

LA-5525-M, Vol. 2

MANUAL

1

Guide to the
Program Library and Abstracts



REFER REQUESTS TO C-DIVISION
PROGRAM LIBRARY



Los Alamos
scientific laboratory
of the University of California
LOS ALAMOS, NEW MEXICO 87544

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PROGRAMMER'S INFORMATION MANUAL

LA-5525-M, Vol. 2

Manual

SPECIAL DISTRIBUTION

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Guide to the Program Library and Abstracts



COMPUTER INFORMATION SERVICES
GROUP C-4, PHONE (505) 667-6946

LOS ALAMOS SCIENTIFIC LABORATORY
OF THE
UNIVERSITY OF CALIFORNIA



MANUAL REVISION

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Replace ii.
 Replace all of Part II
 Replace Index 1-2 thru Index 1-23 with Index 1-2 thru Index 1-24.
 Replace Index 2-1

CCF Newsletters Cancelled

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Title Page (10/72), ii (9/73), iii thru iv (2/73)
 Part I page (2/73)
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 CHAPTER 2: 2-1 (10/72)
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PART I

PROGRAM LIBRARY USAGE

CHAPTER 1 INTRODUCTION

Experience in the computing field has shown the desirability of maintaining libraries of commonly-used programs and subroutines in order to improve programmer productivity. Group C-4 maintains such a library, the C-Division Program Library, at LASL. This library is located in Room 11 adjacent to the User's Area in Building SM-132, phone 6992.

Volume 2 of PIM is devoted to the Program Library. It contains the abstracts of the C-Division programs. It defines the program classification codes under which all C-Division programs are classified. It includes a description of how to use the library and how to submit new or revised programs.

THE PROGRAM AND WRITEUP COLLECTION

The Program Library houses several collections of programs and their documentation in order to relieve the programmer of the necessity of writing non-trivial often-used programs. Due to extensive use and multiple-user checkout, the quality of the library programs is constantly improving in accuracy and efficiency. Programs for a wide range of problems and applications are available.

The collections include more than 500 programs written and maintained by C-Division as well as programs which have been made available by other organizations such as the CDC Users' Group (VIM).

The Local Library contains two types of programs. The Type 1 collection should be considered the first source of programs. A program will be classified Type 1 if C-Division accepts responsibility for its maintenance, conversion to new CCF computers, etc. Most Type 1 programs are written

by C-Division or CCF programmers. The Program Library will act as custodian for a program, designated Type 2, which anyone desires to have placed in the centrally-located repository. The submitter retains all responsibility for the program. Some of the frequently-used programs in the Local Library are placed in the System Library or other libraries residing on disk storage in the computers.

The procedures for using any of the collections of programs are generally similar. All materials may be obtained through the librarians, although the Local Library is also self-service. The materials are found in the following files.

<u>Local Library</u>	<u>Location</u>
Abstract File	PIM Volume 2
Abstract, Writeup, and Listing File	Librarians' Office
System Library File	CDC 6600/7600 Disk
Card Deck File	Users' Area

<u>Other Libraries</u>	<u>Location</u>
Abstract, Writeup, and Listing File	Librarians' Office

THE REFERENCE COLLECTION

The Program Library houses several collections of manuals and newsletters in order to facilitate the distribution of new documents and revisions. These collections include manuals and newsletters published by C-Division and manuals published by other organizations such as Control Data.

The library also maintains distribution lists of manual holders and newsletter subscribers so that manual

updates and newsletters may be sent automatically to the people who need them.

LIBRARY STAFF

The library is basically self-service, but there are librarians and a Program Library coordinator to assist programmers in the use of the library and to be responsible for the operation and maintenance of the library. The librarians will also perform services such as the reproducing and interpreting of card decks. The C-Division Program Library personnel are:

Librarians -- Marge Olson and Sylvia Wohlberg, phone 6992
Program Library Coordinator -- Chester Kazek, phone 5284

In addition to the staff, several committees are directly associated with the library.

The Program Library Steering Committee assists the Program Library Coordinator in the formation of policies which reflect the needs of the CCF programmers.

The Program Review Committee assists the Program Library Coordinator in the evaluation of programs and assists the CCF programmers in the use of the library programs. Committee members and their areas of responsibility are indicated in Chapter 4.

The Documentation Review Committee assists the Program Library Coordinator in the evaluation of program documentation.

CHAPTER 2 - USING THE PROGRAM LIBRARY

Examine the program abstract list in Appendix A of this volume and the abstracts in the other chapters. If there is a suitable program, obtain the documentation from the Writeup and Listing File. Determine from the abstract whether the program resides on disk or cards. If it is on disk, it is in the System Library and the programmer may use the routine simply by calling it properly within his program. If it is on cards, the programmer may reproduce the library copy of the deck. The librarians are happy to reproduce library documents or library decks; writeups and cards can be put on the output shelves.

If no suitable program is listed, the programmer should look in the program abstract lists of other libraries. Books of short writeups are also available, as well as longer writeups and listings of programs which have been ordered previously. Any of these documents may be reproduced. Many of the programs not available locally may be ordered by the Program Library, an order which may result in a delay of one to three weeks.

If no suitable program can be found, the Program Review Committee or the Program Library Coordinator should be contacted. Group C-4 can be requested to assist in producing programs.

If a programmer becomes aware of a program available in another library which would be useful locally with some modifications, he should contact the Program Library Coordinator.

CHAPTER 3 - SUBMITTING MATERIAL TO THE PROGRAM LIBRARY

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SUBMISSION OF NEW PROGRAMS

If a programmer wishes to include a program in the Type 1 or 2 Library, he prepares documentation according to the instructions given in this section. The Program Library Coordinator will decide whether the program is of Type 1 or Type 2 and will assign a program designation. Generally, every Type 1 routine is submitted with a separate program designation and submittal sheet. However, internal routines transparent to the user may be included with the primary routines. On approval of the Program Library Coordinator, the librarian will have writeups, listings, and decks duplicated and placed in the library files.

RESPONSIBILITIES OF THE SUBMITTER

1. Writing, testing, and documentation of his own program.
2. Determining to the best of his ability that the program does not duplicate a program already in the Program Library.
3. Discussing and changing submittals as requested by the Program Library Coordinator.
4. For programs which are to be included in the System Library of a given system, assisting the systems programmers for that system as necessary in placing the routine in the Systems Library and in any necessary checkout.
5. Assisting the C-Division Consultants with questions about the program once it is included in the Program Library.
6. For subroutines and functions with long argument lists, considering the passage of arguments through a labeled COMMON, since dummy arguments are very expensive in space and time.

LIST OF MATERIALS WHICH MUST BE SUBMITTED WITH EACH PROGRAM

1. The submittal sheet (forms available in the Program Library) from which abstract cards will be punched. A complete description is given on page 3-4.

2. The abstract. See page 3-6.
3. The writeup. This material, combined with the listing of the abstract cards, will form the complete writeup. See page 3-8.
4. The compiler- or assembler-produced program listing. This listing will be generated by the librarian. See page 3-9.
5. The source deck. Optional for Type 2 program. See page 3-9.
6. The binary deck. This deck will be generated by the librarian. Optional for a Type 2 program. See page 3-10.
7. The test problem which was used to check out the routine. Optional for a Type 2 program. See page 3-10.
 - a. Card deck
 - b. Documentation, including source listing and dayfile. These listings should be exactly as they come out of the computer.
 - c. Actual input
 - d. Actual output

NOTE: All decks submitted, including test decks, must be those which produced the accompanying listings. Duplicates of the decks actually used are not acceptable since they may be punched incorrectly.

THE SUBMITTAL SHEET

Submittal sheets are available from the Program Library. Generally, a separate submittal sheet is submitted for each routine and for each computer (see page 3-2). An example is given on page 3-11.

Only the starred items are to be filled in by the submitter, and these items are to be filled in with pencil. Unless specifically stated, all items should be left-adjusted.

The following describes the information required on this form.

1. Date of Submittal.
2. Submitter's Installation Code - Always LA.
3. Program designation (6 characters allowed): See page 3-2.
- * 4. Submitter's name (17 characters allowed): The name of the person submitting the routine, who will be contacted in case of trouble with the routine, ambiguity in the writeup, etc.
- * 5. Submitter's group (12 characters allowed): e.g., GMX-3.
6. Reviewer's name (17 characters allowed): The member of the Program Review Committee who will be contacted to answer questions regarding the differences between this and similar routines, the validity of this routine in relation to a particular application, etc. (Previously, this field was used for the author of the routine.)
- * 7. Year completed (2 characters allowed): Last two digits of the year completed.
- * 8. Title (57 characters allowed): The title of the routine, which may include punctuation. Include nicknames or abbreviations by which the program is widely known, not just the name of the routine.
- * 9. Principal Source Language (7 characters maximum). For consistency, please use the following abbreviations.

ALG	=	ALGØL	F2	=	FØRTRAN II
ATC	=	Autocoder	GAP	=	Autocoder
CØBØL	=	CØBØL	LSC	=	LACENT
CMP	=	CØMPASS	MDC	=	MADCAP
F4	=	FØRTRAN IV	SPS	=	Autocoder
FTN	=	FØRTRAN IV Extended			

- * 10. Secondary Source Language (7 characters maximum). As above if portions of the program are written in other than the primary source language.
- * 11. Type of Routine (2 characters maximum). Choose from the following codes:
 - CD = Console Deck, a self-loading deck such as an operator's core dump.
 - IR = Independent Routine, loads into core and operates independently of any monitor system.
 - MP = Main Program, a program which is essentially independent, relies on an external monitor system for some functions.
 - MS = Monitor System, a complete system which provides a framework within which other programs are operated.
 - ØR = Open Routine, which would normally be inserted in-line in the user's program. Macro-instructions of the type allowed in assembly languages would be given this designation.
 - SR = Closed Subroutine, entered from some other routine, via a calling sequence.
- * 12. Machine (7 characters maximum). The number of the machine, such as: 7600, 6600, or 1401.
- * 13. Monitor or Operating System Required (7 characters maximum). To be filled in only if the program is system dependent; for example, it calls AFSREL in CRØS or CPAREA in SCØPE.
 - SCP 3.1 = SCØPE 3.1 (CDC 6600).
 - CRØS = CDC 7600
- * 14. Special Requirements (12 characters maximum, right-justified). Describe any special facilities which must be requested by the user, e.g., Microfilm, CALCØMP, paper tape, ECS, exceptional amounts of LCM or Central Memory.
- 15. No longer used.
- 16. Documents Available (2 entries, 3 characters maximum in each, right-justified). Indicate number of pages in the listing.
- 17. Type of Support (1 character).

18. Primary Form (20 characters maximum). Usually source language; e.g., F4 SOURCE CARDS.
- a. Count (5 characters maximum). Number of cards.
 - b. Medium (3 characters maximum). Choice of one of the following:
 - BCD = cards which have only BCD punching
 - BIN = cards which have any binary punching
 - nTP = n reels of magnetic tape.
19. Additional Form (20 characters maximum). Usually object language; e.g., F4 OBJECT CARDS. Same as item #18.
20. Search Key (63 characters maximum). A brief description of the program, used for permuted indexing. Every key word in the search key should be preceded by an asterisk (*). Note that the search key itself is listed in the permuted index and should, therefore, not simply be a list of subject categories.
21. Identification (5 characters maximum). Same as item #3.
22. Residence (7 characters maximum):
- ØN DISK = if in the System Library,
 - CARDS = if in the Program Library on cards,
 - TAPE = if in the Program Library on tape.
- * 23. Language Compatibility (10 characters maximum). This routine expects the calling sequence generated by the CALL statement or its equivalent in the language listed here. Use abbreviations shown in item #9.
24. Writeup Date (8 characters maximum). Date of the current writeup in the form MM/DD/YY.
25. Writeup Revision Number (5 characters maximum). Revision number if this is a revised writeup.
26. Deck Date (8 characters maximum). Date as MM/DD/YY.
27. Deck Revision Number (5 characters maximum). Revision number if this is a revision of the original deck.

THE ABSTRACT

The abstract is included in the Programmer's Information Manual. An example is given on page 3-12. It should be brief enough to be keypunched on ten cards, 61 columns each. All characters in the abstract must be keypunchable, as defined

in PIM Volume 1, pp. 4-37 and 4-38, The abstract should be structured in the following manner.

Form:

The general form (subroutine, function, or main program and the number of arguments). All real and integer arguments should be given names which indicate the type of the argument implicitly. For example,

```
FORM:    Y=SQRT(X)
FORM:    CALL CPWØRD(A)
FORM:    MAIN PRØGRAM
```

Purpose:

A short statement of what the routine does, including some information about the arguments, such as use and dimensionality, if possible.

Storage:

The number of words of central memory and of ECS or LCM required by this routine. Indicate whether the number is octal or decimal.

Timing:

The amount of computer time required by this routine for a particular quantity of data or a typical run.

Externals: or Self Contained:

A list of externals referenced by the routine as indicated by a load map. Both the external name and the program designation, if any, should be given. Externals which are a fundamental part of the system should be marked SYSTEM. Common blocks should be given unique names, perhaps including the program designation, and marked CØMMØN. If the routine references no externals, SELF CØNTAINED should be indicated. For example,

```
LABRT(N103A)
INPUTN(SYSTEM)
M101AC(CØMMØN)
```

THE WRITEUP

The full writeup contains the abstract plus a more detailed description. The full writeup is available through the Program Library. An example is given on page 3-12. A Type 2 routine may optionally refer the user to another source, such as an LA report. The following information should be included in the more detailed description.

Function:

A description of what the routine is capable of doing. This might provide a means of choosing between several similar routines. It should be longer than the PURPOSE although a detailed description of the arguments should be saved for later.

Form:

Same or similar to FORM on abstract.

Arguments:

A complete description of each argument, including type, dimensionality, purpose, and restrictions. Indicate whether each argument is an input, output, or scratch (modified but not an output) argument. Any other input should be described in similar terms.

Method:

A precise description of the technique or mathematics used by the routine, indicating known differences from other similar routines. Include any pertinent references.

Error Conditions:

Describe those conditions which are detected as invalid and the results produced by such conditions. Possible undetectable errors should be pointed out.

Accuracy:

Information about the accuracy of the results of the routine.

Example:

A simple example which has actually been run on the computer. For a subprogram, give a simple driver program, along with sample input and the output produced by this example. Include enough comments to explain the example.

Additional Information:

If the routine is a FORTRAN main program, the PROGRAM card should be given, so that the user has the option of overriding the filenames via the execute (or LGØ) card.

Special input/output requirements.

Restrictions or cautions to the user.

A flowchart, if it would be useful to the general user.

THE PROGRAM LISTING

Comments should be used liberally throughout the program.

The librarian will obtain a listing of the source cards generated by the compiler or assembler and will make sure that each page is numbered and labeled with the program designation.

THE SOURCE DECK

The source deck must be the deck which generated the submitted listing, not a duplicated deck. Before submitting the program, it is recommended that the program TIDY (L301) be used to clean up the FORTRAN statements.

The librarians will sequence and label the source deck. It will be identified by a 5-character program designation (see section on PROGRAM DESIGNATION) in cols. 73-77 of each card and will be numbered sequentially in cols. 78-80 with an increment of 1.

The first source language card will be numbered 1. If feasible, the card numbered 2 should be a comment card containing the title, #8 of the submittal sheet.

THE BINARY DECK

The librarians will generate a binary deck from the source deck.

THE TEST PROBLEM

Necessary documentation, decks, input, and sample output should be provided so that a knowledgeable programmer who is not familiar with the routine can check it out without the submitter's help in case of emergency. The test problem should be brief enough so that the system programmers can use it to check the residence of the routine, if it is included in the System Library.

Tests submitted should have as few lines of output as possible to indicate whether the routine failed or functioned properly. If possible, they should be self-checking, printing a message indicating if the test was successful or not.

SAMPLE ABSTRACT

FORM: CALL ECSGLSS(IM,IN,IK,IL,NR,A,D,IR,IY,B,IB,
X,JX,EPS)

PURPOSE: SOLVE IN THE LEAST SQUARES SENSE THE GENERAL
LINEAR SYSTEM $CX=Y$ WHEN C AND Y ARE STORED COLUMN-WISE
IN ECS.

STORAGE: 717 (OCTAL) WORDS. AT LEAST $IM*IN+IM=IK$ WORDS
RESERVED IN ECS.

TIMING: DEPENDS ON SIZE OF PROBLEM. SEE FULL WRITEUP.

ROUTINE NAME: ECSGLSS

ENTRY NAME: ECSGLSS

EXTERNALS: DTPRØ(F124A), LABRT(N103A), SQRT(B408A),
VECPRØD, VEC SUM(F133A), ECRD, ECWR, EXIT(SYSTEM).

SAMPLE WRITEUP

Function:

ECSGLSS solves in the least squares sense the general linear system $CX=Y$ when the C and Y matrices are stored column-wise in ECS. The IM by IN input matrix C of (1) below is stored in ECS by columns at addresses IR(i), $i=1,2,\dots,IN$. The IM by IK input matrix Y of (1) below is stored in ECS by columns at addresses IY(i), $i=1,2,\dots,IK$. The IM by NR output matrix CT of (1) below is stored in ECS by columns at addresses IR(i), $i=1,2,\dots,NR$. The IM by IK residual matrix $CX-Y$ of (1) below is stored in ECS by columns at addresses IY(i), $i=1,2,\dots,IK$.

Form:

CALL ECSGLSS(IM,IN,IK,IL,NR,A,D,IR,IY,B,IB,X,JX,EPS)

Arguments:

IM = column length of a column in C --- input
 IN = number of columns in C --- input
 IK = number of columns in Y and X --- input
 IL = number of rows in B --- input
 NR = rank of C --- output
 A,D = storage columns having length \geq IM --- scratch
 IR = array of size IN containing, in location j, the ECS starting address for column j of matrix C --- input
 IY = array of size IK containing, in location j, the ECS starting address for column j of matrix Y --- input
 B = auxiliary matrix of size IL by IN, usually set to identity of size IN. See section entitled METHOD for further details. --- input
 IL by IN matrix BT of (1) below --- output
 IB = column reserved length for B in calling program --- input
 X = IL by IN solution matrix BX of (1) below --- output
 JX = column reserved length for X in calling program --- input
 EPS = machine constant - for 6600 user should set it to 1.E-14 --- input

Method:

Given the matrices C(IM,IN), Y(IM,IK) whose column starting addresses in ECS are stored in arrays IR and IY respectively, the routine forms the factorization

$$\begin{bmatrix} C & Y \\ B & 0 \end{bmatrix} \begin{bmatrix} T & X \\ 0 & -I \end{bmatrix} = \begin{bmatrix} CT & CX-Y \\ BT & BX \end{bmatrix} \quad (1)$$

where X is the solution to

$$CX=Y \quad (2)$$

and the first NR columns of CT are orthonormal. Setting B=I, we obtain BX=X, as the solution to (2). When B=I and NR<N, then BT=T; and IN-NR homogeneous solutions of (2) are contained in the last IN-NR columns of T. For further details see the writeup of GLSS (F405).

