LEVINSON LEAST	SQUARE ERROR FILTER OR PREDICT	F	WLLSFP
WITH ROUNDING	\$SQUARE	ROOT OF A FIXED VECTOR	M	XSQRUT
OR	\$SQUARE	ROOT OF A FLOATING VECTOR	M	SQROOT
	\$FIND THE POWER SERIES	SQUARE ROOT OF A POLYNOMIAL	F	PSQRT
F	\$PROBABILITY THAT A CHI-SQUARED	VARIATE EXCEEDS A VALUE	F	KIINT1
FXD VECTOR	\$SUM THE SQUARED	ELEMENTS OF A FLTG OR	M	SQRSUM
	\$MULTI-INPUT FILTER BY LEAST	SQUARES	F	MIFLS
	\$MULTI-INPUT PREDICTOR BY LEAST	SQUARES	F	MIPLS
	\$LEAST SQUARES LINE		F	LSLINE
RATION	\$LEAST SQUARES SHAPER BY	SIDEWAYS ITERATION	F	LSSS1
• 1-DIMENSIONAL	\$REALIZABLE LEAST	SQUARES PREDICTOR BY RECURSION	F	RLSPR
• 2-DIMENSIONS	\$REALIZABLE LEAST	SQUARES PREDICTOR BY RECURSION	F	RLSPR2
	\$REALIZABLE LEAST	SQUARES SHAPER BY RECURSION	F	RLSSR
OF A SUCCEEDING INPUT OR OUTPUT	STATEMENT	\$REPLACE THE FORMAT	M	RPLFMT
OPERATE SUBROUTINES BY PROXY CALL	STATEMENTS	\$LOCATE AND OPERATE	M	LOCATE
FIXED POINT	\$DELTA FUNCTION AND	STEP FUNCTIONS, FLOATING AND	F	DELTA
	\$FIND LENGTH OF COMMON	STORAGE	M	XLCOMN
	\$FAST AND CONVENIENT DATA	STORAGE ON TAPE	F	OUADATA
	\$FAST REVERSE	STORAGE ORDER OF A VECTOR	M	REVERS
ELEMENTS	\$LOCATE AND OPERATE	SUBROUTINES BY PROXY CALL	M	LOCATE
REPEATEDLY	\$OPERATE SEVERAL	SUBROUTINES OR ONE SUBROUTINE	M	SEVRAL
	\$PLURALIZED FORMS OF	SUBROUTINES SETK AND SETVEC	M	SETKP
VECTORS	\$ADD OR SUBTRACT TWO	FLOATING OR FIXED	M	VPLUSV
ANOTHER OR FROM A CONSTANT	\$SUM	DIFFERENCE OF VECTOR FROM	M	SUMDER
FIXED VECTOR	\$SUM	ELEMENTS OF FLOATING OR	M	SUM
BASE	\$RAISE VECTOR TO POWER OR	SUM POWER OF DEVIATIONS FROM	M	POWER
FROM ANOTHER OR FROM A CONSTANT	\$SUM SQUARE	DIF. OF FLTG VECTOR	M	SQRDER
FROM ANOTHER OR FROM A CONSTANT	\$SUM SQUARE	DIF. OR FXD. VECTOR	M	XSQDER
FLTG OR FXD VECTOR	\$SUM THE SQUARED	ELEMENTS OF A	M	SQRSUM
	\$COMPUTE A LOGICAL	SUMCHECK	M	FAPSUM
FIXED VECTOR	\$INTEGRATED	SUMMATION OF A FLOATING OF	M	INTSUM
FIXED BLOCKS OF CONSTANT LENGTH	\$SUMMATION	OF VECTOR OVER ABOUT	M	BLKSUM
VECTOR	\$FAST MOVING	SUMMATION OF A FIXED POINT	M	MUVADD
CONSTANT	\$MOVING	SUMMATION WITH DIVISION BY A	M	MVNSUM
\$TEST THE CONDITION OF ANY SENSE	SWITCH		M	SWITCH
TRIX	\$FACTOR A SYMMETRIC	POSITIVE DEFINITE	M	MFACT
2-DIMENSIONAL ARRAY	\$ROTATE CENTRO-SYMMETRIC	OR ANTISYMMETRIC 2-D	F	ROAR2