Error Conditions:

- a. Stops 40523, 40537, 40557, 40562, 40563, 40567, and 40570 indicate either an ECRD or ECWR error persists after three attempts.

- b. ECSGLSS CALLED WITH ARRAYS DIMENSIONED WRONG
or
ECSGLSS CALLED WITH NONPOSITIVE INDICES
indicates IM,IN,IK, or IL improperly set when routine called.

Accuracy and Timing:

A. Hilbert Segments N=2 to N=10

N	ECSGLSS	GLSS	AVE. NO. CORRECT DIGITS*
	SEC		
2	.002	.002	14.274
3	.002	.002	12.989
4	.004	.004	11.364
5	.006	.006	10.355
6	.008	.008	9.252
7	.012	.008	7.705
8	.014	.014	6.723
9	.016	.014	4.362
10	.022	.018	3.273**

B. Rectangular Identity Blocks

M x N		SEC	
50	3	.006	.006
1000	3	.062	.058
1000	3	.064	.060

* Average number of digits calculated by formula developed by Jordan, T. L., Math. Comp. 22, pp. 579-588, 1968. ECSGLSS, as a modification of GLSS, gives the same number of significant figures as GLSS provided the epsilons, the machine constants, are identical.

** GLSS with its present internal machine constant, failed to solve the 10 by 10 Hilbert Segment. However, resetting EPS in GLSS to 1.E-14 will rectify this problem.

Example:

```

PROGRAM EXAMPLE (INPUT,OUTPUT)
DIMENSION C(10,10),B(10)
DIMENSION A(10),AID(10,10) IR(10),IY(10),AEC(10),CEC(10)
DATA APZERØ/1.E-14/
C EXAMPLE SHOWS A SQ MATRIX C READ INTO CORE, THEN WRITTEN COLUMNWISE
C INTO ECS. THE INFORMATION STORED IS THEN PROCESSED BY ECSGLSS
  READ 2,N
  2 FORMAT(I5)
  ND=N
  NW=N
C MATRIX C READ INTO MEMORY ROWWISE
  DØ 200 I=1,N
  200 READ 3,(C(I,K),K=1,N)
  3 FORMAT(4F20.0)
C SET AID EQUAL TO IDENTITY AND RT HAND SIDE B TO (1,0,...,0)
  DØ 150 I=1,NW
  B(I)=0.
  DØ 140 K=1,NW
  140 AID(I,K)=0.
  150 AID(I,I)=1.
  B(1)=1.
C STORE MATRICES C,B INTO ECS NOTE CA=B
  IR(1)=0
  DØ 4 IWRLP=1,3
  CALL ECWR(C,IR(1),100,JV)
  IF(JV) 5,5,4
  4 CONTINUE
  STØP 4
  5 DØ 6 IWRLP=1,3
  CALL ECWR(B,100,N,JV)
  IF(JV) 7,7,6
  6 CONTINUE
  STØP 6
C STORE CØL C(J) AT LØC (J-1)*10 IN ECS (J.LE. 10)
C STORE CØL B(1) AT LØC 100
  7 DØ 8 J=1,N
  8 IR(J+1)=J*10
  IY(1)=100
  CALL ECSGLSS(ND,NW,1,NW,NRANK,AEC,CEC,IR,IY,AID,10,A,10,APZERØ)
  PRINT 52, ND,NW,NRANK
  52 FORMAT(* RANK ØF INPUT MATRIX ØF SIZE *3X,I5,3X*BY*3X,I5,3X*IS*,
  13X,I5)
  PRINT 56, (A(K),K=1,NW)
  56 FORMAT(*SØLUTION VECTOR IS = * 4(1PE20.12,2X)/5(1PE20.12,2X)/
  13(1PE20.12,2X))
  END

```

REVISION OF EXISTING PROGRAMS

A program may be revised for a number of reasons, for example, a faster, more versatile, or more correct version. When a program is revised, the procedure outlined in SUBMISSION OF NEW PROGRAMS may be followed. However, if the revision is relatively minor, the procedure may be altered. After discussing the revisions with the Program Library Coordinator, the submitter and the Program Library Coordinator can determine which parts of the procedure can be omitted. The submitter must specify any items on the submittal sheet which are altered due to revision. Sometimes the old submittal sheet can be altered and resubmitted as the new submittal sheet, thus avoiding unnecessary duplication of effort.

CHAPTER 4 - PROGRAM CLASSIFICATION CODES

The programs in the Program Library are organized according to their function. Each program has a program designation, a four or five character code assigned by the Program Library. The first two characters are the classification code, the first character indicating the primary class, the second character indicating the secondary class within the primary.

Program designations for Type 1 programs have two forms:

<u>General Form</u>	<u>Example</u>
psnn	N103
psnnv	N103A

where ps is a two-character classification code (e.g., N1), nn is a two-digit sequence number assigned by the Program Library (e.g., 03), and v is a one-letter version letter (e.g., A or B). Currently, the version letter A refers to the 6600 and B to the 7600. The program designation without the version letter is meant to refer to all versions of the program.

Program designations for Type 2 programs have the form:

<u>General Form</u>	<u>Example</u>
psxx	N1AA

where ps is a two-character classification code (e.g., N1) and xx is a two-letter sequence assigned by the Program Library (e.g., AA).

IBM 1401 program designations begin with the digit 1, followed by a three-character code assigned by the Program Library.

The classifications shall be reviewed from time to time. It is anticipated that new program developments will show the need for additional classifications. Any program for which no suitable secondary class exists may be assigned the secondary code 0 (zero). Additional secondary classes may be assigned as required to distribute the accumulation of "0"-classed programs into applicable classes. Additional primary classes may be established as required. Suggestions for additional classifications may be submitted to the Program Library Coordinator.

The list of Secondary Classification Codes on the following pages includes the names of the Program Review Committee members who have volunteered to be responsible for the quality of each area of the Type 1 library. These reviewers may be contacted for assistance whenever the C-Division Consultants are not able to help. The nature of the assistance which the reviewers are willing to provide includes answering questions regarding the differences between similar routines and the validity of particular routines in relation to a particular application. If the reviewer is not available, please contact his group leader.

PRIMARY CLASSIFICATION CODES

- A. Arithmetic Routines
- B. Elementary Functions
- C. Polynomials and Special Functions
- D. Operations on Functions and Solutions of Differential Equations
- E. Approximation Theory and Curve Fitting
- F. Numerical Linear Algebra
- G. Statistical Analysis and Probability
- H. (Not Used)
- I. Input with Conversion or Interpretation
- J. Output with Conversion or Interpretation
- K. Information Transfer with no Particular Conversion or Interpretation Other Than Device-Dependent Requirements
- L. Program Maintenance
- M. Data Handling
- N. Debugging
- O. Simulation of Computers and Data Processors - Interpreters
- P. (Not Used)
- Q. Service
- R. (Not Used)
- S. Information Retrieval
- T. Applications and Application-Oriented Programs
- U. Languages
- V. (Not Used)
- W. File Manipulation
- X. (Not Used)
- Y. (Not Used)
- Z. (Not Used)

SECONDARY CLASSIFICATION CODES

- A. Arithmetic Routines (Wayne Fullerton, C-4)
 - A1. Real Numbers
E.g., multiple precision, fixed, and floating point operations; conversions between floating point and mantissa/characteristic.
 - A2. Complex Numbers
E.g., multiple precision, fixed, and floating point operations; complex absolute value.
- B. Elementary Functions (Wayne Fullerton, C-4)
 - B1. Trigonometric and inverse trigonometric functions
 - B2. Hyperbolic functions
 - B3. Exponential and logarithmic functions
 - B4. Roots and powers

- C. Polynomials and Special Functions
 - C1. Evaluation of polynomials (J. Hancock, C-4)
 - C2. Roots of polynomials (J. Hancock, C-4)
 - C3. Evaluation of special functions (Wayne Fullerton, C-4)
E.g., Bessel, gamma, error, elliptic integrals,
exponential integrals.
 - C4. Simultaneous non-linear algebraic equations
(J. Hancock, C-4)
Zeros of non-linear functions.
 - C5. Simultaneous transcendental equations (J. Hancock, C-4)
- D. Operations on Functions and Solutions of Differential Equations
 - D1. Numerical integration (D. Kahaner, C-6)
 - D2. Numerical solution of ordinary differential equations
(J. Sopka, C-4)
 - D3. Numerical solution of partial differential equations
(F. Dorr, C-4)
 - D4. Numerical differentiation (D. Kahaner, C-6)
- E. Approximation Theory and Curve Fitting
 - E1. Interpolation and table look-up (B. Swartz, C-6)
 - E2. Least squares approximation and curve fitting
(B. Swartz, C-6)
 - E3. Smoothing tabular data (B. Swartz, C-6)
 - E4. Non-linear optimization (M. Klein, C-6)
- F. Numerical Linear Algebra
 - F1. Vector and matrix operations (B. Buzbee, C-4)
 - F2. Eigenvalues and eigenvectors (B. Buzbee, C-4)
Matrix decompositions.
 - F3. Determinants (B. Buzbee, C-4)
 - F4. Simultaneous linear and linear least squares
(B. Buzbee, C-4)
 - F5. Fast transforms (B. Hunt, C-5)
E.g., Fourier.

G. Statistical Analysis and Probability

- G1. Descriptive statistics (R. Lohrding, C-5)
- G2. Hypothesis testing (R. Lohrding, C-5)
- G3. Analysis of experimental design data (R. Lohrding, C-5)
- G4. Distribution functions and their inverse (R. Lohrding, C-5)
- G5. Multivariate analysis (R. Lohrding, C-5)
- G6. Time series analysis and processing (R. Hunt, C-5)
- G7. Regression analysis (R. Lohrding, C-5)
Includes curve fitting explicitly for statistical purposes.
- G8. Random variable generators (R. Lohrding, C-5)
- G9. Miscellaneous (R. Lohrding, C-5)

H. (Not Used)

I/J. Input/Output with Conversion or Interpretation

- I4. Free form and NAMELIST I/O (J. Moore, C-2)
- I5. Graphics (R. Frank, C-4)

K. Information Transfer with no Particular Conversion or Interpretation Other than Device-Dependent Requirements

- K1. Direct access core/disk I/O (J. Moore, C-2)
- K2. ECS/core, core/core (J. Moore, C-2)
- K3. Sequential I/O (J. Norris, C-2)
- K4. Convert sequential/random (J. Norris, C-2)
- K5. Magnetic tape/tape, tape/core, etc. (J. Norris, C-2)
- K6. Paper tape routines (J. Norris, C-2)

L. Program Maintenance

Routines which make it easier to maintain and document programs.

- L2. Document (A. Solem, C-4)
E.g., INDEX
- L3. Clean (A. Solem, C-4)
E.g., TIDY.
- L4. Updating (F. McGirt, C-4)
E.g., UPDATE, AFWL.

- M. Data Handling (P. Iwanchuk, C-4)
 - M1. Sorting
 - M2. Conversion/Scaling
Pertains to any conversion or scaling routine (packed or unpacked, single or multiple precision), such as card image to BCD, binary to BCD, fixed to floating. The primary function must be conversion or scaling, not input/output.
 - M3. Merging
 - M4. Bit and character manipulation
E.g., SHIFT, PUT, FETCH.

- N. Debugging (A. Solem, C-4)
 - N1. Tracing, trapping
E.g., LABRT. Also includes some interrupt handling (see Q2).
 - N2. Dumping
Core, tape, disk, console printouts (on-line or off-line), e.g., ABØRT, DUMP, DMPPK.
 - N3. Memory verification and searching
 - N4. Breakpoint printing

- O. Simulation of computers and data processors - Interpreters (J. Neergaard, C-7)
 - O1. Off-line equipment
Simulate off-line equipment.
 - O3. Computers
Simulate or interpret compilers for other computers or systems.
 - O4. Pseudo-computers
Simulation of theoretical or pseudo-computers.

- P. (Not Used)

- Q. Service (J. Melendez, C-4)
 - Q1. Time, dayfile, pause
E.g., SECØND, CLØCK, TIME, DATE, REMARK, PAUSE.
Also includes some file manipulation (see W).
 - Q2. Interrupt handling
E.g., XIT, ENTR, RETN, ENDD. Also see N.
 - Q3. Dynamic storage allocation

- Q. (cont'd.)
 - Q4. Get and set job-related information
E.g., CPAREA, field length, sense switches, package, GETQ, SETQ. Also includes some programming aids (see X) and I/O (see K).
- R. (Not Used)
- S. Information Retrieval (W. Draisin, C-4)
- T. Applications and Application-oriented Programs (Reviewer is submitter of particular "T" routine.)
 - T1. Physics (including nuclear)
 - T2. Chemistry
 - T3. Other physical sciences (geology, astronomy, etc.)
 - T4. Engineering
 - T5. Business data processing
 - T6. Manufacturing, (non-data) processing, and process control
 - T7. Mathematics and applied mathematics
 - T8. Social and behavioral sciences and psychology
 - T9. Biological sciences
- U. Languages (J. Moore, C-2)
 - U1. Assembly
E.g., LACENT, CØMPASS.
 - U2. Compiling
E.g., RUN, FTN.
- V. (Not Used)
- W. File Manipulation (J. Norris, C-2)
 - W1. Access
E.g., ØPEN, CLØSE, CREATE, RELEASE, MØDIFY, UNLØAD, RENAME, SWITCH, GETRQT, DATAREL. Also see Q1.
 - W2. Get information on status of I/O
E.g., IF(EØF), LENGTH, BØI, IØCHECK.

W. (cont'd.)

W3. Positioning

E.g., skip file, backspace, ENDFILE, REWIND.

W4. Get information on file

Dump file, CATALØG, DIRL, CRSREF.

X. (Not Used)

Y. (Not Used)

Z. (Not Used)

PART II

CATALOG OF PROGRAMS

A

ARITHMETIC ROUTINES

A1 REAL NUMBERS

E.G., MULTIPLE PRECISION, FIXED, AND FLOATING-POINT OPERATIONS; CONVERSIONS BETWEEN FLOATING POINT AND MANTISSA/CHARACTERISTIC.

REVIEWER: WAYNE FULLERTON, C-4

A101A A* B. L. BUZBEE C-4 67
 A101A B*UNPACK A FLOATING POINT NUMBER
 A101A C*COMPASS SR66J0 SCP 3.1
 A101A D* SW 1 LS 1
 A101A E*COMPASS SOURCE CARDS 18 BCD OBJECT CARDS 4 BIN
 A101A F*UNPACK A*FLOATING POINT NUMBER
 A101A G*CARDS F4 COMPAT WU 02/18/69REV 2 DECK 02/18/69REV 2
 A101A 1*GIVEN A FLOATING POINT NUMBER X, Y=UNPAK(X,N) YIELDS A
 A101A 2*FLOATING POINT NUMBER Y, WHERE .5 .LF. ABS(Y) .LT. 1.,
 A101A 3*AND AN INTEGER N SUCH THAT
 A101A 4*X=Y*(2**N).
 A101A 5*STORAGE=7 WORDS.
 A101A 6*SELF CONTAINED.

A102A A* B. L. BUZBEE C-4 67
 A102A B*UNPACK A FLOATING POINT NUMBER
 A102A C*COMPASS SR6600 SCP 3.1
 A102A D* SW 2 LS 1
 A102A E*COMPASS SOURCE CARDS 12 BCD OBJECT CARDS 4 BIN
 A102A F*UNPACK A*FLOATING POINT NUMBER
 A102A G*CARDS F4 COMPAT WU 02/18/69REV 2 DECK 02/18/69REV 2
 A102A 1*GIVEN A FLOATING POINT NUMBER X, J=IUNPK(X,I) YIELDS TWO
 A102A 2*INTEGERS J AND I SUCH THAT $X = J*(2**I)$.
 A102A 3*STORAGE=5 WORDS.
 A102A 4*SELF CONTAINED.

A103A A* B. L. BUZBEE C-4 67
 A103A B*ADD AN INTEGER TO THE EXPONENT OF A FLOATING PT. NUMBER
 A103A C*COMPASS SR6600 SCP 3.1
 A103A D* SW 1 LS 1
 A103A E*COMPASS SOURCE CARDS 15 BCD OBJECT CARDS 4 BIN
 A103A F*ADD AN INTEGER TO THE*EXPONENT OF A FLOATING PT. NUMBER.
 A103A G*ON DISK F4 COMPAT WU 02/18/69REV 2 DECK 02/18/69REV 2
 A103A 1*GIVEN A FLOATING POINT NUMBER $X=A*(2**N)$, AND AN INTEGER I,
 A103A 2* $Y=EXPAD(X,I)$ YIELDS $Y=A*(2**(N+I))$.
 A103A 3*STORAGE=6 WORDS.
 A103A 4*SELF CONTAINED.

A104A A* JIM CLARK T-1 67
 A104A 0*NUMBER RANGE
 A104A B*MATHEMATICS A1 COMPASS SR6600 SCOPE
 A104A C* SW 3 LS 1
 A104A D*COMPASS SOURCE CARDS 17BCDCOMPASS OBJECT CARDS 4BIN
 A104A S**RANGE*NUMBER EVALUATION
 A104A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 A104A 11*CALL RANGE(A,IND) RESULTS IN IND HAVING AN INTEGER VALUE OF
 A104A 12*ONE IF THE FLOATING POINT NUMBER A IS INFINITE, IND IS TWO
 A104A 13*IF A IS INDEFINITE, AND IND IS THREE IF A IS NEITHER
 A104A 14*INDEFINITE NOR INFINITE.
 A104A 15*STORAGE 11 OCTAL WORDS.
 A104A 16*THIS ROUTINE IS SELF CONTAINED.