AMPLITUDE RESPONSE	\$GENERATE	SYMMETRICAL FILTER WITH GIVEN	F	GNFLT1
X ROOTS	\$POLYNOMIAL	SYNTHESIS FROM REAL AND COMPLEX	F	POLYSN
COMPLEX ROOTS	\$POLYNOMIAL	SYNTHESIZED FROM ITS REAL AND	F	PLYSYN
	\$LINEAR INTERPOLATION	IN A TABLE	F	LINTR1

SQUADRATIC INTERPOLATION IN A TABLE	F	QINTR1
GENERATE COSINE OR SINE HALF-WAVE TABLES, FIXED OR FLOATING	\$G M	COSTBL
CORP. MILLION RANDOM DIGITS FROM TAPE	\$ACCESS ROUTINE FOR RAND F	GETRD1
RETRIEVAL OF DATA FROM A SPECIAL TAPE	\$FAST AND CONVENIENT F	INDATA
MATION FOR AN INDATA-OUTDATA TYPE TAPE	\$LIST AUXILIARY INFOR F	LISTING
ORWARD OR BACKWARD OVER FILES ON TAPE	\$SKIP F M	FSKIP
\$FAST COPY FILE FROM ONE TAPE TO ANOTHER - VERSION 2	M	CPYFL2
\$LIST DATA DECK AND REPOSITION TAPE TO FRONT OF DECK	F	DADECK
RMAT VECTOR \$WRITE OUTPUT TAPE WITH NORMAL OR LITERAL	FO F	FMTOUT
AST AND CONVENIENT DATA STORAGE ON TAPE	\$F F	OUTDATA
D FOR ADDING TO AN INDATA-OUTDATA TAPE	\$INITIALIZE F	SETINO
READ EVERY N-TH WORD FROM BINARY TAPE	\$ N	PACDAT
WARD OR BACKWARD OVER RECORDS ON TAPE	\$SKIP FOR M	RSKIP
\$TERMINATE AN INDATA-OUTDATA TAPE	F	TRMINO
RD IS END OF FILE AND REPOSITION TAPE	\$TEST IF NEXT TAPE RECO M	ZEFBCD
\$WRITE BINARY DATA ON TAPE	M	WRDAT
R VECTOR \$PRINT OR WRITE OUTPUT TAPE A MACHINE LANGUAGE INTEGE	F	PWMLIV
REPOSITION TAPE \$TEST IF NEXT TAPE RECORD IS END OF FILE AND	M	ZEFBCD
\$OPTIONAL ONLINE MONITOR OF BCD TAPE WRITING	M	ONLINE
E \$TERMINATE AN INDATA-OUTDATA TAP	F	TRMINO
D OF FILE AND REPOSITION TAPE \$TEST IF NEXT TAPE RECORD IS EN	M	ZEFBCD
E SWITCH \$TEST THE CONDITION OF ANY SENS	M	SWITCH
ID SUBPROGRAMS FOR INCREMENTING, TESTING, AND SETTING	\$HYBR M	INDEX
\$WRITE HOLLERITH TEXT ON SCOPE	M	7090DISPLA
\$WRITE HOLLERITH TEXT ON SCOPE	M	709DISPLA
090 INTERVAL CLOCK \$FOR REAL TIME TIMING IN SECONDS USING 7	M	7090CLOCK1
EN ACCURACY \$FIND OPERATION TIME OF NEXT SUBROUTINE TO GIV	M	TIMSUB
FOURIER TRANSFORM WITH ARBITRARY TIME ORIGIN \$QUICK INVERSE	F	QIFURY
FORM OF TRANSIENT WITH ARBITRARY TIME ORIGINS\$FAST FOURIER TRANS	F	QFURRY
F GIVEN PROGRAM RANGE \$REAL TIME, TO SPECIFIED ACCURACY, 0	M	709TIMA2B
UEST IF NOT \$CHECK IF INTERVAL TIMER IS ON MAKING ON-LINE REQ	F	CLKON
INTERVAL CLOCK \$FOR REAL TIME TIMING IN SECONDS USING 7090 I	M	7090CLOCK1
CES \$FAST TRACK THROUGH A VECTOR OF INDI	M	FASTRK
\$AUTOSPECTRUM BY COSINE TRANSFORM OF AUTOCORRELATION	M	ASPEC2
BITRARY TIME ORIGINS\$FAST FOURIER TRANSFORM OF TRANSIENT WITH AR	F	QFURRY
ORIGIN \$QUICK INVERSE FOURIER TRANSFORM WITH ARBITRARY TIME	F	QIFURY
D PARTS \$FAST COSINE AND/OR SINE TRANSFORMS FROM 2 OR 4 EVEN-OD	M	COSP
S \$FAST COSINE AND/OR SINE TRANSFORMS OF ODD-LENGTH SERIE	F	COSIS1
RRELATIONS \$FAST COSINE TRANSFORMS OF ONE-SIDED AUTO CO	M	ASPECT
N FUNCTIONS \$FAST COSINE, SINE TRANSFORMS OF CROSS-CORRELATIO	F	XSPECT
\$CROSSCORRELATION OF TRANSIENT VECTORS OF MATRICES	F	CRSVM
ORIGINS\$FAST FOURIER TRANSFORM OF TRANSIENT WITH ARBITRARY TIME	F	QFURRY
\$COMPLETE CONVOLUTION OF TWO TRANSIENTS	M	CONVLV-II
\$COMPLETE CONVOLUTION OF TWO TRANSIENTS	F	CONVLV
LAG \$CROSSCORRELATION OF TRANSIENTS BEGINNING WITH ANY	F	CROST
LAG \$CROSSCORRELATION OF TRANSIENTS BEGINNING WITH ZERO	F	CROSS
\$QUICK CROSSCORRELATION OF MLI TRANSIENTS	F	QXCOR1
\$MATRIX TRANSPOSE	M	MATRA
\$SQUARE MATRIX TRANSPOSE	M	MATRA1
\$INVERSION OF TRAPEZOIDAL INTEGRAL	M	IINTGR

\$INDEFINITE INTEGRAL BY TRAPEZOIDAL RULE	M	INTGRA
ON OR ITS MAGNITUDE	M	TINGL
\$DEFINITE TRAPEZOIDAL INTEGRAL OF FUNCTI	M	MVNTIN
TE VALUE INTEGRAL	M	TAMVL
\$MOVING TRAPEZOIDAL INTEGRAL OR ABSOLU	M	XFIXM
FFT OR RIGHT END	M	XDIV
\$TRIANGULAR AVERAGING, MOVING L	M	FIRE2
NUMBER TO MACHINE INTEGER	M	PLANSF
\$TRUNCATE OR ROUND FLOATING PT.	M	UNPAK
RAN-II INTEG\$FXD PT DIVIDE WITH TRUNCATION OR ROUNDING TO FORT	M	SMPKN
REGION	F	MAXSN
\$TWO-DIMENSIONAL FILTER BY RECU	F	KIINT1
UM	F	ABSVAL
\$FAST TWO-DIMENSIONAL SPATIAL SPECTR	F	FASCN1
TA VECTOR	M	NM2MG1
\$UNPACK AND RESCALE A PACKED DA	M	SEARCH
MPSON INTEGRAL AND/OR INTEGRATE \$UNSCALE OR SCALE VECTOR FOR SI	F	SETK -II
VECTOR	M	MVNTIN
\$FIND SIGNED OR UNSIGNED EXTREMAL VALUES OF A	M	INTOPR
A CHI-SQUARED VARIATE EXCEEDS A VALUE	F	CHOOSE
\$PROBABILITY THAT	F	FRQCT2
\$FAST ABSOLUTE VALUE OF A VECTOR	M	MAXSN
MENT EQUAL OR GREATER THAN GIVEN VALUE\$FAST SCAN VECTOR FOR ELE	M	MAXSNM
VALIZE A VECTOR TO GIVEN MAXIMUM VALUE	M	XLIMIT
\$NOR	M	SCPSCL
\$SEARCH A VECTOR FOR A VALUE	M	SETK
. OF VARIABLES EQUAL TO A SINGLE VALUE (FXD OR FLTG)\$SET ANY NO	F	NXALRM
TRAPEZOIDAL INTEGRAL OR ABSOLUTE VALUE INTEGRAL	M	SETKVS