A105A A* B L BUZBEE C-4 I CHERRY C-4 72
 A105A B*CONVERT SINGLE PRECISION NUMBER TO DOUBLE PRECISION
 A105A C*COMPASS SR6600 SCP 3.1
 A105A D* SW 1 LS 1 TYPE 1
 A105A E*SOURCE CARDS 10 BCD OBJECT CARDS 3 BIN
 A105A F**SINGLE PRECISION*DOUBLE PRECISION
 A105A G*ON DISK F4 COMPAT WU 11/22/72 DECK 11/22/72
 A105A 1*FORM: DX = DBLE(X)
 A105A 2*PURPOSE: GENERATE DOUBLE PRECISION FORM DX OF A
 A105A 3* SINGLE PRECISION NUMBER X.
 A105A 4*WARNING: THIS ROUTINE IS MADE AVAILABLE FOR
 A105A 5* COMPATIBILITY CONSIDERATIONS WITH OLDER FORTRANS.
 A105A 6* SINCE DBLE IS AN EXTERNAL ROUTINE, MIXED-MODE
 A105A 7* STATEMENTS ARE PREFERRED INSTEAD OF DBLE
 A105A 8* WHEN SPEED IS A CONSIDERATION.
 A105A 9*ROUTINE NAME: DBLE
 A105A 10*ENTRY NAME: DBLE
 A105A 11*STORAGE: 4 OCTAL WORDS
 A105A 12*ROUTINES CALLED: SELF CONTAINED

A105B A* B L BUZBEE C-4 I CHERRY C-4 72
 A105B H*CONVERT SINGLE PRECISION NUMBER TO DOUBLE PRECISION
 A105B C*COMPASS SR7600 CROS
 A105B D* SW 1 LS 1 TYPE J
 A105B E*SOURCE CARDS 10 BCD OBJECT CARDS 3 BIN
 A105B F**SINGLE PRECISION*DOUBLE PRECISION
 A105B G*ON DISK F4 COMPAT WU 11/22/72 DECK 11/22/72
 A105B 1*FORM: DX = DBLE(X)
 A105B 2*PURPOSE: GENERATE DOUBLE PRECISION FORM DX OF A
 A105B 3* SINGLE PRECISION NUMBER X.
 A105B 4*WARNING: THIS ROUTINE IS MADE AVAILABLE FOR
 A105B 5* COMPATIBILITY CONSIDERATIONS WITH OLDER FORTRANS.
 A105B 6* SINCE DBLE IS AN EXTERNAL ROUTINE, MIXED-MODE
 A105B 7* STATEMENTS ARE PREFERRED INSTEAD OF DBLE
 A105B 8* WHEN SPEED IS A CONSIDERATION.
 A105B 9*ROUTINE NAME: DBLE
 A105B 10*ENTRY NAME: DBLE
 A105B 11*STORAGE: 4 OCTAL WORDS
 A105B 12*ROUTINES CALLED: SELF CONTAINED

A106A A* LAURI RATHMANN C-4 W.FULLERTON 73
 A106A H*CONVERT DOUBLE TO INTEGER
 A106A C*CMP SR6600 SCP 3.1
 A106A D* SW 2 LS 2 TYPE 1.1
 A106A E* SOURCE 49 CARDS OBJECT 5 CARDS
 A106A F**DOUBLE TO INTEGER*IDINT
 A106A G*DISK F4 COMPAT WU 07/09/73 DECK 07/09/73
 A106A 1*FORM: I = IDINT(DX)
 A106A 2*PURPOSE: CONVERT A DOUBLE PRECISION FLOATING NUMBER INTO A
 A106A 3* 59 BIT SIGNED INTEGER.
 A106A 4*ROUTINE NAME: IDINT
 A106A 5*ENTRY NAME: IDINT
 A106A 6*STORAGE: 25 OCTAL WORDS
 A106A 7*ROUTINES CALLED: SYSTEM

A106B A* LAURI RATHMANN C-4 W.FULLERTON 73
 A106B B*CONVERT DOUBLE TO INTEGER
 A106B C*CMP SR7600 CROS
 A106B D* SW 2 LS 2 TYPE 1.1
 A106B E* SOURCE 49 CARDS OBJECT 5 CARDS
 A106B F**DOUBLE TO INTEGER*IDINT
 A106B G*DISK F4 COMPAT WU 07/09/73 DECK 07/09/73
 A106B 1*FORM: I = IDINT(DX)
 A106B 2*PURPOSE: CONVERT A DOUBLE PRECISION FLOATING NUMBER INTO A
 A106B 3* 59 BIT SIGNED INTEGER.
 A106B 4*ROUTINE NAME: IDINT
 A106B 5*ENTRY NAME: IDINT
 A106B 6*STORAGE: 25 OCTAL WORDS
 A106B 7*ROUTINES CALLED: SYSTEM

A107A A* B L BUZBEE C-4 I CHERRY C-4 72
 A107A B*CONVERT DOUBLE PRECISION NUMBER TO SINGLE PRECISION
 A107A C*COMPASS SR6600 SCP 3.1
 A107A D* SW 1 LS 1 TYPE 1
 A107A E*CMP SOURCE CARDS 8 BCD OBJECT CARDS 3 BIN
 A107A F**SINGLE PRECISION*DOUBLE PRECISION
 A107A. G*ON DISK F4 COMPAT WU 11/22/72 DECK 11/22/72
 A107A 1*FORM: X = SNGL(DX)
 A107A 2*PURPOSE: GENERATE THE SINGLE PRECISION FORM X OF A
 A107A 3* DOUBLE PRECISION NUMBER DX.
 A107A 4*WARNING: THIS ROUTINE IS MADE AVAILABLE FOR
 A107A 5* COMPATIBILITY CONSIDERATIONS WITH OLDER FORTRANS.
 A107A 6* SINCE SNGL IS AN EXTERNAL ROUTINE, MIXED-MODE
 A107A 7* STATEMENTS ARE PREFERRED INSTEAD OF SNGL WHEN
 A107A 8* SPEED IS A CONSIDERATION.
 A107A 9*ROUTINE NAME: SNGL
 A107A 10*ENTRY NAME: SNGL
 A107A 11*STORAGE: 3 OCTAL WORDS
 A107A 12*ROUTINES CALLED: SELF CONTAINED

A107B A* B L BUZBEE C-4 I CHERRY C-4 72
 A107B B*CONVERT DOUBLE PRECISION NUMBER TO SINGLE PRECISION
 A107B C*COMPASS SR7600 CROS
 A107B D* SW 1 LS 1 TYPE 1
 A107B E*CMP SOURCE CARDS 8 BCD OBJECT CARDS 3 BIN
 A107B F**SINGLE PRECISION*DOUBLE PRECISION
 A107B G*ON DISK F4 COMPAT WU 11/22/72 DECK 11/22/72
 A107B 1*FORM: X = SNGL(DX)
 A107B 2*PURPOSE: GENERATE THE SINGLE PRECISION FORM X OF A
 A107B 3* DOUBLE PRECISION NUMBER DX.
 A107B 4*WARNING: THIS ROUTINE IS MADE AVAILABLE FOR
 A107B 5* COMPATIBILITY CONSIDERATIONS WITH OLDER FORTRANS.
 A107B 6* SINCE SNGL IS AN EXTERNAL ROUTINE, MIXED-MODE
 A107B 7* STATEMENTS ARE PREFERRED INSTEAD OF SNGL WHEN
 A107B 8* SPEED IS A CONSIDERATION.
 A107B 9*ROUTINE NAME: SNGL
 A107B 10*ENTRY NAME: SNGL
 A107B 11*STORAGE: 3 OCTAL WORDS
 A107B 12*ROUTINES CALLED: SELF CONTAINED

A108A A* LAURI RATHMANN C-4 W. FULLERTON 73
 A108A B*DOUBLE PRECISION ABSOLUTE VALUE
 A108A C*CMP SR6600 SCP 3.1
 A108A D* SW 2 LS 2 TYPE 1.1
 A108A E* SOURCE 31 CARDS OBJECT 4 CARDS
 A108A F**ABSOLUTE VALUE DOUBLE*DABS
 A108A G*DISK F4 COMPAT WU 05/23/73 DECK 05/23/73
 A108A 1*FORM: DY = DABS(DX)
 A108A 2*PURPOSE: TO TAKE THE ABSOLUTE VALUE OF A DOUBLE PRECISION
 A108A 3* NUMBER
 A108A 4*ROUTINE NAME: DABS
 A108A 5*ENTRY NAME: DABS
 A108A 6*STORAGE: 15 OCTAL WORDS
 A108A 7*ROUTINES CALLED: SYSTEM.

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A108B A*          LAURI RATHMANN  C-4          W. FULLERTON      73
A108B B*DOUBLE PRECISION ABSOLUTE VALUE
A108B C*CMP          SR7600   CROS
A108B D*          SW 2      LS 2      TYPE 1.1
A108B E*          SOURCE 31 CARDS      OBJECT 4   CARDS
A108B F**ABSOLUTE VALUE DOUBLE*DABS
A108B G*DISK        F4  COMPAT WU 05/23/73      DECK 05/23/73
A108B 1*FORM:  DY = DABS(DX)
A108B 2*PURPOSE:  TO TAKE THE ABSOLUTE VALUE OF A DOUBLE PRECISION
A108B 3*   NUMBER
A108B 4*ROUTINE NAME:  DABS
A108B 5*ENTRY NAME:   DABS
A108B 6*STORAGE:    15 OCTAL WORDS
A108B 7*ROUTINES CALLED:  SYSTEM.

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A109A A*          LAURI RATHMANN  C-4          W. FULLERTON      73
A109A B*GENERALIZED SIGNUM FUNCTION DOUBLE PRECISION
A109A C*CMP          SR6600   SCP 3.1
A109A D*          SW 2      LS 2      TYPE 1.1
A109A E*          SOURCE 38 CARDS      OBJECT 4   CARDS
A109A F**SIGNUM*GENERAL*DOUBLE*SIGN
A109A G*DISK        F4  COMPAT WU 05/23/73      DECK 05/23/73
A109A 1*FORM:  CALL DSIGN(D1,D2)
A109A 2*PURPOSE:  GIVEN TWO DOUBLE PRECISION ARGUMENTS,
A109A 3*   ATTACH SIGN OF SECOND TO ABSOLUTE VALUE OF FIRST.
A109A 4*ROUTINE NAME:  DSIGN
A109A 5*ENTRY NAME:   DSIGN
A109A 6*STORAGE:    21 OCTAL WORDS
A109A 7*ROUTINES CALLED:  SYSTEM.

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A109B A*          LAURI RATHMANN  C-4          W. FULLERTON      73
A109B B*GENERALIZED SIGNUM FUNCTION DOUBLE PRECISION
A109B C*CMP          SR7600   CROS
A109B D*          SW 2      LS 2      TYPE 1.1
A109B E*          SOURCE 38 CARDS      OBJECT 4   CARDS
A109B F**SIGNUM*GENERAL*DOUBLE*SIGN
A109B G*DISK        F4  COMPAT WU 05/23/73      DECK 05/23/73
A109B 1*FORM:  CALL DSIGN(D1,D2)
A109B 2*PURPOSE:  GIVEN TWO DOUBLE PRECISION ARGUMENTS,
A109B 3*   ATTACH SIGN OF SECOND TO ABSOLUTE VALUE OF FIRST.
A109B 4*ROUTINE NAME:  DSIGN
A109B 5*ENTRY NAME:   DSIGN
A109B 6*STORAGE:    21 OCTAL WORDS
A109B 7*ROUTINES CALLED:  SYSTEM.

```

A2 COMPLEX NUMBERS

E.G., MULTIPLE PRECISION, FIXED, AND FLOATING-POINT OPERATIONS; COMPLEX ABSOLUTE VALUE.

REVIEWER: WAYNE FULLERTON, C-4

A202A A* B L BUZBEE C-4 67
 A202A 0*ABSOLUTE VALUE OF DOUBLE PRECISION COMPLEX NUMBER
 A202A H*MATH A2 F4 SR6600 SCP 3.1
 A202A C* SW 2 LS 1
 A202A D*F4 SOURCE CARDS 11BCDF4 BINARY CARDS 10BIN
 A202A S**ABSOLUTE VALUE OF DOUBLE PRECISION COMPLEX NUMBER
 A202A 10*ON DISK F4 COMPAT WU 1/3/69 REV. 2 DECK 1/3/69 REV. 2
 A202A 11*CALLED BY A=DCABS(X,Y) WHERE X AND Y ARE THE DOUBLE PRECISION
 A202A 12*REAL AND IMAGINARY COMPONENTS OF $Z=X+iy$. STORAGE=135 WORDS.
 A202A 13*USES DSQRT(B410A).

A203A A* J.L.DURAN C-4 67
 A203A 0*MAGNITUDE OF A COMPLEX NUMBER
 A203A H*MATH B3 COMPASS SR6600 SCOPE
 A203A C* SW 2 LS 1
 A203A D*COMPASS SOURCE CARDS 44BCDOBJECT CARDS 4BIN
 A203A S**MAGNITUDE*COMPLEX*NUMBER*FORTRAN IV COMPATIBLE 1967
 A203A 10*ON DISK F4 COMPAT WU 04/17/68 REV DECK 04/17/68 REV
 A203A 11* $F=CABS(Z)$ WHERE Z IS A COMPLEX ARGUMENT AND F IS THE
 A203A 12*MAGNITUDE OF Z
 A203A 13*STORAGE 17 WORDS
 A203A 14*SQRT SUBROUTINE SELF-CONTAINED.

B

ELEMENTARY FUNCTIONS

B1 TRIGONOMETRIC AND INVERSE TRIGONOMETRIC FUNCTIONS

REVIEWER: WAYNE FULLERTON, C-4

B104A A* KARL J MELENDEZ C-4 IVAN CHERRY 67
 B104A 0*ARCTANGENT OF X OR OF Y/X
 B104A B*MATHEMATICS B1 COMPASS SR6600 SCOPE
 B104A C* SW 3 LS 3
 B104A D*COMPASS SOURCE CARDS 118BCDCOMPASS OBJECT CARDS 7BIN
 B104A S**ARCTANGENT OF X OR OF Y/X
 B104A 10*ON DISK F4 COMPAT WU11/05/68REV 2 DECK 11/05/68REV 2
 B104A 11*CALLED BY Z=ATAN(X) OR Z=ATAN2(Y,X)
 B104A 12*COMPUTES- ARCTANGENT OF X OR OF Y/X
 B104A 13*-PI/2 .LE. ATAN(X) .LE. PI/2
 B104A 14*-PI .LE. ATAN2(Y,X) .LT. PI
 B104A 15*RELATIVE ERROR FOR ATAN IS APPROXIMATELY 7.2E-15
 B104A 16*RELATIVE ERROR FOR ATAN2 IS APPROXIMATELY 1.1E-14
 B104A 17*STORAGE-52(DECIMAL) WORDS
 B104A 18*SELF CONTAINED.

B106A A* KARL J. MELENDEZ C-4 67
 B106A B*SINE OR COSINE FUNCTION FOR ARGUMENTS IN RADIANS AND DEG
 B106A C*COMPASS SR6600 SCP 3.1
 B106A D* SW 3 LS 4 TYPE 1
 B106A E*SOURCE CARDS 182 BCD OBJECT CARDS 9 BIN
 B106A F**SINE*COSINE
 B106A G*ON DISK F4 COMPAT WU 08/04/69REV 2 DECK 08/04/69REV 2
 B106A 1*CALLED BY: Y=SIN(X), Y=COS(X) FOR ARGUMENT IN RADIANS
 B106A 2*CALLED BY: Y=SDG(X), Y=CDG(X) FOR ARGUMENT IN DEGREES
 B106A 3*PURPOSE: COMPUTES - SINE OR COSINE OF THE ARGUMENT X.
 B106A 4*RELATIVE ERROR IS APPROXIMATELY 1.5 E-14
 B106A 5*ROUTINES CALLED: SYSTEM
 B106A 6*STORAGE: 76 (DECIMAL) WORDS

B107A A* PAUL N.IWANCHUK C-4 72
 B107A B*FLOATING POINT TANGENT OR COTANGENT ROUTINE
 B107A C*F-4 SR6600 SCP 3.1
 B107A D* SW 3 LS 2 TYPE 1
 B107A E*SOURCE CARDS 47 HCD OBJECT CARDS 21 BIN
 B107A F**TANGENT*COTANGENT ROUTINE
 B107A G*ON DISK F4 COMPAT WU 04/05/72REV.2 DECK 04/05/72REV.2
 B107A 1*FORM: Y=TAN(X)
 B107A 2* Y=COT(X)
 B107A 3* Y=COTAN(X)
 B107A 4*PURPOSE: COMPUTE TANGENT OR COTANGENT OF
 B107A 5* FLOATING POINT ARGUMENT X
 B107A 6*ROUTINE NAME: TAN
 B107A 7*ENTRY NAMES: TAN, COT, COTAN
 B107A 8*STORAGE: 310 (OCTAL) WORDS
 B107A 9*ROUTINES CALLED: LABRT(N103A)

B107B A* PAUL N.IWANCHUK C-4 I. CHERRY 72
 B107B B*FLOATING POINT TANGENT OR COTANGENT ROUTINE
 B107B C*F-4 SR7600 CROS
 B107B D* SW 3 LS 2 TYPE 1
 B107B E*SOURCE CARDS 64 BCD OBJECT CARDS 22 BIN
 B107B F**TANGENT*COTANGENT ROUTINE
 B107B G*ON DISK F4 COMPAT WU 10/12/72REV 1 DECK 10/12/72REV 1
 B107B 1*FORM: Y=TAN(X)
 B107B 2* Y=COT(X)
 B107B 3* Y=COTAN(X)
 B107B 4*PURPOSE: COMPUTE TANGENT OR COTANGENT OF FLOATING POINT
 B107B 5* ARGUMENT X.
 B107B 6*ROUTINE NAME: TAN
 B107B 7*ENTRY NAMES: TAN, COT, COTAN
 B107B 8*STORAGE: 334 OCTAL WORDS.
 B107B 9*ROUTINES CALLED: LABRT(N103B), LIRMSG(SYSTEM).

B108A A* B. L. BUZBEE C-4 67
 B108A B*ARCSINE OR ARCCOSINE
 B108A C*CMP SR6600 SCP 3.1
 B109A D* SW 3 LS 4 TYPE 1
 B108A E*CMP SOURCE CARDS 159 BCD OBJECT CARDS 10 BIN
 B108A F**ARCSINE*ARCCOSINE*INVERSE FUNCTION
 B108A G*ON DISK F4 COMPAT WU 08/02/71REV 2 DECK 08/02/71REV 2
 B108A 1*FORM: Z=ASIN(X), Z=ARSIN(X), Z=ARCSIN(X,B)
 B108A 2* Z=ACOS(X), Z=ARCOS(X), Z=ARCCOS(X,B)
 B108A 3*PURPOSE: ARCSINE OR ARCCOSINE OF A REAL ARGUMENT.
 B108A 4*ROUTINE NAME: ASIN
 B108A 5*ENTRY NAMES: ASIN, ARSIN, ARCSIN, ACOS, ARCOS, ARCCOS
 B108A 6*RELATIVE ERROR APPROXIMATELY 1.1E-14.
 B108A 7*STORAGE: 123 (OCTAL) WORDS.
 B108A 8*ROUTINES CALLED: LABRT(N103A), SQRT(B408A).

B108B A* B.L.BUZBEE C-4 72
 B108B B*ARCSINE OR ARCCOSINE
 B108B C*CMP SR7600 CROS
 B108B D* SW 3 LS 5 TYPE 1
 B108B E*CMP SOURCE CARDS 159 BCD OBJECT CARDS 10 BIN
 B108B F**ARCSINE*ARCCOSINE*INVERSE FUNCTION
 B108B G*ON DISK F4 COMPAT WU 08/09/72 DECK 08/09/72
 B108B 1*FORM: Z=ASIN(X), Z=ARSIN(X), Z=ARCSIN(X,B)
 B108B 2* Z=ACOS(X), Z=ARCOS(X), Z=ARCCOS(X,B)
 B108B 3*PURPOSE: ARCSINE OR ARCCOSINE OF A REAL ARGUMENT.
 B108B 4*ROUTINE NAME: ASIN
 B108B 5*ENTRY NAMES: ASIN, ARSIN, ARCSIN, ACOS, ARCOS, ARCCOS
 B108B 6*RELATIVE ERROR APPROXIMATELY 1.1E-14.
 B108B 7*STORAGE: 123 OCTAL WORDS.
 B108B 8*ROUTINES CALLED: LABRT(N103B), SQRT(B408B).

B109A A* J. L. DURAN T-1 68
 B109A 0*SINE OR COSINE OF A COMPLEX NUMBER
 B109A B*MATH B1 COMPASS SR6600 SCOPE
 B109A C* SW 2 LS 2
 B109A D*COMPASS SYMBOLIC 64BCDRELOCATABLE COL BIN 5BIN
 B109A S*COMPLEX*SINE*COMPLEX*COSINE
 B109A 10*ON DISK F4 COMPAT WU 02/23/68 DECK 02/21/68
 B109A 11*F=CSIN(Z) OR F=CCOS(Z). Z AND F ARE COMPLEX NUMBERS.
 B109A 12*STORAGE 36 WORDS
 B109A 13*USES SIN(B106A), COS(B106A), SINH(B203A), COSH(B203A).

B2 HYPERBOLIC FUNCTIONS

REVIEWER: WAYNE FULLERTON, C-4

B203A A* J.L. DURAN T-1 68
 B203A 0*HYPERBOLIC SINE AND COSINE
 B203A B*MATH B2 COMPASS SR6600 SCOPE
 B203A C* SW 2 LS 2
 B203A 0*COMPASS SYMBOLIC 81BCDRELOCATABLE COL BIN SBIN
 B203A S*HYPERBOLIC*SINE AND*COSINE
 B203A 10*ON DISK F4 COMPAT WU 02/07/68 REV DECK 01/31/68 REV
 B203A 11*Y=SINH(X) OR Y=COSH(X) WHERE X IS A NORMALIZED FLOATING
 B203A 12*POINT ARGUMENT.
 B203A 13*STORAGE 42 FULL WORDS.
 B203A 14*THIS ROUTINE USES EXP(B306A).

B203B A* J.L. DURAN C-4 I. CHERRY 72
 B203B 0*HYPERBOLIC SINE AND COSINE
 B203B C*COMPASS SR7600 CROS
 B203B D* SW 2 LS 3 TYPE 1
 B203B E*CMP SOURCE CARDS 99 BCD OBJECT CARDS BIN
 B203B F**SINE*COSINE*HYPERBOLIC SINE AND *HYPERBOLIC COSINE
 B203B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 B203B 1*FORM: Y=SINH(X)
 B203B 2* Y=COSH(X)
 B203B 3*PURPOSE: COMPUTE HYPERBOLIC SINE OR COSINE OF NORMALIZED
 B203B 4* FLOATING POINT ARGUMENT.
 B203B 5*ROUTINE NAME: SINH
 B203B 6*ENTRY NAMES: SINH,COSH
 B203B 7*STORAGE: 60 OCTAL WORDS.
 B203B 8*ROUTINES CALLED: EXP(B306B), LIBMSG(SYSTEM).

B204A A* W.FULLERTON T-4 I CHERRY C-4 67
 B204A B*HYPERBOLIC TANGENT
 B204A C*COMPASS SR6600 SCP 3.1
 B204A D* SW 6 LS 2 TYPE 1
 B204A E*SOURCE CARDS 68 BCD OBJECT CARDS 5 BIN
 B204A F**HYPERBOLIC TANGENT
 B204A G*ON DISK F4 COMPAT WU 12/22/72REV.2 DECK 12/22/72REV.2
 B204A 1*FORM: $Y = \text{TANH}(X)$
 B204A 2*PURPOSE: COMPUTE THE SINGLE PRECISION VALUE OF THE
 B204A 3* HYPERBOLIC TANGENT.
 B204A 4*ROUTINE NAME: TANH
 B204A 5*ENTRY NAME: TANH
 B204A 6*STORAGE: 30 OCTAL WORDS
 B204A 7*ROUTINES CALLED: EXP(B306A)

B204B A* W.FULLERTON T-4 I CHERRY C-4 72
 B204B B*HYPERBOLIC TANGENT
 B204B C*COMPASS SR7600 CROS
 B204B D* SW 6 LS 2 TYPE 1
 B204B E*SOURCE CARDS 68 BCD OBJECT CARDS 5 BIN
 B204B F**HYPERBOLIC TANGENT
 B204B G*ON DISK F4 COMPAT WU 12/22/72 DECK 12/22/72
 B204B 1*FORM: $Y = \text{TANH}(X)$
 B204B 2*PURPOSE: COMPUTE THE SINGLE PRECISION VALUE OF THE
 B204B 3* HYPERBOLIC TANGENT.
 B204B 4*ROUTINE NAME: TANH
 B204B 5*ENTRY NAME: TANH
 B204B 6*STORAGE: 30 OCTAL WORDS
 B204B 7*ROUTINES CALLED: EXP(B306B)

B206A A* J. L. DURAN C-4 68
 B206A 0*DOUBLE PRECISION HYPERBOLIC TANGENT
 B206A B*MATH B2 COMPASS SR6600 SCOPE
 B206A C* SW 2 LS 2
 B206A D*COMPASS SYMBOLIC 82BCDRELOCATABLE COL. BIN 4BIN
 B206A S*HYPERBOLIC*TANGENT*DOUBLE*PRECISION
 B206A 10*ON DISK F4 COMPAT WU 01/16/68 DECK 01/16/68
 B206A 11* $F = \text{DTANH}(X)$. X AND F ARE DOUBLE PRECISION NORMALIZED FLOATING
 B206A 12*POINT NUMBERS.
 B206A 13*STORAGE 31 WORDS
 B206A 14*USES DEXP(B308A).

B3

EXPONENTIAL AND LOGARITHMIC FUNCTIONS

REVIEWER: WAYNE FULLERTON, C-4

B305A A* A. SOLEM C-4 W. FULLERTON 73
 B305A B*NATURAL LOGARITHM OR LOG TO THE BASE 10
 B305A C*CMP SR6600 SCP 3.1
 B305A D* SW 1 LS 4 TYPE 1.1
 B305A E* SOURCE 121 CARD OBJECT 7 CARD
 B305A F**NATURAL*LOGARITHM *BASE 10
 B305A G*DISK F4 COMPAT WU 04/25/73 DECK 04/25/73
 B305A 1*FORM: Y = ALOG (X)
 B305A 2* Y = ALOG10 (X)
 B305A 3*PURPOSE: ALOG COMPUTES THE NATURAL LOGARITHM.
 B305A 4* ALOG10 COMPUTES THE LOGARITHM TO THE BASE 10.
 B305A 5*ROUTINE NAME: ALNLOG
 B305A 6*ENTRY NAMES: ALOG, ALOG10
 B305A 7*STORAGE: 67 OCTAL WORDS
 B305A 8*ROUTINES CALLED: SYSTEM(SYSTEM)

B305B A* A. SOLEM C-4 W. FULLERTON 73
 B305B B*NATURAL LOGARITHM OR LOG TO THE BASE 10
 B305B C*CMP SR7600 CROS
 B305B D* SW 1 LS 5 TYPE 1.1
 B305B E* SOURCE 140 CARD OBJECT 8 CARD
 B305B F**NATURAL*LOGARITHM *BASE 10
 B305B G*DISK F4 COMPAT WU 04/25/73 DECK 04/25/73
 B305B 1*FORM: Y = ALOG (X)
 B305B 2* Y = ALOG10 (X)
 B305B 3*PURPOSE: ALOG COMPUTES THE NATURAL LOGARITHM.
 B305B 4* ALOG10 COMPUTES THE LOGARITHM TO THE BASE 10.
 B305B 5*ROUTINE NAME: ALNLOG
 B305B 6*ENTRY NAMES: ALOG, ALOG10
 B305B 7*STORAGE: 77 OCTAL WORDS
 B305B 8*ROUTINES CALLED: LIBMSG(SYSTEM), SYSTEM(SYSTEM)

B305C A* A. SOLEM C-4 W. FULLERTON 73
 B305C B*NATURAL LOG OR LOG TO THE BASE 10 FOR LCM ARGUMENT
 B305C C*CMP SR7600 CROS
 B305C D* SW 1 LS 5 TYPE 1.1
 B305C E* SOURCE 154 CARD OBJECT 9 CARD
 B305C F**NATURAL*LOGARITHM *BASE 10*LCM
 B305C G*DISK F4 COMPAT WU 04/25/73 DECK 04/25/73
 B305C 1*FORM: LEXT ALOG LEXT ALOG10
 B305C 2* Y = ALOG (X) Y = ALOG10 (X)
 B305C 3*PURPOSE: ALOG↑ COMPUTES THE NATURAL LOGARITHM.
 B305C 4* ALOG10↑ COMPUTES THE LOGARITHM TO THE BASE 10.
 B305C 5*ROUTINE NAME: ALNLOG↑
 B305C 6*ENTRY NAMES: ALOG↑, ALOG10↑
 B305C 7*STORAGE: 105 OCTAL WORDS
 B305C 8*ROUTINES CALLED: LIBMSG(SYSTEM), SYSTEM(SYSTEM)

B306A A* B.L.BUZZBEE C-4 W. FULLERTON 67
 B306A B*EXPONENTIAL FUNCTION E**X
 B306A C*CMP SR6600 SCP 3.1
 B306A D* SW 2 LS 3 TYPE 1.1
 B306A E*CMP SOURCE CARDS 97 BCD OBJECT CARDS 6
 B306A F**EXPONENTIAL*FUNCTION*E TO THE*X
 B306A G*DISK F4 COMPAT WU 06/15/73 REV.5 DECK 06/25/73 REV.5
 B306A 1*FORM: Y = EXP (X)
 B306A 2*PURPOSE: CALCULATE EXPONENTIAL OF X.
 B306A 3*ROUTINE NAME: EXP
 B306A 4*ENTRY NAME: EXP
 B306A 5*TIMING FOR 6600: 27 MICROSECONDS
 B306A 6*STORAGE: 53 OCTAL WORDS
 B306A 7*ROUTINES CALLED: LABRT(N103A).

B306B A* B.L.BUZZBEE C-4 W. FULLERTON 73
 B306B B*EXPONENTIAL FUNCTION E**X
 B306B C*CMP SR7600 CROS
 B306B D* SW 2 LS 4 TYPE 1.1
 B306B E*CMP SOURCE CARDS 106 BCD OBJECT CARDS 7 BIN
 B306B F**EXPONENTIAL*FUNCTION*E TO THE*X
 B306B G*ON DISK F4 COMPAT WU 04/12/73 DECK 04/12/73
 B306B 1*FORM: Y = EXP (X)
 B306B 2*PURPOSE: CALCULATE EXPONENTIAL OF X.
 B306B 3*ROUTINE NAME: EXP
 B306B 4*ENTRY NAME: EXP