\$MOVING	M	GETX -II
OR FOR 1 TO 4 EVENLY SPACED DATA VALUES	M	GETX
\$INTERPOLATION OPERAT	M	DSPFMT
VARIABLES TO ONE OF TWO SETS OF VALUES	M	VARFMT
\$SET A LIST OF	M	ADDK
NGESFREQUENCY COUNT OF NUMBER OF VALUES OF A SERIES IN GIVEN RA	M	MULK -II
FIND SIGNED OR UNSIGNED EXTREMAL VALUES OF A VECTOR	M	CSOUT
\$	M	CMPARP
\$EXTREMAL VALUES OF MATRIX ELEMENTS	M	LIMITS
\$FIND IF AR	M	CMPARP
GUMENT FALLS INSIDE TWO LIMITING VALUES	M	CHOOSE
RS FOR SCOPE, CLIPPING EXCESSIVE VALUES	M	WHICH
\$SCALE VECTOR TO INTEGE	M	VRROUT
ET VARIABLES OR VECTORS TO GIVEN VALUES	M	SETK -II
\$S	M	SETKS -II
CAN VECTOR FOR POSSIBLE BLOCK OF VALUES ALL ABOVE GIVEN LEVEL\$S	F	XLOCV
NO. OF VECTORS EQUAL TO SEPARATE VALUES (FXD OR FLTG) \$SET ANY	M	XACTEQ
. OF VARIABLES EQUAL TO SEPARATE VALUES (FXD OR FLTG)\$SET ANY NO	F	SETK
TOPS	M	KIINT1
\$FALLOWS VARIABLE DEPTH INDEXING OF VEC	M	BOOST
OR FOR SCOPE SUBROUTINE DISPLA	M	CHSIGN
\$VARIABLE ORIGIN FORMAT GENERAT	M	ABSVAL
CES	M	
\$ENABLE FORTRAN VARIABLE LENGTH CALLING SEQUEN	M	
CONSTANTS	M	
\$MODIFY A SET OF VARIABLES BY A CONSTANT OR BY	M	
. CONSTANT \$MULTIPLY ANY NO. OF VARIABLES BY A SINGLE FLTG. PT	F	
ORMAT	M	
\$OUTPUT VARIABLES FIVE PER LINE IN G	F	
E PAIRS OF VARIABLES OR A SET OF VARIABLES FOR EQUALITY \$COMPAR	M	
N GIVEN LIMITS	M	
\$CHECK THAT VARIABLES FROM LIST FALL WITHI	M	
S FOR EQUALITY \$COMPARE PAIRS OF VARIABLES OR A SET OF VARIABLE	M	
F VALUES	M	
\$SET A LIST OF VARIABLES TO ONE OF TWO SETS O	M	
ZERO	M	
\$CHOOSE BETWEEN TWO VARIABLES BY A THIRD ONE BEING	M	
FORMAT	M	
\$OUTPUT VARIABLES BY NORMAL OR LITERAL	M	
LUE (FXD OR FLTG)\$SET ANY NO. OF VARIABLES EQUAL TO A SINGLE VA	F	
LUES (FXD OR FLTG)\$SET ANY NO. OF VARIABLES EQUAL TO SEPARATE VA	F	
E VECTOR OF MACHINE ADDRESSES OF VARIABLES IN A LIST	M	
\$CREAT	M	
NG SIGN \$SIGN OF DIFFERENCE OF 2 VARIABLES OR 0 IF SAME INCLUDI	M	
VALUES	M	
\$SET VARIABLES OR VECTORS TO GIVEN	M	
\$PROBABILITY THAT A CHI-SQUARED VARIATE EXCEEDS A VALUE	F	
ANT TO FLEMENTS OF A FXD OR FLTG VECTOR	M	
\$ADD A CONST	M	
\$CHANGE ALL SIGN BITS OF A VECTOR	M	
\$FAST ABSOLUTE VALUE OF A VECTOR	M	

RT FORTRAN INTEGER VECTOR TO MLI VECTOR	\$FAST CONVE	M	ITOMLI
\$FIND AVERAGE OF FLOATING VECTOR		M	AVRAGE