 B306B 5*STORAGE: 56 OCTAL WORDS
 B306B 6*ROUTINES CALLED: LABRT(N103B), LIBMSG(SYSTEM).

B306C A* F.L.BUZZEE C-4 W. FULLERTON 73
 B306C B*EXPONENTIAL FUNCTION E**X ALLOWING LCM ARGUMENT
 B306C C*CMP SR7600 CROS
 B306C D* SW 2 LS 4 TYPE 1.1
 B306C E*CMP SOURCE CARDS 119 BCD OBJECT CARDS 7 BIN
 B306C F**EXPONENTIAL*FUNCTION*E TO THE*X*LCM
 B306C G*ON DISK F4 COMPAT WU 04/12/73 DECK 04/12/73
 B306C 1*FORM: LEXT EXP
 B306C 2* Y = EXP
 B306C 3*PURPOSE: CALCULATE EXPONENTIAL OF X
 B306C 4*ROUTINE NAME: EXP↑
 B306C 5*ENTRY NAME: EXP↑
 B306C 6*STORAGE: 66 OCTAL WORDS
 B306C 7*ROUTINES CALLED: LABRT(N103B), LIBMSG(SYSTEM).

B307A A* J.L.DURAN C-4 67
 B307A O*COMPLEX NATURAL LOG
 B307A B*MATH B3 COMPASS SR6600 SCOPE
 B307A C* SW 2 LS 2
 B307A D*COMPASS SOURCE CARDS 81BCD OBJECT CARDS 6BIN
 B307A S**COMPLEX*NATURAL LOG*SINGLE PRECISION*FORTRAN IV COMPATIBLE
 B307A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 B307A 11*Y=CLOG(Z) WHERE Z IS A COMPLEX ARGUMENT AND Y THE COMPLEX
 B307A 12*RESULT.
 B307A 13*STORAGE 39 WORDS
 B307A 14*ROUTINE USES ALOG(B305A), ATAN2(B104A).

B310A A* J.L. DURAN T-1 68
 B310A O*NATURAL EXPONENTIAL OF A COMPLEX NUMBER
 B310A B*MATH B3 COMPASS SR6600 SCOPE
 B310A C* SW 2 LS 1
 B310A D*COMPASS SYMBOLIC 28BCDRELOCATABLE COL BIN 3BIN
 B310A S*NATURAL*EXPONENTIAL*COMPLEX*NUMBER
 B310A 10*ON DISK F4 COMPAT WU 02/12/68 DECK 02/05/68
 B310A 11*F=CEXP(Z) F AND Z ARE COMPLEX NUMBERS IN NORMALIZED FLOATING
 B310A 12*POINT.
 B310A 13*ERROR MESSAGES CONTROLLED BY EXP AND COS.
 B310A 14*STORAGE 15 FULL WORDS.
 B310A 15*USES EXP(B306A), COS(B106A), SIN(B106A).

8313A A* B.L.BUZZBEE C-4 I CHERRY 72
 8313A B*EVALUATE DX**N WHERE DX IS DOUBLE PREC. AND N IS INTEGER
 8313A C*COMPASS 6600 SCP .1
 8313A D* SW 3 LS 3 TYPE 1
 8313A E*SOURCE CARDS 107 BCD OBJECT CARDS 6 BIN
 8313A F**EXPONENTIATION
 8313A G*ON DISK F4 COMPAT WU 08/10/72 DECK 08/10/72
 8313A 1*FORM: DY=DX**N
 8313A 2*PURPOSE: PERFORM THE FORTRAN OPERATION DX**N WHERE DX
 8313A 3* IS DOUBLE PRECISION AND N IS INTEGER
 8313A 4*ROUTINE NAME: DBAIEX
 8313A 5*ENTRY NAME: DBAIEX
 8313A 6*STORAGE: 57 OCTAL WORDS
 8313A 7*ROUTINES CALLED: SYSTEM (ON SYSTEM)

8313B A* B.L.BUZZBEE C-4 I CHERRY 72
 8313B B*EVALUATE DX**N WHERE DX IS DOUBLE PREC. AND N IS INTEGER
 8313B C*COMPASS 7600 CROS
 8313B D* SW 3 LS 3 TYPE 1
 8313B E*SOURCE CARDS 107 BCD OBJECT CARDS 6 BIN
 8313B F**EXPONENTIATION
 8313B G*ON DISK F4 COMPAT WU 08/10/72 DECK 08/10/72
 8313B 1*FORM: DY=DX**N
 8313B 2*PURPOSE: PERFORM THE FORTRAN OPERATION DX**N WHERE DX
 8313B 3* IS DOUBLE PRECISION AND N IS INTEGER
 8313B 4*TIMING: .9 MICROSECONDS FOR N=2.
 8313B 5*ROUTINE NAME: DBAIEX
 8313B 6*ENTRY NAME: DBAIEX
 8313B 7*STORAGE: 57 OCTAL WORDS
 8313B 8*ROUTINES CALLED: SYSTEM (ON SYSTEM)

B4 ROOTS AND POWERS

REVIEWER: WAYNE FULLERTON, C-4

B407A A* B.L. BUZBEE C-4 C. HAMILTON 67
 B407A B*CUBE ROOT FORTRAN IV SINGLE PRECISION
 B407A C*COMPASS SR6600 SCP 3.1
 B407A D* SW 2 LS 2 TYPE 1
 B407A E*SOURCE CARDS 76 BCD OBJECT CARDS 5 BIN
 B407A F**CUBE*ROOT FORTRAN IV SINGLE PRECISION
 B407A G*CARDS F4 COMPAT WU 11/11/69REV 1 DECK 11/11/69REV 1
 B407A 1*Y=CUBRT(X) OR Y=QBRT4(X).
 B407A 2*PURPOSE-COMPUTES THE CUBE ROOT OF X.
 B407A 3*STORAGE-37 (OCTAL) WORDS. TIMING: 30 MICROSECONDS.
 B407A 4*SELF CONTAINED.

B408A A* C-4 W. FULLERTON 67
 B408A H*SQUARE ROOT
 B408A C*COMPASS SR6600 SCP 3.1
 B408A D* SW 2 LS 3 TYPE 1.1
 B408A E*SOURCE CARDS 89 BCD OBJECT CARDS 7 BIN
 B408A F**SQUARE ROOT
 B408A G*ON DISK F4 COMPAT WU 04/20/73REV.7 DECK 12/03/70REV.5
 B408A 1*FORM: Y = SQRT (X)
 B408A 2*PURPOSE: COMPUTE SQUARE ROOT OF FLOATING POINT
 B408A 3* VALUE WITHIN RELATIVE ERROR OF APPROXIMATELY 1.2E-14.
 B408A 4*TIMING: APPROXIMATELY 20 MICROSECONDS
 B408A 5*ROUTINE NAME: SQRT
 B408A 6*ENTRY NAME: SQRT
 B408A 7*STORAGE: 56 OCTAL WORDS
 B408A 8*ROUTINES CALLED: LABRT(N103A),OUTPTS(SYSTEM)

B408B A* C-4 W. FULLERTON 73
 B408B B*SQUARE ROOT
 B408B C*COMPASS SR7600 CROS
 B408B D* SW 2 LS 3 TYPE 1.1
 B408B E*SOURCE CARDS 101 BCD OBJECT CARDS 7 BIN
 B408B F**SQUARE ROOT
 B408B G*ON DISK F4 COMPAT WU 04/20/73 DECK 04/20/73
 B408B 1*FORM: $Y = \sqrt{X}$
 B408B 2*PURPOSE: COMPUTE SQUARE ROOT OF FLOATING POINT
 B408B 3* VALUE WITHIN RELATIVE ERROR OF APPROXIMATELY $1.2E-14$.
 B408B 4*ROUTINE NAME: SQRT
 B408B 5*ENTRY NAME: SQRT
 B408B 6*STORAGE: 63 OCTAL WORDS
 B408B 7*ROUTINES CALLED: LABRT(N103B),OUTPTS(SYSTEM,LIBMSG(SYSTEM)).

B408C A* C-4 W. FULLERTON 73
 B408C B*SQUARE ROOT ALLOWING LCM ARGUMENT
 B408C C*COMPASS SR7600 CROS
 B408C D* SW 2 LS 3 TYPE 1.1
 B408C E*SOURCE CARDS 114 BCD OBJECT CARDS 8 BIN
 B408C F**SQUARE ROOT*LCM
 B408C G*ON DISK F4 COMPAT WU 04/20/73 DECK 04/20/73
 B408C 1*FORM: LEXT SQRT
 B408C 2* $Y = \sqrt{X}$
 B408C 3*PURPOSE: COMPUTE SQUARE ROOT OF FLOATING POINT VALUE
 B408C 4* WHICH MAY BE IN SCM OR LCM WITHIN RELATIVE ERROR OF
 B408C 5* APPROXIMATELY $1.2E-14$.
 B408C 6*ROUTINE NAME: SQRT↑
 B408C 7*ENTRY NAME: SQRT↑
 B408C 8*STORAGE: 72 OCTAL WORDS
 B408C 9*ROUTINES CALLED: LABRT(N103B),OUTPTS(SYSTEM,LIBMSG(SYSTEM)).

B409A A* B.L.BUZZBEE C-4 IVAN CHERRY 68
 B409A H*COMPLEX SQUARE ROOT OF A COMPLEX NUMBER
 B409A C*COMPASS SR6600 SCP 3.1
 B409A D* SW 2 LS 2 TYPE 1
 B409A E*SOURCE CARDS 75 BCD OBJECT CARDS 6 BIN
 B409A F**COMPLEX*SQUARE*ROOT
 B409A G*ON DISK F4 COMPAT WU 10/03/72REV.6 DECK 05/03/72REV 4
 B409A 1*FORM: $Y = \text{CSQRT}(Z)$
 B409A 2*PURPOSE: COMPUTE COMPLEX SQUARE ROOT Y OF COMPLEX
 B409A 3* ARGUMENT Z.
 B409A 4*TIMING: 58 MICROSECONDS
 B409A 5*ROUTINE NAME: CSQRT
 B409A 6*ENTRY NAME: CSQRT
 B409A 7*STORAGE 41 OCTAL WORDS
 B409A 8*ROUTINES CALLED: SQRT(B408A)

B409B A* B.L.BUZBEE C-4 IVAN CHERRY 72
 B409B B*COMPLEX SQUARE ROOT OF A COMPLEX NUMBER
 B409B C*COMPASS SR7600
 B409B D* SW 2 LS 2 TYPE 1
 B409B E*SOURCE CARDS 75 BCD OBJECT CARDS 6 BIN
 B409B F**COMPLEX*SQUARE*ROOT
 B409B G*ON DISK F4 COMPAT WU 10/03/72REV.3 DECK 05/03/72REV 1
 H409B 1*FORM: $Y = \text{CSQRT}(Z)$
 B409B 2*PURPOSE: COMPUTE COMPLEX SQUARE ROOT Y OF COMPLEX
 H409B 3* ARGUMENT Z.
 B409B 4*TIMING: 14 MICROSECONDS
 B409B 5*ROUTINE NAME: CSQRT
 B409B 6*ENTRY NAME: CSQRT
 B409B 7*STORAGE 41 OCTAL WORDS
 B409B 8*ROUTINES CALLED: SQRT(B409B)

B413A A* B.L. BUZBEE C-4 68
 B413A B*FOURTH ROOT OF X
 B413A C*CMP SR6600 SCP 3.1
 B413A D* SW 2 LS 2 TYPE 1
 B413A E*CMP SOURCE CARDS 61 BCD OBJECT CARDS 5 BIN
 B413A F**ROOT*FOURTH ROOT OF X
 B413A G*ON DISK F4 COMPAT WU 10/24/72REV 2 DECK 10/24/72REV 1
 B413A 1*FORM: $Y = \text{FOURROT}(X)$
 B413A 2*PURPOSE: OBTAINS THE 4TH ROOT OF X IF X IS NON-NEGATIVE;
 B413A 3* IF X IS NEGATIVE, THE RESULT IS INDETERMINATE.
 B413A 4*ACCURACY: MAXIMUM OBSERVED RELATIVE ERROR IS $3.E-14$.
 H413A 5*TIMING = 30 MICROSECONDS
 H413A 6*ROUTINE NAME: FOURROT
 B413A 7*ENTRY NAME: FOURROT
 B413A 8*STORAGE: 35 OCTAL WORDS
 B413A 9*SELF-CONTAINED.

B413B A* B.L. BUZBEE C-4 72
 B413B B*FOURTH ROOT OF X
 B413B C*CMP SR7600 CROS
 B413B D* SW 2, LS 2 TYPE 1
 B413B E*CMP SOURCE CARDS 61 BCD OBJECT CARDS 5 BIN
 B413B F**ROOT*FOURTH ROOT OF X
 B413B G*ON DISK F4 COMPAT WU 10/24/72 DECK 10/24/72
 B413B 1*FORM: $Y = \text{FOUROT}(X)$
 B413B 2*PURPOSE: OBTAINS THE 4TH ROOT OF X IF X IS NON-NEGATIVE;
 B413B 3* IF X IS NEGATIVE, THE RESULT IS INDETERMINATE.
 B413B 4*ACCURACY: MAXIMUM OBSERVED RELATIVE ERROR IS $3.E-14$.
 B413B 5*TIMING = 7.2 MICROSECONDS
 B413B 6*ROUTINE NAME: FOUROT
 B413B 7*ENTRY NAME: FOUROT
 B413B 8*STORAGE: 35 OCTAL WORDS
 B413B 9*SELF-CONTAINED.

B4AA A* B.L. BUZBEE C-4 J.L. DURAN 72
 B4AA B*COMPLEX SQUARE ROOT OF A COMPLEX NUMBER
 B4AA C*COMPASS SR6600 SCP 3.1
 B4AA D* SW 2 LS 2 TYPE 2
 B4AA E*CMP SOURCE CARDS 81 BCD OBJECT CARDS 6 BIN
 B4AA F**COMPLEX*SQUARE*ROOT
 B4AA G*CARDS F4 COMPAT WU 05/03/72 DECK 05/03/72
 B4AA 1*FORM: $Y = \text{CSQRT}(Z)$
 B4AA 2*PURPOSE: COMPUTE COMPLEX SQUARE ROOT Y OF COMPLEX
 B4AA 3* ARGUMENT Z. THE RESULT IS ON THE FIRST RIEMANN SHEET.
 B4AA 4*TIMING: 58 MICROSECONDS
 B4AA 5*ROUTINE NAME: CSQRT
 B4AA 6*ENTRY NAME: CSQRT
 B4AA 7*STORAGE: 42 OCTAL WORDS
 B4AA 8*ROUTINES CALLED: SQRT(B408A).

C

POLYNOMIALS AND SPECIAL FUNCTIONS

C1 EVALUATION OF POLYNOMIALS

REVIEWER: J. HANCOCK, C-4

C106A A* R. M. FRANK C-4 D. WILLIAMS 67
 C106A O*POLYNOMIAL COEFFICIENT GENERATOR
 C106A B*MATHEMATICS C1 F4 SR6600 SCOPE
 C106A C* SW 2 LS 1
 C106A D*F4 SOURCE CARDS 24BCDBINARY DECK 9BIN
 C106A S**POLYNOMIAL*COEFFICIENT GENERATOR
 C106A I0*CARDS F4 COMPAT WU 09/18/67 REV DECK 05/04/67
 C106A I1*CALL GENPOL(N,R,P,C) GENERATES THE COEFFICIENTS OF AN NTH
 C106A I2*ORDER POLYNOMIAL WHOSE ROOTS ARE STORED IN REAL ARRAY
 C106A I3*R, OF DIMENSION N. P IS A TEMPORARY DBL PREC ARRAY OF DIM. 2N.
 C106A I4*C IS AN ARRAY OF DIMEN. N+1 CONTAINING THE CALCULATED
 C106A I5*COEFFICIENTS.
 C106A I6*STORAGE= 145 (8) WORDS.
 C106A I7*SELF CONTAINED.

C107A A* B. BUZBEE T-1 67
 C107A O*POLYNOMIAL COEFFICIENT GENERATOR-DOUBLE PRECISION ROOTS
 C107A B*MATHEMATICS C1 F4 SR6600 SCOPE
 C107A C* SW 2 LS 1
 C107A D*SOURCE DECK 24BCDBINARY DECK 9BIN
 C107A S**POLYNOMIAL*COEFFICIENT GENERATOR IN DOUBLE PRECISION
 C107A I0*CARDS F4 COMPAT WU 05/04/67 DECK 05/04/67
 C107A I1*CALL GENPDP(N,R,P,C)
 C107A I2*PURPOSE - TO GENERATE THE COEFFICIENTS OF A POLYNOMIAL WHOSE
 C107A I3* ROOTS ARE GIVEN IN DOUBLE PRECISION AND ARE REAL.
 C107A I4* N - NUMBER OF ROOTS
 C107A I5* R - P, AND C ARE ALL DOUBLE PRECISION ARRAYS:
 C107A I6* R - ARRAY OF ROOTS OF DIMENSION N
 C107A I7* P - ARRAY OF 2N WORDS OF TEMPORARY STORAGE
 C107A I8* C - ARRAY OF CALCULATED COEFFICIENTS, OF DIMENSION N+1,
 C107A I9* WHERE $C(1)=A_0$, $C(2)=A_1, \dots, C(N+1)=A_N$
 C107A I20*STORAGE=147 WORDS.
 C107A I21*SELF CONTAINED.

C108A A* B. BUZBEE T-1 67
 C108A 0*POLYNOMIAL COEFFICIENT GENERATOR-COMPLEX ROOTS
 C108A B*MATHEMATICS C1 F4 SR6600 SCOPE
 C108A C* SW 2 LS 1
 C108A D*SOURCE DECK 24BCDBINARY DECK 9BIN
 C108A S**POLYNOMIAL*COEFFICIENT GENERATOR FOR*COMPLEX ROOTS
 C108A 10*CARDS F4 COMPAT WU 05/04/67 DECK 05/04/67
 C108A 11*CALL GNCPX(N,R,P,C)
 C108A 12*PURPOSE - TO GENERATE THE COEFFICIENTS OF A POLYNOMIAL WHOSE
 C108A 13* ROOTS ARE GIVEN AND ARE COMPLEX.
 C108A 14* N - THE NUMBER OF ROOTS
 C108A 15* R, P, AND C ARE COMPLEX ARRAYS:
 C108A 16* R - ROOTS, OF DIMENSION N
 C108A 17* P - 2N WORDS OF TEMPORARY STORAGE
 C108A 18* C - CALCULATED COEFFICIENTS OF DIMENSION N+1, WHERE
 C108A 19* C(1)=A0=1.0, C(2)=A1, . . . , C(N+1)=AN
 C108A 20*STORAGE=144 WORDS.
 C108A 21*SELF CONTAINED.

C112A *(PSI) HAS BEEN REDESIGNATED C312A

C2 ROOTS OF POLYNOMIALS

REVIEWER: J. HANCOCK, C-4

C205A *(SRPOLY) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED C2AA.

C206A A* B.L. HUZBEE C-4 D. WILLIAMS 67
 C206A R*ZEROS OF REAL POLYNOMIALS
 C206A C*MATHEMATICS SR6600 SCP. 3.1
 C206A D SW 2 LS 3
 C206A E*SOURCE CARDS 167 BCU OBJECT CARDS 38 BIN
 C206A F**ZEROS OF REAL*POLYNOMIALS
 C206A G*ON DISK F4 COMPAT WU 01/28/69REV2 DECK 01/28/69REV2
 C206A 1*CALL RPOLY(N,P,T,R,IE) FINIS THE ZEROS OF A REAL NTH ORDER
 C206A 2*POLYNOMIAL.
 C206A 3*STORAGE=512 WORDS.
 C206A 4*USES SQR(8408A).

C207A *(SCPOLY) DEMOTED TO TYPE 2 STATUS AND IS NOW C2AB.

C208A *(DRPOLY) DEMOTED TO TYPE 2 STATUS AND IS NOW C2AC.

C209A *(DCPOLY) DEMOTED TO TYPE 2 STATUS AND IS NOW C2AD.

C210A A* B. L. BUZBEE T-1 D. WILLIAMS 67
 C210A 0*MTH DERIVATIVE EVALUATION OF REAL (SP) POLYNOMIAL
 C210A B*MATHEMATICS C2 F4 SR6600 SCOPE
 C210A C* SW 2 LS 1
 C210A D*F4 SOURCE CARDS 19BCDF4 OBJECT CARDS 9BIN
 C210A S*MTH*DERIVATIVE*EVALUATION OF A REAL SINGLE PRECISION*POLYNOMIAL