OR UNSIGNED EXTREMAL VALUES OF A VECTOR	\$FIND SIGNED	M	MAXSN
\$FLOAT A VECTOR		M	FLOATV
CY DISTRIBUTION OF A FIXED POINT VECTOR	\$FREQUEN	F	FRQCT1
SUMMATION OF A FLOATING OF FIXED VECTOR	\$INTEGRATED	M	INTSUM
NCE SPACING, OR CHANGE SIGN OF A VECTOR	\$MOVE, REVERSE, CHA	M	MOVREV
TRAN INTEGER VECTOR AS HOLLERITH VECTOR	\$PACK UP FOR	M	IVTOHV
PE WITH NORMAL OR LITERAL FORMAT VECTOR	\$WRITE OUTPUT TA	F	FMTOUT
\$COLLAPSE ODD-LENGTHED VECTOR	ABOUT ITS MIDPOINT	M	KOLAPS
\$SPREAD OUT HOLLERITH VECTOR	AS FORTRAN INTEGERS	M	HVTOIV
\$PACK UP FORTRAN INTEGER VECTOR	AS HOLLERITH VECTOR	M	IVTOHV
\$DIVIDE A FLOATING VECTOR	BY A CONSTANT	M	DIVIDE
T INTEGER \$MULTIPLY AN MLI VECTOR	BY A FORTRAN FIXED POIN	M	MLISCL
ARY INCREMENTS \$VECTOR	DOT PRODUCT WITH ARBITR	M	DOTJ
\$DIFFERENCE FIXED OR FLOATING VECTOR	ELEMENTS IN PAIRS	M	DIFPRS
\$FAST DOUBLING OR HALVING A VECTOR	(FIXED OR FLOAT NG)	M	DUBLX
FATER THAN GIVEN VALUES \$FAST SCAN VECTOR	FOR ELEMENT EQUAL OR GR	M	FASCN1
OR DECREASING BEHAVIOR \$CHECK VECTOR	FOR MOMOTONE INCREASING	M	MONOCK
\$COLLAPSE ONE-SIDED VECTOR	INTO SMALLER RANGE	M	COLAPS
\$DERIVATIVE OF A VECTOR	OF DIFFERENCING	M	DERIVA
\$FAST TRACK THROUGH A VECTOR	OF INDICES	M	STRK
\$REVERSE VECTOR	OF MATRICES	F	MRVRS
CONSTANT LENGTH \$SUMMATION OF VECTOR	OVER ABUTTING BLOCKS OF	M	BLKSUM
\$MULTIPLE FRAME SCOPE PLOTS OF VECTOR	SETS	F	GRAPH
\$MOVE A VECTOR	TO A DIFFERENT LOCATION	M	MOVE
CONVERSELY \$SCALE, CONVERT FLTG. VECTOR	TO MACHINE INTEGERS OR	M	FXDATA
\$FAST CONVERT FORTRAN INTEGER VECTOR	TO MLI VECTOR	M	ITOMLI
ON \$HI-SPEED EXPANSION OF A VECTOR	UNDER CUBIC INTERPOLATI	M	EXPAND
G \$FIX A FLOATING VECTOR	WITH OR WITHOUT ROUNDIN	M	FIXV
NCREASING SIZE) OF ELEMENTS IN A VECTOR	\$FAST MAKE INDEX (BY I	M	SIZEUP
OVING SUMMATION OF A FIXED POINT VECTOR	\$FAST	M	MUVADD
\$FAST REVERSE STORAGE ORDER OF A VECTOR		M	REVERS
TS OF A MACHINE LANGUAGE INTEGER VECTOR	\$FAST SQUARE ELEMEN	M	SQRM LI
\$FIND AVERAGE OF FIXED PT VECTOR		M	XAVRGE
\$MOVING AVERAGE OF A VECTOR		F	MVINAV
\$MOVING MEAN SQUARE AVERAGE OF A VECTOR		F	MVSOAV
\$NORMALIZE AND CHANGE MEAN OF A VECTOR		F	NRMVEC
TAPE A MACHINE LANGUAGE INTEGER VECTOR	\$PRINT OR WRITE OUTPUT	F	PWMLIV
\$REMOVE THE MEAN FROM A FIXED VECTOR		M	XREMAV
\$REMOVE THE MEAN FROM A FLOATING VECTOR		M	REMAV
UND UP, OR ROUND DOWN A FLOATING VECTOR	\$ROUND, RO	M	RNDV
\$SQUARE ELEMENTS OF FXD OR FLTG VECTOR		M	SQUARE
\$SQUARE ROOT OF A FLOATING VECTOR		M	SQROOT
UM ELEMENTS OF FLOATING OR FIXED VECTOR	\$S	M	SUM
QUARED ELEMENTS OF A FLTG OR FXD VECTOR	\$SUM THE S	M	SQSUM
UNPACK AND RESCALE A PACKED DATA VECTOR	\$	M	UNPAKN
\$DIVIDE A FXD VECTOR	BY A CONSTANT	M	XDVIDE
NSTANT \$MULTIPLY VECTOR	BY FLOATING OR FIXED CO	M	MULPLY
RMAT WITH SPACING \$OUTPUT NAMED VECTOR	BY NORMAL OR LITERAL FO	F	VOUT

VEN INCREMENTS	\$FORM A VECTOR BY SIFTING ANOTHER AT E	M	SIFT
\$DIVIDE ELEMENTS OF ONE	VECTOR BY THOSE OF ANOTHER	M	VDVBYV
LEFT OR RIGHT	\$SHIFT VECTOR ELEMENTS ARITHMETICALLY	M	SHFTR1
OR RIGHT	\$SHIFT VECTOR ELEMENTS LOGICALLY LEFT	M	SHFTR2
	\$REVERSE A VECTOR ELSEWHERE OR IN PLACE	M	REVER
Y MODE)	\$SET ALL ELEMENTS OF VECTOR EQUAL TO A CONSTANT (AN	M	SETKV
NT	\$ SET FXD OR FLTG VECTOR EQUAL TO A LINEAR SEGME	M	SETLIN
	\$SEARCH A VECTOR FOR A VALUE	M	SEARCH
OM FIRST OR LAST TERM	\$SEARCH VECTOR FOR NUMBER, STARTING FR	F	SRCH1
ALUES ALL ABOVE GIVEN LEVEL	\$SCAN VECTOR FOR POSSIBLE BLOCK OF V	F	NXALRM
D/OR INTEGRATE \$UNSCALE OR SCALE	VECTOR FOR SIMPSON INTEGRAL AN	F	SMPSON
CONSTANT \$SUM SQUARE DIF. OR FXD.	VECTOR FROM ANOTHER OR FROM A	M	XSQDFR
CONSTANT	\$SUM DIFFERENCE OF VECTOR FROM ANOTHER OR FROM A	M	SUMDFR
CONSTANT \$SUM SQUARE DIF. OF FLTG	VECTOR FROM ANOTHER OR FROM A	M	SQDFR
ANGE AND INCREMENT	\$CREATE ONE VECTOR FROM ANOTHER WITH NEW R	M	NURINC
ARTS (OR INVERSE)	\$SPLIT A VECTOR INTO ITS EVEN AND ODD P	M	SPLIT
VARIABLES IN A LIST	\$CREATE VECTOR OF MACHINE ADDRESSES OF	M	XLOCV
ITERAL FORMAT	\$OFFLINE VECTOR OUTPUT WITH NORMAL OR L	F	VEOUT
REGISTER	\$SCALE AND FIX DATA VECTOR, PACK N DATA POINTS PER	M	PAKN
\$REFLECT A FIXED OR FLOATING	VECTOR THROUGH A CONSTANT	M	REFLEC
	\$NORMALIZE A VECTOR TO GIVEN MAXIMUM VALUE	M	NMZMG1
CLIPPING EXCESSIVE VALUES	\$SCALE VECTOR TO INTEGERS FOR SCOPE,	M	SCPSCL
F DEVIATIONS FROM BASE	\$RAISE VECTOR TO POWER OR SUM POWER O	M	POWER
	\$FAST SET VECTOR TO ZERO	M	STZ
ARBITRARY AMOUNT	\$ROTATE A VECTOR UPWARDS OR DOWNWARDS AN	M	ROTAT1
\$SQUARE ROOT OF A FIXED	VECTOR WITH ROUNDING	M	XSORUT
LLOWS VARIABLE DEPTH INDEXING OF	VECTORS	\$A M	GETX