 C210A 10*CARDS F4 COMPAT WU 09/18/67 REV DECK 01/10/67
 C210A 11*CALL SRPOLE(N,M,SR,DP,Z,Y) EVALUATES THE MTH DERIVATIVE OF
 C210A 12*A NTH DEGREE REAL POLYNOMIAL WITH SINGLE PRECISION COEFF-
 C210A 13*ICIENTS.
 C210A 14*STORAGE=110 WORDS.
 C210A 15*USES LAHRT(N103A),DCPOLE(C213A).

C211A A* B L BUZBEE T-1 67
 C211A 0*MTH DERIVATIVE EVALUATION OF A COMPLEX (SP) POLYNOMIAL
 C211A B*MATHEMATICS C2 F4 SR6600 SCOPE
 C211A C* SW 2 LS 1
 C211A D*F4 SOURCE CARDS 18BCDF4 OBJECT CARDS 10BIN
 C211A S*MTH*DERIVATIVE*EVALUATION OF COMPLEX (SP)*POLYNOMIAL
 C211A 10*CARDS F4 COMPAT WU 01/18/67 DECK 01/18/67
 C211A 11*CALL SCPOLE(N,M,SC,DP,Z,Y) EVALUATES THE MTH DERIVATIVE OF A
 C211A 12*NTN DEGREE COMPLEX POLYNOMIAL WITH SINGLE PRECISION COEFF-
 C211A 13*ICIENTS.
 C211A 14*STORAGE=126 WORDS.
 C211A 15*USES DCPOLE(C213A).

C212A A* B L BUZBEE T-1 67
 C212A 0*MTH DERIVATIVE EVALUATION OF A REAL (DP) POLYNOMIAL
 C212A B*MATHEMATICS C2 F4 SR6600 SCOPE
 C212A C* SW 2 LS 1
 C212A D*F4 SOURCE CARDS 14BCDF4 OBJECT CARDS 58IN
 C212A S*MTH*DERIVATIVE*EVALUATION OF A REAL (DP)*POLYNOMIAL
 C212A 10*CARDS F4 COMPAT WU 01/18/67 DECK 01/18/67
 C212A 11*CALL DRPOLE(N,M,DR,DP,DZ,DY) EVALUATES THE MTH DERIVATIVE OF
 C212A 12*A NTH DEGREE REAL POLYNOMIAL WITH DOUBLE PRECISION COEFF-
 C212A 13*ICIENTS.
 C212A 14*STORAGE=49 WORDS.
 C212A 15*USES DCPOLE(C213A).

C213A A* B L BUZBEE C-4 67
 C213A 0*MTH DERIVATIVE EVALUATION OF A COMPLEX (DP) POLYNOMIAL
 C213A B*MATHEMATICS C2 F4 SR6600 SCOPE
 C213A C* SW 2 LS 1
 C213A D*F4 SOURCE CARDS 41BCDF4 OBJECT CARDS 158IN
 C213A S*MTH*DERIVATIVE*EVALUATION OF A COMPLEX (DP) POLYNOMIAL
 C213A 10*CARDS F4 COMPAT WU 07/15/68 REV DECK 07/11/68 REV
 C213A 11*CALL DCPOLE(N,M,DC,DP,DZ,DY) EVALUATES THE MTH DERIVATIVE OF
 C213A 12*A NTH DEGREE COMPLEX POLYNOMIAL WITH DOUBLE PRECISION COEFF-
 C213A 13*ICIENTS.
 C213A 14*STORAGE= 180 WORDS.
 C213A 15*USES LABRT(N103A).

C214A A* JOHN HANCOCK C-4 70
 C214A B*DCPTACO - POLYNOMIAL AND DERIVATIVES WITH ERROR BOUNDS
 C214A C*F4 SR6600 SCP 3.1
 C214A D* SW 3 LS 1 TYPE 1
 C214A E*SOURCE CARDS 51 BCD OBJECT CARDS 46 BIN
 C214A F**DCPTACO*TAYLOR*SERIES*COEFFICIENT*DOUBLE PRECISION
 C214A G*CARDS F4 COMPAT WU 05/06/70 DECK 05/06/70
 C214A 1*CALL NAME: CALL DCPTACO(N,M,A,Z,C,E)
 C214A 2*PURPOSE: SIMULTANEOUS EVALUATION OF FIRST M+1 TAYLOR SERIES
 C214A 3*COEFFICIENTS (ESSENTIALLY THE POLYNOMIAL AND ITS DERIVATIVES)
 C214A 4*OF A COMPLEX POLYNOMIAL P(Z) AT A COMPLEX POINT Z.
 C214A 5*STORAGE: 1136 (OCTAL) WORDS.
 C214A 6*ROUTINES CALLED: LABRT(N103A).

C215A A* JOHN HANCOCK C-4 70
 C215A B*SCPTACO -- POLYNOMIAL AND DERIVATIVES WITH ERROR BOUNDS
 C215A C*F4 SR6600 SCP 3.1
 C215A D* SW 3 LS 1 TYPE 1
 C215A E*SOURCE CARDS 49 BCD OBJECT CARDS 20 BIN
 C215A F**SCPTACO*TAYLOR*SERIES*COEFFICIENT*SINGLE PRECISION
 C215A G*CARDS F4 COMPAT WU 05/06/70 DECK 05/06/70
 C215A 1*CALL NAME: CALL SCPTACO(N,M,A,Z,C,E)
 C215A 2*PURPOSE: SIMULTANEOUS EVALUATION OF FIRST M+1 TAYLOR SERIES
 C215A 3*COEFFICIENTS (ESSENTIALLY THE POLYNOMIAL AND ITS DERIVATIVES)
 C215A 4*OF A COMPLEX POLYNOMIAL P(Z) AT A COMPLEX POINT Z.
 C215A 5*STORAGE: 336 (OCTAL) WORDS.
 C215A 6*ROUTINES CALLED: LABRT(N103A).

C215B A* J HANCOCK C-4 J. HANCOCK 73
 C215B B*SCPTACO--POLYNOMIAL AND DERIVATIVES WITH ERROR BOUNDS
 C215B C*F4 SR7600 CROS
 C215B D* SW 3 LS 2 TYPE 1
 C215B E*SOURCE CARDS 49 BCD OBJECT CARDS 20 BIN
 C215B F**SCPTACO*TAYLOR*SERIES*COEFFICIENT*SINGLE PRECISION
 C215B G*ON DISK F4 COMPAT WU 02/15/73 DECK 02/15/73
 C215B 1*FORM: CALL SCPTACO(N,M,A,Z,C,E)
 C215B 2*PURPOSE: SIMULTANEOUS EVALUATION OF FIRST M+1 TAYLOR
 C215B 3* SERIES COEFFICIENTS (ESSENTIALLY THE POLYNOMIAL
 C215B 4* AND ITS DERIVATIVES) OF A COMPLEX POLYNOMIAL P(Z)
 C215B 5* AT A COMPLEX POINT Z.
 C215B 6*ROUTINE NAME: SCPTACO
 C215B 7*ENTRY NAME: SCPTACO
 C215B 8*STORAGE 372 (OCTAL) WORDS.
 C215B 9*ROUTINES CALLED: LABRT(N103B).

C216A A* B L BUZBEE C-4 J.HANCOCK 71
 C216A B*NEWPOL ZEROS OF A POLYNOMIAL WITH OPTIONAL ERROR BOUNDS
 C216A C*F4 SR6600 SCP 3.1
 C216A D* SW 3 LS 5 TYPE 1
 C216A E*SOURCE CARDS 192 BCD OBJECT CARDS 39 BIN
 C216A F**POLYNOMIAL*ZEROS
 C216A G*CARDS F4 COMPAT WU 01/04/73REV.2 DECK 09/19/72REV.1
 C216A 1*FORM: CALL NEWPOL(N,A,R,T,S,LE)
 C216A 2*PURPOSE: FIND ZEROS OF COMPLEX POLYNOMIAL WITH
 C216A 3* OPTIONAL ERROR BOUNDS
 C216A 4*TIMING: FOR N.LE.5 AND NO INPUT ESTIMATES, EXECUTION TIME IS
 C216A 5* 1 TO 5 MILLISECONDS PER ZERO.
 C216A 6*ROUTINE NAME: NEWPOL
 C216A 7*ENTRY NAME: NEWPOL
 C216A 8*STORAGE: 1006 (OCTAL) WORDS
 C216A 9*ROUTINES CALLED: CABS(A203A), COS(B106A), SIN(B106A),
 C216A 10*ALOG(B305A), EXP(B306A), SCPTACO(C215A).

C216B A* B L BUZBEE C-4 JOHN HANCOCK 72
 C216B B*NEWPOL ZEROS OF A POLYNOMIAL WITH OPTIONAL ERROR BOUNDS
 C216B C*F4 SR7600 CROS
 C216B D* SW 3 LS 5 TYPE 1
 C216B E*F4 SOURCE CARDS 192 BCD OBJECT CARDS 40 BIN
 C216B F**POLYNOMIAL*ZEROS
 C216B G*ON DISK F4 COMPAT WU 01/04/73REV.1 DECK 09/19/72
 C216B 1*FORM: CALL NEWPOL(N,A,R,T,S,LE)
 C216B 2*PURPOSE: FIND ZEROS OF COMPLEX POLYNOMIAL WITH
 C216B 3* OPTIONAL ERROR BOUNDS
 C216B 4*TIMING: FOR N.LE.5 AND NO INPUT ESTIMATES, EXECUTION TIME IS
 C216B 5* LESS THAN 1 MILLISECOND PER ZERO.
 C216B 6*ROUTINE NAME: NEWPOL
 C216B 7*ENTRY NAME: NEWPOL
 C216B 8*STORAGE: 1011 OCTAL WORDS
 C216B 9*ROUTINES CALLED: CABS(A203B), SIN(B106B),
 C216B 10* ALOG(B305B), EXP(B306B), SCPTACO(C215B).

C2AA A* 1 B.L. BUZBEE C-4 72
 C2AA B*ZEROS OF REAL (SP) POLYNOMIAL
 C2AA C*F4 SR6600 SCP 3.1
 C2AA D* SW 2 LS 1 TYPE 2
 C2AA E*F4 SOURCE CARDS 23 BCD OBJECT CARDS 9 BIN
 C2AA F**ZEROS OF REAL (SP)*POLYNOMIAL
 C2AA G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 C2AA 1*FORM: CALL SRPOLY(N,SR,DP,Z,IE)
 C2AA 2*PURPOSE: FIND THE ZEROS OF A REAL POLYNOMIAL WITH SINGLE
 C2AA 3* PRECISION COEFFICIENTS.
 C2AA 4*ROUTINE NAME: SRPOLY
 C2AA 5*ENTRY NAME: SRPOLY
 C2AA 6*STORAGE: 85 OCTAL WORDS.
 C2AA 7*USES: DCPOLY(C2AD).

C2AB A* B.L. BUZBEE C-4 72
 C2AB B*ZEROS OF COMPLEX (SP) POLYNOMIAL
 C2AB C*F4 SR6600 SCP 3.1
 C2AB D* SW 2 LS 1 TYPE 2
 C2AB E*F4 SOURCE CARDS 22 BCD OBJECT CARDS 9 BIN
 C2AB F**ZEROS OF COMPLEX (SP)*POLYNOMIALS
 C2AB G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 C2AB 1*FORM: CALL SCPOLY(N,SC,DP,Z,IE)
 C2AB 2*PURPOSE: FIND THE ZEROS OF A COMPLEX POLYNOMIAL WITH
 C2AB 3* SINGLE PRECISION COEFFICIENTS.
 C2AB 4*ROUTINE NAME: SCPOLY
 C2AB 5*ENTRY NAME: SCPOLY
 C2AB 6*STORAGE: 89 OCTAL WORDS.
 C2AB 7*USES DCPOLY(C2AD).

C2AC A* B.L. BUZBEE C-4 72
 C2AC B*ZEROS OF A REAL (DP) POLYNOMIAL
 C2AC C*F4 SR6600 SCP 3.1
 C2AC D* SW 2 LS 1 TYPE 2
 C2AC E*F4 SOURCE DECK 14 BCD OBJECT DECK 6 BIN
 C2AC F**ZEROS OF A REAL (DP)*POLYNOMIAL
 C2AC G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 C2AC 1*FORM: CALL DRPOLY(N,DBR,DP,DZ,IE)
 C2AC 2*PURPOSE: FIND THE ZEROS OF A REAL POLYNOMIAL WITH DOUBLE
 C2AC 3* PRECISION COEFFICIENTS.
 C2AC 4*ROUTINE NAME: DRPOLY
 C2AC 5*ENTRY NAME: DRPOLY
 C2AC 6*STORAGE: 48 OCTAL WORDS.
 C2AC 7*USES DCPOLY(C2AD).

C2AD A* B.L. BUZBEE C-4 72
C2AD B*ZEROS OF A COMPLEX (DP) POLYNOMIAL
C2AD C*F4 SR6600 SCP 3.1
C2AD D* SW 3 LS 4 TYPE 2
C2AD E*F4 SOURCE CARDS 170 BCD OBJECT CARDS 68 BIN
C2AD F**ZEROS OF A COMPLEX (DP)*POLYNOMIAL
C2AD G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
C2AD 1*FORM: CALL DCPOLY(N,DC,DP,DZ,IE)
C2AD 2*PURPOSE: FIND THE ZEROS OF A COMPLEX POLYNOMIAL WITH
C2AD 3* DOUBLE PRECISION COEFFICIENTS.
C2AD 4*ROUTINE NAME: DCPOLY
C2AD 5*ENTRY NAME: DCPOLY
C2AD 6*STORAGE: 1617 OCTAL WORDS.
C2AD 7*USES: DCABS(A202A),USQRT(B410A), AND LABRT(N103A).

C3 EVALUATION OF SPECIAL FUNCTIONS

E.G., BESSEL, GAMMA, ERROR, ELLIPTIC INTEGRALS,
EXPONENTIAL INTEGRALS.

REVIEWER: WAYNE FULLERTON, C-4

C301A A* R. M. FRANK C-4 CHERRY 67
 C301A 0*BESSEL FUNCTION OF THE FIRST KIND FOR INTEGRAL N
 C301A 8*MATHEMATICS C3 F4 SR6600 SCOPE
 C301A C* SW 3 LS 2
 C301A D*F4 SOURCE CARDS 100BCDF4 OBJECT CARDS 24BIN
 C301A S**BESSEL*FUNCTION J
 C301A 10*ON DISK F4 COMPAT WU 09/12/66 DECK 09/08/66
 C301A 11*CALL BESJN(X,N,T,B)
 C301A 12*COMPUTES BESSEL FUNCTION JN(X) FOR N.LE.20 AND ALL X.
 C301A 13*X IS FLOATING-POINT ARGUMENT. N IS THE ORDER.
 C301A 14*T IS TEMPORARY STORAGE OF LENGTH 12*MAX(2X,N).
 C301A 15*B IS THE RESULT.
 C301A 16*STORAGE=296 WORDS
 C301A 17*USES-LABRT(N103A), SIN(B106A),COS(B106A).

C302A A* B.L. RUZBEE C-4 CHERRY 67
 C302A 8*INCOMPLETE GAMMA FUNCTION
 C302A C*FORTRAN IV SR6600 SCP 3.1
 C302A D* SW 3 LS 2 TYPE 1
 C302A E*SOURCE CARDS 88 BCD OBJECT CARDS 46 BIN
 C302A F**GAMMA FUNCTION*INCOMPLETE GAMMA FUNCTION
 C302A G*ON DISK F4 COMPAT WU 09/15/72REV.4 DECK 06/13/68REV 1
 C302A 1*FORM: $Z=GAMMA(A,X)$
 C302A 2*PURPOSE: EVALUATE $(GAMMA)(A,X)$ =THE INTEGRAL FROM
 C302A 3* X TO INFINITY OF $(EXP(-U))*(U**(A-1))*(DU)$
 C302A 4*ERROR CONDITIONS: 1. X.LT.0. 2. A INTEGRAL,NEGATIVE
 C302A 5* AND SMALL VALUES OF X. (SEE WRITEUP)
 C302A 6*ACCURACY: REL. ERROR .LT. 6.E-9.
 C302A 7*ROUTINE NAME: GAMMA
 C302A 8*ENTRY NAME: GAMMA
 C302A 9*STORAGE: 608 (DECIMAL WORDS)
 C302A 10*ROUTINES CALLED: EI(C309A),ALOG(B305A),EXP(B306A),
 C302A 11* LABRT(N103A),GAM1(C325A).

C304A A* KARL J MELENDEZ T-1 68
 C304A 0*COMPLETE AND INCOMPLETE ELLIPTIC INTEGRALS
 C304A B*MATH C3 F4 SR6600 SCOPE
 C304A C* SW 3 LS 2
 C304A D*F4 SOURCE CARDS 92BCDF4 OBJECT CARDS 28BIN
 C304A S**ELLIPTIC*INTEGRALS OF THE FIRST AND SECOND KIND
 C304A 10*CARDS F4 COMPAT WU 02/05/68 DECK 02/05/68
 C304A 11*CALLED BY-CALL ELLI(PHI,CAY,F,E) OR CALL CELLI(PHI,CAY,F,E)
 C304A 12*PURPOSE - TO COMPUTE THE INCOMPLETE OR COMPLETE ELLIPTIC
 C304A 13* INTEGRALS OF THE FIRST AND SECOND KIND.
 C304A 14*PHI - THE UPPER LIMIT OF THE INTEGRAL(A DUMMY VAR IN CELLI).
 C304A 15*CAY - THE PARAMETER IN THE INTEGRAL.
 C304A 16*F - ON RETURN, THE ELLIPTIC INTEGRAL OF THE FIRST KIND.
 C304A 17*E - ON RETURN, THE ELLIPTIC INTEGRAL OF THE SECOND KIND.
 C304A 18*ACCURACY - AT LEAST TEN SIGNIFICANT FIGURES.
 C304A 19*STORAGE - 335 (DEC) WORDS
 C304A 20*USES - LABRT(N103A),SQRT(B408A),SIN(B106A),TAN(B107A),
 C304A 21*ATAN(B104A),ALOG(B305A).

C305A *(BESSJ) DELETED FROM THE LIBRARY-
 C301(BESJN), C328(BJYIK), AND C327(BJSN) ARE RECOMMENDED.

C306A *(BESSY) DELETED FROM THE LIBRARY-
 C301(BESJN), C328(BJYIK), AND C327(BJSN) ARE RECOMMENDED.

C307A *(BESSI) DELETED FROM THE LIBRARY-
 C301(BESJN), C328(BJYIK), AND C327(BJSN) ARE RECOMMENDED.

C308A *(BESSK) DELETED FROM THE LIBRARY-
 C301(BESJN), C328(BJYIK), AND C327(BJSN) ARE RECOMMENDED.

C309A A* CHERRY T-1 67
 C309A 0*EXPONENTIAL INTEGRAL E1(X)
 C309A B*MATH C3 F4 SR6600 SCOPE
 C309A C* SW 2 LS 1
 C309A D*F4 SOURCE 20BCD RELOCATABLE 10BIN
 C309A S**EXPONENTIAL*INTEGRAL*EI
 C309A 10*ON DISK F4 COMPAT WU 09/13/67 REV DECK 06/08/67
 C309A 11*CALLED BY Y=E1(X), X,Y,REAL
 C309A 12*PURPOSE-TO COMPUTE THE EXPONENTIAL INTEGRAL E1(X)
 C309A 13*RELATIVE ERROR ABOUT 1.E-13
 C309A 14*STORAGE-88 WORDS.
 C309A 15*USES-LABRT(N103A), GAMMA(C302A), DLOG(B309A).

C310A A* CHERRY T-1 66
 C310A 0*ERROR FUNCTION
 C310A B*MATH C3 F4 SR6600 SCOPE
 C310A C* SW 2 LS 1
 C310A D*F4 SOURCE DECK 30BCDF4 OBJECT DECK 14BIN
 C310A S**ERROR*FUNCTION*ERF
 C310A 10*ON DISK F4 COMPAT WU 09/18/67 REV DECK 12/30/66
 C310A 11* Y = ERF(X)
 C310A 12*ACCURACY- 6.E-14
 C310A 13*STORAGE - 170 WORDS.
 C310A 14*USES-LABRT(N103A) AND EXP(B306A).

C310B A* I. CHERRY C-4 72
 C310B B*ERF - ERROR FUNCTION
 C310B C*F4 SR7600 CROS
 C310B D* SW 2 LS 1 TYPE 1
 C310B E*F4 SOURCE CARDS 30 BCD OBJECT CARDS 14 BIN
 C310B F**ERROR*FUNCTION
 C310B G*ON DISK F4 COMPAT WU 03/10/72 DECK 03/10/72
 C310B 1*FORM: Y = ERF(X)