\$EXCHANGE ANY TWO	VECTORS	M	EXCHVS
\$FAST DOT PRODUCT OF TWO	VECTORS	M	FDOT
\$MOVE AN ARBITRARY SET OF	VECTORS	M	MOVECS
\$FAST REVERSAL OF SPECIAL	VECTORS ,AS PRODUCED BY SPLIT.	M	CHPRTS
ORMATS	\$OUTPUT COLUMN VECTORS BY NORMAL OR LITERAL F	M	CVSOUT
\$FAST COMPARE TWO ARBITRARY MODE	VECTORS FOR IDENTITY	M	CMPARV
\$CROSSCORRELATION OF TRANSIENT	VECTORS OF MATRICES	F	CRSVM
ODUCT OR REVERSED DOT PRODUCT OF	VECTORS OF MATRICES	\$DOT PR F	MDOT3
ODUCT OR REVERSED DOT PRODUCT OF	VECTORS OF MATRICES	\$DOT PR F	MDOT
R SUBTRACT TWO FLOATING OR FIXED	VECTORS	\$ADD O M	VPLUSV
FR PLOT OF A SET OF EQUAL LENGTH	VECTORS	\$PRINT F	PLTVS1
PRINTER-PLOT OF ARBITRARY SET OF	VECTORS	\$ F	PLOTVS
ORMATS WITH SPACINGS	\$OUTPUT NAMED VECTORS BY NORMAL OR LITERAL F	M	VSOUT
ES (FXD OR FLTG) \$SET ANY NO. OF	VECTORS EQUAL TO SEPARATE VALU	M	SETKVS
	\$SET LINEAR VECTORS, FIXED AND/OR FLOAT+NG	M	SETLNS
\$MULTIPLY ELEMENTS OF TWO	VECTORS FIXED OR FLOATING	M	VTIMSV
\$SET VARIABLES OR	VECTORS TO GIVEN VALUES	M	SETK
\$SET A LIST OF	VECTORS TO ZERO	M	STZS
ANT	\$DOT PRODUCT OF TWO VECTORS WITH DIVISION BY CONST	M	VDOTV
NG \$DIVIDE ELEMENTS OF TWO FIXED	VECTORS WITH OR WITHOUT ROUNDI	M	XVDVBYV
\$GENERATE COSINE OR SINE HALF-WAVE	TABLES, FIXED OR FLOATING	M	COSTBL
R SPECTRUM TO FIND MINIMUM PHASE	WAVELET	\$FACTOR POWE M	FACTOR
	\$WIENER AUTOCORRELATION	F	WAC

RROR FILTER OR PREDICTOR	\$WIENER-LEVINSON LEAST SQUARE	E F	WLLSFP
	\$READ EVERY N-TH WORD FROM BINARY TAPE	N	PACDAT
	\$COMPARE ARITHMETICALLY TWO WORDS WHERE -0 IS LESS THAN +0	M	CMPRA
	\$WRITE HOLLERITH TEXT ON SCOPE	M 7090DISPLA	
	\$WRITE HOLLERITH TEXT ON SCOPE	M 709DISPLA	
OR LITERAL FORMAT VECTOR	\$WRITE OUTPUT TAPE WITH NORMAL	F	FMTOUT
	\$WRITE BINARY DATA ON TAPE	M	WRDAT
NGUAGE INTEGER VECTOR	\$PRINT OR WRITE OUTPUT TAPE A MACHINE LA	F	PWMLIV
IONAL ONLINE MONITOR OF BCD TAPE WRITING		\$OPT M	ONLINE
0 VARIABLES BY A THIRD ONE BEING ZERO	\$CHOOSE BETWEEN TW	M	WHICH
	\$FAST SET VECTOR TO ZERO	M	STZ
	\$SET A LIST OF VECTORS TO ZERO	M	STZS

7. Difference Between Programs Sets I and II

Additions 172 programs have been added to Set I in forming Set II. They are

ADDK	FASCUB	MDOT	QUFIT1	STZS
ARBCOL	FASTRK	MDOT3	QXCOR1	SUM
ARCTAN	FIRE2	MEMUSE	RDATA	SUMDFR
ASPEC2	FIXV	MPACT	REFLEC	SWITCH
AVRAGE	FLQATV	MIPLS	REMAV	TAMVL
BLKSUM	FMTOUT	MIPLS	REREAD	TIMA2B(7094)
BOOST	FNDFMT	MISS	REVER	TIMSUB
CARIGE	FT24-II	MONOCK	RLSPR	TINGL
CHOOSE	GETHOL	MOUT	RLSPR2	TRMINO
CHSIGN	GETX	MOUTAI	RLSSR	VDOTV
CLKON	GNHOL2	MOVECS	RMSDEV	VDVBYV
CMPARP	GRAPHX	MOVREV	RNDV	VECOUT
CMPARV	HLADJ	MRVRS	ROAR2	VOUT
CMPRA	HVTOIV	MULK-II	RPLFMT	VPLUSV
CNTRDB	IDERIV	MULLER	SEQSAC	VRSOUT
CNTROW	IFNCTN	MULPLY	SETINO	VSOUT
COLABL	IINTGR	MVINAV	SETK	VTIMSV
CONTUR	INDEX	MVNSUM	SETK-II	WHICH
COSIS1	INTGRA	MYNTIN	SETKP	WRTDAT
CPYFL2	INTHOL	MVSQAV	SETKS-II	XACTEQ
CROSS	INTOPR	MXRARE	SETKV	XAVRGE
CROST	INTSUM	NRMVEC	SETKVS	XDIV
CRSVM	IVTOHV	NTHA	SETLIN	XDVIDE
CSOUT	IXCARG	NURINC	SETLNS	XLCOMN
CUFIT1	LIMITS	ONLINE	SEVRAL	XLIMIT
CVSOUT	LOCATE	PACDAT	SHUFFL	XLOCV
DADECK	LSHFT	PLANSP	SIPT	XOOZE
DELTA	LSSLINE	PLOTVS	SIZEUP	XREMAV
DERIVA	LSSS1	PLTVS1	SMPSON	XSQDFR
DIFPRS	MATINV	PLURNS	SPCOR2	XSQRUT
DIVIDE	MATML1	POLYSN	SQRDFR	XVDVBV
DOTJ	MATML3	POWER	SQROOT	ZEFBCD
DOTP	MATRA	QFURRY	SQRSUM	
EXCHVS	MATRA1	QIFURY	SQUARE	
EXPAND	MAXSNM	QINTR1	SRCH1	

Deletions 11 programs have been deleted from Set I in forming Set II. They are

ATSH	CRST1	GNFMT1	UPDATE
BENIMP	GETREC	ORGDLT	WRTREC
BENSPT	GETREC-II	ROKWIC	

Carryovers 95 programs were carried over from Set I to Set II. In all cases the date appearing on the first card of the symbolic deck has been changed and in most cases other changes have also been made, mostly to upgrade the documentation but in some cases to improve the coding.

The carryovers are

ABSVAL	FSKIP	LOC	QXCORR
ADANL	FT24	MAXSN	REVERS
AMPHZ	FXDATA	MLISCL	RND
ASPECT	GENHOL	MLI2A6	ROTAT1
CHISQR	GETRD1	MOVE	RSKIP
CHPRTS	GNFLT1	MPSEQ1	SAME
CLOCK1 (7050)	GRAPH	MSCON1	SCPSCL
COLAPS	GRUP2	MUVADD	SEARCH
CONVLV	HSTPLT	MVBLOK	SHFTR1
CONVLV-II	HSTPLT-II	NMZMG1	SHFTR2
COSP	HSTPLT-III (709)	NOINT1	SIMEQ
COSTBL	HSTPLT-III (7090)	NXALRM	SPLIT
DISPLA (709)	INDATA	OUDDATA	SQRMLI
DISPLA (7090)	IPLYEV	PAKN	STZ
DSPFMT	ITOMLI	PLYSYN	UNPAKN
DUBLX	KIINT1	POKCT1	VARARG
FACTOR	KOLAPS	POLYDV	WAC
FAPSUM	LINE (709)	POLYEV	WLLSFP
FASCN1	LINE (7090)	PRBFIT	XFIXM
FDOT	LINEH (709)	PROB2	XSPECT
FLOATM	LINEH (7090)	PROCOR	
FRAME (709)	LINEV (709)	PSQRT	
FRAME (7090)	LINEV (7090)	PWMLIV	
FRQCT1	LINTR1	QACORR	
FRQCT2	LISTNG	QCNVLV	