 C310B 2*PURPOSE: COMPUTE THE ERROR FUNCTION. SAME AS
 C310B 3* ERF(C310A).
 C310B 4*ACCURACY: 6.0 E-14
 C310B 5*STORAGE: 236 OCTAL WORDS
 C310B 6*ROUTINES CALLED: LABRT(N103A), EXP(B306A).

1 C311A *(LOGGAM) DELETED FROM THE LIBRARY;USE C326 INSTEAD,

C312A A* IVAN CHERRY C-4 72
C312A B*COMPLEX DIGAMMA (PSI) FUNCTION FOR COMPLEX NUMBER Z
C312A C*F4 SR6600 SCP 3.1
C312A D* SW 2 LS 2 TYPE 1
C312A E*F4 SOURCE CARDS 50 RCD OBJECT CARDS 33 BIN
C312A F**COMPLEX*DIGAMMA*PSI FUNCTION
C312A G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
C312A 1*FORM: $Y = \text{PSI}(Z)$
C312A 2*PURPOSE: APPROXIMATES COMPLEX DERIVATIVE OF $\text{ALOG}(\text{GAMMA}(Z))$.
C312A 3*NOTE-PSI MUST BE DECLARED COMPLEX IN A TYPE STATEMENT
C312A 4* IN THE USERS PROGRAM. Y AND Z ARE ALSO COMPLEX.
C312A 5*ROUTINE NAME: PSI
C312A 6*ENTRY NAME: PSI
C312A 7*ACCURACY-8 DECIMAL PLACES.
C312A 8*STORAGE: 428 OCTAL WORDS.
C312A 9*ROUTINES CALLED: LABRT(N103A),DATAN2(B110A),DLOG(B309A).

C313A A* DONALD L WILLIAMST-1 IVAN CHERRY 67
C313A 0*EXPONENTIAL INTEGRAL
C313A H*MATHEMATICS C3 F4 SR6600 SCOPE
C313A C* SW 2 LS 1
C313A D*F4 SOURCE CARDS 9BCDF4 OBJECT CARDS 4BIN
C313A S**EXPONENTIAL*INTEGRAL
C313A 10*CARDS F4 COMPAT WU 03/15/67 DECK 03/15/67
C313A 11*CALLED BY $Y=\text{EXPINT}(N,X)$
C313A 12*ACCURACY--SEE $\text{GAMMA}(A,X)$ (C302A)
C313A 13*STORAGE-44 WORDS.
C313A 14*USES--- $\text{GAMMA}(C302A)$.

C323A A* DONALD L WILLIAMST-1 IVAN CHERRY 67
 C323A 0*BESSEL FUNCTION EVALUATION FOR COMPLEX ARGUMENT AND ORDER
 C323A B*MATHEMATICS C3 F4 SR6600 SCOPE
 C323A C* SW 3 LS 2
 C323A D*F4 SOURCE CARDS 101BCDF4 OBJECT CARDS 56BIN
 C323A S**HESSEL*FUNCTION*EVALUATION FOR*COMPLEX*ARGUMENT AND*ORDER
 C323A 10*CARDS F4 COMPAT WU 09/18/67 REV DECK 05/19/67
 C323A 11*CALL COMBES(Z,ANU,N,BJ,Y)
 C323A 12*PURPOSE-TO COMPUTE N+1 VALUES OF THE BESSEL FUNCTIONS J(Z)
 C323A 13*AND Y(Z) FOR COMPLEX ARGUMENT Z AND COMPLEX ORDERS ANU TO
 C323A 14*ANU+N, BJ-COMPLEX STORAGE FOR J(Z) FOR ORDERS ANU TO ANU+N,
 C323A 15*Y-COMPLEX STORAGE FOR Y(Z) FOR ORDERS ANU TO ANU+N,BJ AND Y
 C323A 16*ARE OF LENGTH L WHERE L.EQ.MAX(N,2*ABS(Z))+13. NOTE-Z,ANU,
 C323A 17*BJ, AND Y MUST BE DECLARED COMPLEX IN A TYPE STATEMENT IN
 C323A 18*THE USERS PROGRAM.
 C323A 19*STORAGE-1630(DECIMAL)WORDS.
 C323A 20*USES-LNGAM(C326A),CLOG(B307A),CEXP(B310A),LABRT(N103A).

C325A A* DONALD L WILLIAMST-1 IVAN CHERRY 67
 C325A 0*GAMMA FUNCTION
 C325A B*MATH C3 F4 SR6600 SCOPE
 C325A C* SW 2 LS 1
 C325A D*F4 SOURCE CARDS 33BCDF4 OBJECT CARDS 14BIN
 C325A S**GAMMA FUNCTION
 C325A 10*ON DISK F4 COMPAT WU 11/13/67 REV DECK 11/09/67 REV
 C325A 11*CALLED BY Z=GAM1(X)
 C325A 12*ERROR CONDITIONS--
 C325A 13* (1) GAM1 ABS(ARG) TOO BIG. SEE WRITEUP.
 C325A 14* (2) GAM1 ARGUMENT A NONPOSITIVE INTEGER.
 C325A 15*ACCURACY-APPROXIMATELY 13 SIGNIFICANT FIGURES.
 C325A 16*STORAGE-151(DECIMAL) WORDS.
 C325A 17*USES LABRT(N103A).

C326A A* DONALD L WILLIAMST-1 IVAN CHERRY 67
 C326A 0*COMPLEX LN GAMMA
 C326A B*MATH C3 F4 SR6600 SCOPE
 C326A C* SW 2 LS 1
 C326A D*F4 SOURCE CARDS 38BCDF4 OBJECT CARDS 16BIN
 C326A S**COMPLEX*LN GAMMA
 C326A 10*ON DISK F4 COMPAT WU 02/06/67 DECK 02/06/67
 C326A 11*CALLED BY Z1=LNGAM(Z),WHERE Z1,Z,AND LNGAM
 C326A 12* ARE DECLARED COMPLEX IN THE USERS PROGRAM.
 C326A 13*ACCURACY-8 DECIMAL PLACES.
 C326A 14*USES-LABRT,CLOG
 C326A 15*STORAGE-198 WORDS.

C327A A* C-4 W. FULLERTON 68
 C327A B*BESSEL FUNCTIONS FOR LARGE REAL ARGUMENTS
 C327A C*F4 SR6600 SCP 3.1
 C327A D* SW 3 LS 1 TYPE 1.1
 C327A E* SOURCE 31 CARDS OBJECT 38 CARDS
 C327A F**BESSEL*FUNCTIONS
 C327A G*DISK F4 COMPAT WU 04/30/73 REV 2 DECK 04/30/73 REV.1
 C327A 1*FORM: CALL BASF(GAMMA,X,FJI,YK,SW)
 C327A 2*PURPOSE: COMPUTE BESSEL FUNCTIONS J AND Y OR I AND K
 C327A 3* FOR LARGE REAL ARGUMENTS.
 C327A 4*ROUTINE NAME: BASF
 C327A 5*ENTRY NAME: BASF
 C327A 6*STORAGE: 742 OCTAL WORDS
 C327A 7*ROUTINES CALLED: DBLE(A105A),DCOS,DEXP,DSIN,DSQRT(ALL ON
 C327A 8* SYSTEM)

C327B A* C-4 W. FULLERTON 73
 C327B B*BESSEL FUNCTIONS FOR LARGE REAL ARGUMENTS
 C327B C*F4 SR7600 CROS
 C327B D* SW 3 LS 1 TYPE 1.1
 C327B E* SOURCE 31 CARDS OBJECT 38 CARDS
 C327B F**BESSEL*FUNCTIONS
 C327B G*DISK F4 COMPAT WU 04/30/73 DECK 04/30/73
 C327B 1*FORM: CALL BASF(GAMMA,X,FJI,YK,SW)
 C327B 2*PURPOSE: COMPUTE BESSEL FUNCTIONS J AND Y OR I AND K
 C327B 3* FOR LARGE REAL ARGUMENTS.
 C327B 4*ROUTINE NAME: BASF
 C327B 5*ENTRY NAME: BASF
 C327B 6*STORAGE: 745 OCTAL WORDS
 C327B 7*ROUTINES CALLED: DBLE(A105B),DCOS,DEXP,DSIN,DSQRT(ALL ON
 C327B 8* SYSTEM)

C328A A* C-4 W. FULLERTON 68
 C328A B*BESSEL FUNCTIONS FOR REAL ORDER AND ARGUMENT
 C328A C*F4 SR6600 SCP 3.1
 C328A D* SW 4 LS 3 TYPE 1.1
 C328A E* SOURCE 127 CARDS OBJECT 76 CARDS
 C328A F**BESSEL FUNCTIONS
 C328A G*DISK F4 COMPAT WU 04/30/73 REV.2 DECK 04/30/73 REV.1
 C328A 1*FORM: CALL BJYIK(X,GAMMA,FN,FJI,YK,SW)
 C328A 2*PURPOSE: COMPUTE A TABLE OF BESSEL FUNCTIONS OF THE
 C328A 3* FIRST AND SECOND KIND OR OF THE MODIFIED FUNCTIONS.
 C328A 4*ROUTINE NAME: BJYIK
 C328A 5*ENTRY NAME: BJYIK
 C328A 6*STORAGE: 1745 OCTAL WORDS
 C328A 7*ROUTINES CALLED: DBLE(A105A),DBAIE(X,B313A),GAMMA(C302A),
 C328A 8* BASF(C327A),DABS,DBAREX,DEXP,DCOS,DSIN,DSQRT(ALL ON SYSTEM)

C328B A* C-4 W. FULLERTON 73
 C328B B*BESSEL FUNCTIONS FOR REAL ORDER AND ARGUMENT
 C328B C*F4 SR7600
 C328B D* SW 4 LS 3 TYPE 1.1
 C328B E* SOURCE 127 CARDS OBJECT 77 CARDS
 C328B F**BESSEL FUNCTIONS
 C328B G*DISK F4 COMPAT WU 04/30/73 DECK 04/30/73
 C328B 1*FORM: CALL BJIYK(X,GAMMA,FN,FJI,YK,SW)
 C328B 2*PURPOSE: COMPUTE A TABLE OF BESSEL FUNCTIONS OF THE
 C328B 3* FIRST AND SECOND KIND OR OF THE MODIFIED FUNCTIONS.
 C328B 4*ROUTINE NAME: BJIYK
 C328B 5*ENTRY NAME: BJIYK
 C328B 6*STORAGE: 1751 OCTAL WORDS
 C328B 7*ROUTINES CALLED: DBLE(A105B),DRAIEX(B313B),GAMMA(C302B),
 C328B 8* BASF(C327B),DABS,DBAREX,DEXP,DCOS,DLOG,DSIN(ALL ON SYSTEM)

C329A *(FFT) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED C3AB.
FFT2(F502A) IS RECOMMENDED.

C329B *(FFT) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED C3AB.
FFT2(F502B) IS RECOMMENDED.

C330A *(RFFT) REDESIGNATED F501A.

C330B *(RFFT) REDESIGNATED F501B.

C331A *(RFSN) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F5AB.
RFTI(F503A) IS RECOMMENDED.

C332A A* C-3 W. FULLERTON 68
 C332A B*COMPLEX BESSEL FUNCTION FOR LARGE ARGUMENT
 C332A C*F4 SR6600 SCP 3.1
 C332A D* SW 2 LS 2 TYPE 1.1
 C332A E* SOURCE 72 CARDS OBJECT 50 CARDS
 C332A F**BESSEL FUNCTIONS
 C332A G*CARDS F4 COMPAT WU 04/30/73 REV.2 DECK 04/30/73 REV.1
 C332A 1*FORM: CALL CBSF(GAMMA,X,FJI,YK,SW)
 C332A 2*PURPOSE: COMPUTE BESSEL FUNCTIONS OF COMPLEX ORDER
 C332A 3* AND ARGUMENT.
 C332A 4*ROUTINE NAME: CBSF
 C332A 5*ENTRY NAME: CBSF
 C332A 6*STORAGE: 1206 OCTAL WORDS
 C332A 7*ROUTINES CALLED: CSQRT(B409A),CEXP(B310A)

C332B A* C-3 W. FULLERTON 73
 C332B B*COMPLEX BESSEL FUNCTION FOR LARGE ARGUMENT
 C332B C*F4 SR7600 CROS
 C332B D* SW 2 LS 2 TYPE 1.1
 C332B E* SOURCE 72 CARDS OBJECT 50 CARDS
 C332B F**BESSEL FUNCTIONS
 C332B G*DISK F4 COMPAT WU 04/30/73 DECK 04/30/73
 C332B 1*FORM: CALL CBSF(GAMMA,X,FJI,YK,SW)
 C332B 2*PURPOSE: COMPUTE BESSEL FUNCTIONS OF COMPLEX ORDER
 C332B 3* AND ARGUMENT.
 C332B 4*ROUTINE NAME: CBSF
 C332B 5*ENTRY NAME: CBSF
 C332B 6*STORAGE: 1211 OCTAL WORDS
 C332B 7*ROUTINES CALLED: CSQRT(B409B),CEXP(B310B)

C333A A* C-3 W. FULLERTON 68
 C333A B*COMPLEX BESSEL FUNCTIONS
 C333A C*F4 SR6600 SCP 3.1
 C333A D* SW 4 LS 3 TYPE 1.1
 C333A E* SOURCE 122 CARDS OBJECT 72 CARDS
 C333A F**BESSEL FUNCTIONS
 C333A G*CARDS F4 COMPAT WU 04/30/73 REV.2 DECK 04/30/73 REV.1
 C333A 1*FORM: CALL CBJYK(X,GAMMA,FN,FJI,YK,SW)
 C333A 2*PURPOSE: COMPUTE A TABLE OF BESSEL FUNCTIONS OF THE
 C333A 3* FIRST AND SECOND KIND OR OF THE MODIFIED FUNCTIONS
 C333A 4*ROUTINE NAME: CBJYK
 C333A 5*ENTRY NAME: CBJYK
 C333A 6*STORAGE: 1666 OCTAL WORDS
 C333A 7*ROUTINES CALLED: CABS(A203A), CSIN/CCOS(B109A), CLOG(B307A),
 C333A 8* CEXP(B310A), LNGAM(C326A), CBSF(C332A)

C333B A* C-3 W. FULLERTON 73
 C333B B*COMPLEX BESSEL FUNCTIONS
 C333B C*F4 SR7600 CROS
 C333B D* SW 4 LS 3 TYPE 1.1
 C333B E* SOURCE 122 CARDS OBJECT 72 CARDS
 C333B F**BESSEL FUNCTIONS
 C333B G*DISK F4 COMPAT WU 04/30/73 DECK 04/30/73
 C333B 1*FORM: CALL CBJYIK(X,GAMMA, FN, FJI, YK, SW)
 C333B 2*PURPOSE: COMPUTE A TABLE OF BESSEL FUNCTIONS OF THE
 C333B 3* FIRST AND SECOND KIND OR OF THE MODIFIED FUNCTIONS
 C333B 4*ROUTINE NAME: CBJYIK
 C333B 5*ENTRY NAME: CBJYIK
 C333B 6*STORAGE: 1672 OCTAL WORDS
 C333B 7*ROUTINES CALLED: CABS(A203H), CSIN/CCOS(B109B), CLOG(B307B),
 C333B 8* CEXP(B310B), LNGAM(C326B), CBSF(C332B)

C334A *(ERFINV) HAS BEEN DEMOTED TO TYPE 2 AND IS NOW C3AD.

C334B *(ERFINV) HAS BEEN DEMOTED TO TYPE 2 AND IS NOW C3AD.

C335A A* B.L. BUZBEE C-4 D. HENDERSON 70
 C335A B*ERROR FUNCTION COMPLEMENT
 C335A C*F4 SR6600 SCP 3.1
 C335A D* SW 3 LS 1 TYPE 1
 C335A E*SOURCE CARDS 39 BCD OBJECT CARDS 18 BIN
 C335A F**ERROR*FUNCTION*COMPLEMENT
 C335A G*CARDS F4 COMPAT WU 12/14/71REV.1 DECK 05/15/70
 C335A 1*FORM: $Y = \text{ERFC}(X)$
 C335A 2* $Y = \text{PQERFC}(X)$
 C335A 3*PURPOSE: COMPUTE ERROR FUNCTION COMPLEMENT
 C335A 4*STORAGE: 257 (OCTAL) WORDS
 C335A 5*TIMING: AVERAGE IS 42 MICROSEC.
 C335A 6*ROUTINES CALLED: ERF(C310A), EXP(B356A)

C335B A* B.L. BUZHEE C-4 I CHERRY 73
 C335B B*ERROR FUNCTION COMPLEMENT
 C335B C*F4 SR7600 CROS
 C335B D* SW 3 LS 2 TYPE 1
 C335B E*SOURCE CARDS 39 BCD OBJECT CARDS 17 BIN
 C335B F**ERROR*FUNCTION*COMPLEMENT
 C335B G*ON DISK F4 COMPAT WU 01/04/73 DECK 01/04/73
 C335B 1*FORM: Y = ERFC(X)
 C335B 2* Y = PQRFC(X)
 C335B 3*PURPOSE: COMPUTE ERROR FUNCTION COMPLEMENT
 C335B 4*ROUTINE NAME: ERFC
 C335B 5*ENTRY NAMES: ERFC,PQRFC
 C335B 6*STORAGE: 262 OCTAL WORDS
 C335B 7*ROUTINES CALLED: ERF(C310B), EXP(H3R6B)

C336B A* B L BUZBEE C-4 71
 C336B B*INCOMPLETE BETA FUNCTION
 C336B C*F4 SR7600 CROS
 C336B D* SW 3 LS 2 TYPE 1
 C336B E*F4 SOURCE CARDS 58 BCD OBJECT CARDS 16 BIN
 C336B F**INCOMPLETE*BETA FUNCTION
 C336B G*ON DISK F4 COMPAT WU 06/28/72REV 1 DECK 12/13/71
 C336B 1*FORM: Z = BETAIC(X,P,Q,RE)
 C336B 2*PURPOSE: EVALUATE INCOMPLETE BETA FUNCTION
 C336B 3*TIMING: FOR 8-DIGIT ACCURACY, AVERAGE 7600 TIME = .35 MS.
 C336B 4*RELATIVE ERROR: SPECIFIED BY USER
 C336B 5*ROUTINE NAME: BETAIC
 C336B 6*ENTRY NAME: BETAIC
 C336B 7*STORAGE: 337 OCTAL WORDS
 C336B 8*ROUTINES CALLED: GAM1(C325B),RBAREX,OUTPTC(ALL ON SYSTEM)

C337A *(FFT2) HAS BEEN REDESIGNATED F502A.

C337B *(FFT2) HAS BEEN REDESIGNATED F502B.

C338A *(RFTI) HAS BEEN REDESIGNATED F503A.

C338B *(RFTI) HAS BEEN REDESIGNATED F503B.

C339A A* B.L. BUZBEE C-3 W. FULLERTON 72
 C339A B*INVERSE ERROR FUNCTION
 C339A C*F4 SR6600 SCP 3.1
 C339A D* SW 2 LS 1 TYPE 1.1
 C339A E*F4 SOURCE CARDS 26 BCD OBJECT CARDS 10 BIN
 C339A F**INVERSE*ERROR*FUNCTION
 C339A G*CARDS F4 COMPAT WU 05/18/73 REV 2 DECK 05/18/73 REV.1
 C339A 1*FORM: $X = \text{ERFI}(Y)$
 C339A 2*PURPOSE: GIVEN Y, DETERMINE X SUCH THAT $Y = \text{ERF}(X)$.
 C339A 3*ROUTINE NAME: ERFI
 C339A 4*ENTRY NAME: ERFI
 C339A 5*STORAGE: 142 OCTAL WORDS.
 C339A 6*ROUTINES CALLED: $\text{ERF}(C310A) \cdot \text{EXP}(B306A)$.

C339B A* B.L. BUZBEE C-3 W. FULLERTON 72
 C339B B*INVERSE ERROR FUNCTION
 C339B C*F4 SR7600 CROS
 C339B D* SW 2 LS 1 TYPE 1.1
 C339B E*F4 SOURCE CARDS 26 BCD OBJECT CARDS 10 BIN
 C339B F**INVERSE*ERROR*FUNCTION
 C339B G*DISK F4 COMPAT WU 05/18/73 REV 2 DECK 05/18/73 REV.1
 C339B 1*FORM: $X = \text{ERFI}(Y)$
 C339B 2*PURPOSE: GIVEN Y, DETERMINE X SUCH THAT $Y = \text{ERF}(X)$.
 C339B 3*ROUTINE NAME: ERFI
 C339B 4*ENTRY NAME: ERFI
 C339B 5*TIMING: AVERAGE 7600 EXECUTION TIME IS .14 MS.
 C339B 6*STORAGE: 142 OCTAL WORDS.
 C339B 7*ROUTINES CALLED: $\text{ERF}(C310B) \cdot \text{EXP}(B306B)$.

C340A A* C-4 W. FULLERTON 73
 C340A B*REAL BESSEL FUNCTION J_0 OF THE ARGUMENT $X.GE.0$
 C340A C*F4 SR6600 SCP 3.1
 C340A D* SW 2 LS 2 TYPE 1.1
 C340A E* SOURCE 92 CARDS OBJECT 27 CARDS
 C340A F**BESSEL FUNCTION
 C340A G*CARDS F4 COMPAT WU 05/14/73 DECK 05/14/73
 C340A 1*FORM: $RJ = FJ_0(X)$
 C340A 2*PURPOSE: COMPUTES THE REAL BESSEL FUNCTION J_0 OF THE
 C340A 3* REAL ARGUMENT $X.GT.0$
 C340A 4*ROUTINE NAME: $FJ_0(X)$
 C340A 5*ENTRY NAME: $FJ_0(X)$
 C340A 6*STORAGE: 440 OCTAL WORDS
 C340A 7*SELF CONTAINED.

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C340B A*                               C=4           W.FULLERTON       73
C340B B*REAL BESSEL FUNCTION J0 OF THE ARGUMENT X.GE.0
C340B C*F4                               SR7600      CROS
C340B D*                               SW 2       LS 2       TYPE 1.1
C340B E*                               SOURCE 92   CARDS       OBJECT 26   CARDS
C340B F**BESSEL FUNCTION
C340B G*DISK           F4 COMPAT WU 05/14/73       DECK 05/14/73
C340B 1*FORM:  RJ=FJ0(X)
C340B 2*PURPOSE:  COMPUTES THE REAL BESSEL FUNCTION J0 OF THE
C340B 3*           REAL ARGUMENT X.GT.0
C340B 4*7600 TIMING:
C340B 5*           7 SECONDS FOR 1000 RANDOM VALUES 0. .LT. X .LE. 30.
C340B 6*           36 SECONDS FOR 5000 RANDOM VALUES 0. .LT. X .LE. 1.
C340B 7*ROUTINE NAME:  FJ0(X)
C340B 8*ENTRY NAME:   FJ0(X)
C340B 9*STORAGE:    440 OCTAL WORDS
C340B 10*SELF CONTAINED.

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C341A A*                               C=4           W.FULLERTON       73
C341A B*REAL BESSEL FUNCTION J1 OF THE ARGUMENT X.GE.0
C341A C*F4                               SR6600      SCP 3.1
C341A D*                               SW 2       LS 2       TYPE 1.1
C341A E*                               SOURCE 92   CARDS       OBJECT 27   CARDS
C341A F**BESSEL FUNCTION
C341A G*CARDS           F4 COMPAT WU 05/14/73       DECK 05/14/73
C341A 1*FORM:  RJ=FJ1(X)
C341A 2*PURPOSE:  COMPUTES THE REAL BESSEL FUNCTION J1 OF
C341A 3*           THE REAL ARGUMENT X.GT.0
C341A 4*ROUTINE NAME:  FJ1(X)
C341A 5*ENTRY NAME:   FJ1(X)
C341A 6*STORAGE:    445 OCTAL WORDS
C341A 7*SELF CONTAINED.

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C341B A* C-4 W.FULLERTON 73
 C341B B*REAL BESSEL FUNCTION J1 OF THE ARGUMENT X.GE.0
 C341B C*F4 SR7600 CROS
 C341B D* SW 2 LS 2 TYPE 1.1
 C341B E* SOURCE 92 CARDS OBJECT 27 CARDS
 C341B F**BESSEL FUNCTION
 C341B G*DISK F4 COMPAT WU 05/14/73 DECK 05/14/73
 C341B 1*FORM: RJ=FJ1(X)
 C341B 2*PURPOSE: COMPUTES THE REAL BESSEL FUNCTION J1 OF
 C341B 3* THE REAL ARGUMENT X.GT.0
 C341B 4*7600 TIMING:
 C341B 5* 7 SECONDS FOR 1000 RANDOM VALUES 0. .LT. X .LE. 30.
 C341B 6* 36 SECONDS FOR 5000 RANDOM VALUES 0. .LT. X .LE. 1.
 C341B 7*ROUTINE NAME: FJ1(X)
 C341B 8*ENTRY NAME: FJ1(X)
 C341B 9*STORAGE: 445 OCTAL WORDS
 C341B 10*SELF CONTAINED.

C342A A* C-4 W.FULLERTON 73
 C342A B*REAL BESSEL FUNCTION I0 OF THE ARGUMENT X.GE.0
 C342A C*F4 SR6600 SCP 3.1
 C342A D* SW 2 LS 2 TYPE 1.1
 C342A E* SOURCE 88 CARDS OBJECT 22 CARDS
 C342A F**BESSEL FUNCTION
 C342A G*CARDS F4 COMPAT WU 05/14/73 DECK 05/14/73
 C342A 1*FORM: RJ=FI0(X)
 C342A 2*PURPOSE: COMPUTES THE REAL BESSEL FUNCTION I0 OF
 C342A 3* THE REAL ARGUMENT X.GT.0
 C342A 4*ROUTINE NAME: FI0(X)
 C342A 5*ENTRY NAME: FI0(X)
 C342A 6*STORAGE: 331 OCTAL WORDS
 C342A 7*SELF CONTAINED.

C342B A* C-4 W.FULLERTON 73
 C342B B*REAL BESSEL FUNCTION I0 OF THE ARGUMENT X.GE.0
 C342B C*F4 SR7600 CROS
 C342B D* SW 2 LS 2 TYPE 1.1
 C342B E* SOURCE 88 CARDS OBJECT 21 CARDS
 C342B F**BESSEL FUNCTION
 C342B G*DISK F4 COMPAT WU 05/14/73 DECK 05/14/73
 C342B 1*FORM: RJ=FI0(X)
 C342B 2*PURPOSE: COMPUTES THE REAL BESSEL FUNCTION I0 OF
 C342B 3* THE REAL ARGUMENT X.GT.0
 C342B 4*7600 TIMING:
 C342B 5* 7 SECONDS FOR 1000 RANDOM VALUES 0. .LT. X .LE. 30.
 C342B 6* 37 SECONDS FOR 5000 RANDOM VALUES 0. .LT. X .LE. 1.
 C342B 7*ROUTINE NAME: FI0(X)
 C342B 8*ENTRY NAME: FI0(X)
 C342B 9*STORAGE: 331 OCTAL WORDS
 C342B 10*SELF CONTAINED.

C343A A* C-4 W.FULLERTON 73
 C343A B*REAL BESSEL FUNCTION I1 OF THE ARGUMENT X.GE.0
 C343A C*F4 SR6600 SCP 3.1
 C343A D* SW 2 LS 2 TYPE 1.1
 C343A E* SOURCE 89 CARDS OBJECT 22 CARDS
 C343A F**BESSEL FUNCTION
 C343A G*CARDS F4 COMPAT WU 05/14/73 DECK 05/14/73
 C343A 1*FORM: RJ=FI1(X)
 C343A 2*PURPOSE: COMPUTES THE REAL BESSEL FUNCTION I1 OF
 C343A 3* THE REAL ARGUMENT X.GT.0
 C343A 4*ROUTINE NAME: FI1(X)
 C343A 5*ENTRY NAME: FI1(X)
 C343A 6*STORAGE: 342 OCTAL WORDS
 C343A 7*SELF CONTAINED.

C343B A* C-4 W.FULLERTON 73
 C343B B*REAL BESSEL FUNCTION I1 OF THE ARGUMENT X.GE.0
 C343B C*F4 SR7600 CROS
 C343B D* SW 2 LS 2 TYPE 1.1
 C343B E* SOURCE 89 CARDS OBJECT 22 CARDS
 C343B F**BESSEL FUNCTION
 C343B G*DISK F4 COMPAT WU 05/14/73 DECK 05/14/73
 C343B 1*FORM: RJ=FI1(X)
 C343B 2*PURPOSE: COMPUTES THE REAL BESSEL FUNCTION I1 OF
 C343B 3* THE REAL ARGUMENT X.GT.0
 C343B 4*7600 TIMING:
 C343B 5* 7 SECONDS FOR 1000 RANDOM VALUES 0. .LT. X .LE. 30.
 C343B 6* 37 SECONDS FOR 5000 RANDOM VALUES 0. .LT. X .LE. 1.
 C343B 7*ROUTINE NAME: FI1(X)
 C343B 8*ENTRY NAME: FI1(X)
 C343B 9*STORAGE: 342 OCTAL WORDS
 C343B 10*SELF CONTAINED.

C3AA A * W. D. BARFIELD T-2 69
 C3AA B *FINDMAP - COMPLEX GREEN*S FUNCTION - CONFORMAL MAPPING
 C3AA C *F4 SR6600 SCP 3.1
 C3AA D * SW 4 LS 3 TYPE 2
 C3AA E *SOURCE CARDS 169 BCD OBJECT CARDS 62 BIN
 C3AA F **FINDMAP*GREEN*CONFORMAL*MAPPING
 C3AA G *CARDS F4 COMPAT WU 10/17/69 DECK 10/17/69
 C3AA 1 *CALL NAME: FINDMAP(X0,Y0,NBDY,N2,X,Y,NN,XA,YA,SIG,G,H,GA,
 C3AA 2 *HA,DS,AA)
 C3AA 3 *PURPOSE: TO FIND VALUES OF THE (COMPLEX) FUNCTION WHICH
 C3AA 4 *CONFORMALLY MAPS A CLOSED TWO DIMENSIONAL REGION INTO THE
 C3AA 5 *UNIT CIRCLE.
 C3AA 6 *STORAGE: 1477 (OCTAL) + 4(NBDY) + (NBDY)**2/4
 C3AA 7 *ROUTINES CALLED: ATAN2(B104A), ALOG(B305A), SQRT(B408A),
 C3AA 8 *LSS(F404A).

C3AB *(FFT) HAS BEEN REDESIGNATED F5AA.

C3AC *(RFSN) HAS BEEN REDESIGNATED F5AB.

C3AD A* H. L. RUZBEE C-4 I. CHERRY 72
C3AD B*INVERSE ERROR FUNCTION
C3AD C*F4 SR6600 SCP 3.1
C3AD D* SW 3 LS 2 TYPE 2
C3AD E*F4 SOURCE CARDS 44 BCD OBJECT CARDS 12 BIN
C3AD F**INVERSE*ERROR FUNCTION
C3AD G*CARDS F4 COMPAT WU 07/20/72 DECK 07/20/72
C3AD 1*FORM: CALL ERFINV(Y,J,X,ANSWER,TEST,VE,RATIO,OUTNO)
C3AD 2*PURPOSE: COMPUTE INVERSE ERROR FUNCTION
C3AD 3*ROUTINE NAME: ERFINV
C3AD 4*ENTRY NAME: ERFINV
C3AD 5*STORAGE: 204 OCTAL WORDS.
C3AD 6*TIMING: AVERAGE TIME = 7 MILLISEC.
C3AD 7*ROUTINES CALLED: EXP(B306), ERF(C310).

C4 SIMULTANEOUS NON-LINEAR ALGEBRAIC FUNCTIONS
ZEROS OF NON-LINEAR FUNCTIONS.

REVIEWER: J. HANCOCK, C-4

C401A *(FROOT) NOW OBSOLETE-SEE C402,C403, AND C404.

C402A A* JOHN HANCOCK C-4 70
 C402A B*SOLVE--ROOT FINDER FOR REAL EQUATIONS
 C402A C*F4 SR6600 SCP 3.1
 C402A D* SW 6 LS 15 TYPE 1
 C402A E*SOURCE CARDS 697 BCD OBJECT CARDS 160 BIN
 C402A F**ROOTS*ZEROS*EQUATIONS*MAXIMUM*MINIMUM*ROOTS SEPARATION
 C402A G*CARDS F4 COMPAT WU 11/02/72REV 5 DECK 11/02/72REV 5
 C402A 1*FORM: CALL SOLVE(XROOT,FROOT,A,B,XIST,XABSER,XRELER,FABSER,
 C402A 2* XBOUND,X2CODE,NPRINT,NCOUNT,NCONV,NSERCH,FNAME,
 C402A 3* FUNCTN,NERROR,SOLVE).
 C402A 4*PURPOSE: LET F AND X BE REAL. SOLVE (C402)
 C402A 5* APPROXIMATES:
 C402A 6* I) A ROOT OF $F(X) = 0$, OR
 C402A 7* II) A POINT AT WHICH $F(X)$ ASSUMES ITS MAXIMUM
 C402A 8* (OR MINIMUM) VALUE.
 C402A 9*ROUTINE NAME: SOLVE
 C402A 10*ENTRY NAME: SOLVE
 C402A 11*STORAGE: 4455 (OCTAL) WORDS.
 C402A 12*SELF CONTAINED.

C402B A* JOHN HANCOCK C-4 72
 C402B B*SOLVE--ROOT FINDER FOR REAL EQUATIONS
 C402B C*F4 SR7600 CROS
 C402B D* SW 6 LS 15 TYPE 1
 C402B E*F4 SOURCE CARDS 697 BCD OBJECT CARDS 163 BIN
 C402B F**ROOTS*ZEROS*EQUATIONS*MAXIMUM*MINIMUM*ROOTS SEPARATION
 C402B G*ON DISK F4 COMPAT WU 11/02/72REV.1 DECK 11/02/72REV.1
 C402B 1*FORM: CALL SOLVE(XROOT,FROOT,A,B,XIST,XABSER,XRELER,FABSER.
 C402B 2* XBOUND,X2CODE,NPRINT,NCOUNT,NCONV,NSERCH,FNAME,
 C402B 3* FUNCTN,NERROR,SOLVE).
 C402B 4*PURPOSE: LET F AND X BE REAL. SOLVE (C402)
 C402B 5* APPROXIMATES:
 C402B 6* I) A ROOT OF $F(X) = 0$, OR
 C402B 7* II) A POINT AT WHICH $F(X)$ ASSUMES ITS MAXIMUM
 C402B 8* (OR MINIMUM) VALUE.
 C402B 9*ROUTINE NAME: SOLVE
 C402B 10*ENTRY NAME: SOLVE
 C402B 11*STORAGE: 4514 OCTAL WORDS.
 C402B 12*SELF CONTAINED.

C403A A* J SOPKA C-4 SANDIA MATH LIB 72
 C403A B*ZEROIN - FINDS A ZERO OF FUNCTION $F(X)$ IN INTERVAL (B,C)
 C403A C*F4 SR6600 SCP 3.1
 C403A D* SW 2 LS 4 TYPE 1
 C403A E*F4 SOURCE CARDS 159 BCD OBJECT CARDS 22 BIN
 C403A F**ZERO*ROOT*FUNCTION*INTERVAL
 C403A G*CARDS F4 COMPAT WU 01/31/72 DECK 01/31/72
 C403A 1*FORM: CALL ZEROIN(F,B,C,RE,AE,IFLAG)
 C403A 2*PURPOSE: SEARCH FOR A REAL ZERO OF THE FUNCTION $F(X)$
 C403A 3* ON THE INTERVAL (B,C).
 C403A 4*ROUTINE NAME: ZEROIN
 C403A 5*ENTRY NAME: ZEROIN
 C403A 6*STORAGE: 344 OCTAL WORDS
 C403A 7*REQUIRES SYSTEM OUTPUT FILESET -OUTPUT- TO BE AVAILABLE
 C403A 8* FOR ERROR MESSAGES.

C403B A* J SOPKA C-4 SANDIA MATH LIB 72
 C403B B*ZEROIN - FINDS A ZERO OF FUNCTION F(X) IN INTERVAL (B,C)
 C403B C*F4 SR7600 CROS
 C403B D* SW 2 LS 4 TYPE 1
 C403B E*F4 SOURCE CARDS 159 BCD OBJECT CARDS 22 BIN
 C403B F**ZERO*ROOT*FUNCTION*INTERVAL
 C403B G*CARDS F4 COMPAT WU 01/31/72 DECK 01/31/72
 C403B 1*FORM: CALL ZEROIN(F,B,C,RE,AE,IFLAG)
 C403B 2*PURPOSE: SEARCH FOR A REAL ZERO OF THE FUNCTION F(X)
 C403B 3* ON THE INTERVAL (B,C).
 C403B 4*ROUTINE NAME: ZEROIN
 C403B 5*ENTRY NAME: ZEROIN
 C403B 6*STORAGE: 350 OCTAL WORDS
 C403B 7*REQUIRES SYSTEM OUTPUT FILESET -OUT- TO BE AVAILABLE
 C403B 8* FOR ERROR MESSAGES.

C404A A* JOHN HANCOCK C-4 J. HANCOCK 72
 C404A B*SOLVITO SEARCHES FOR A ZERO OF F(X) IN INTERVAL (A,B)
 C404A C*F4 SR6600 SCP 3.1
 C404A D* SW 2 LS 3 TYPE 1
 C404A E*SOURCE CARDS 107 BCD OBJECT CARDS 13 BIN
 C404A F**SOLVE*ROOT*EQUATION
 C404A G*CARDS F4 COMPAT WU 01/15/73REV.2 DECK 01/15/73REV.2
 C404A 1*FORM: CALL SOLVITO(X,A,B,XTOL,F,NERROR)
 C404A 2*PURPOSE: SEARCH FOR A ROOT OF AN EQUATION F(X) IN THE
 C404A 3* CLOSED INTERVAL A.LE.X.LE.B.
 C404A 4*ROUTINE NAME: SOLVITO
 C404A 5*ENTRY NAME: SOLVITO
 C404A 6*STORAGE: 231 OCTAL WORDS
 C404A 7*ROUTINES CALLED: SELF CONTAINED

C404B A* JOHN HANCOCK C-4 J. HANCOCK 72
 C404B B*SOLVITO SEARCHES FOR A ZERO OF F(X) IN INTERVAL (A,B)
 C404B C*F4 SR7600 CROS
 C404B D* SW 2 LS 3 TYPE 1
 C404B E*SOURCE CARDS 107 BCD OBJECT CARDS 13 BIN
 C404B F**SOLVE*ROOT*EQUATION
 C404B G*ON DISK F4 COMPAT WU 01/15/73REV.2 DECK 01/15/73REV.2
 C404B 1*FORM: CALL SOLVITO(X,A,B,XTOL,F,NERROR)
 C404B 2*PURPOSE: SEARCH FOR A ROOT OF AN EQUATION F(X) IN THE
 C404B 3* CLOSED INTERVAL A.LE.X.LE.B.
 C404B 4*ROUTINE NAME: SOLVITO
 C404B 5*ENTRY NAME: SOLVITO
 C404B 6*STORAGE: 237 OCTAL WORDS
 C404B 7*ROUTINES CALLED: SELF CONTAINED

D

OPERATIONS ON FUNCTIONS AND SOLUTIONS OF DIFFERENTIAL
EQUATIONS

D1 NUMERICAL INTEGRATION

REVIEWER: D. KAHANER, C-6

D109A *(SIMPSN) HAS BEEN DEMOTED TO TYPE 2 STATUS AND IS NOW DIAC.

D110A A* CHERRY C-2 67
 D110A B*WEIGHTS AND ZEROES OF LEGENDRE POLYNOMIALS ON (0,1)
 D110A C*MATH D1 F4 SR6600 SCOPE
 D110A D* SW 1 LS 3
 D110A E*F4SOURCE CARDS 151 BCD OBJECT CARDS 33 BIN
 D110A F**LEGENDRE*WEIGHTS*ZEROES
 D110A G*ON DISK F4 COMPAT WU 07/23/68 REV DECK 06/22/67
 D110A 1* CALL LGNDR(M,K,A,Z)
 D110A 2* SUPPLIES THE KTH ZERO AND WEIGHT OF THE LEGENDRE
 D110A 3* POLYNOMIAL OF DEGREE M. M MUST BE IN (4,16). IF NOT, 4
 D110A 4*IS USED. USED PRIMARILY WITH GAUSS(D114A). RESULTS
 D110A 5* IN Z (ZERO). AND A(WEIGHT).
 D110A 6* ACCURACY- ERROR .LT.5.E-14
 D110A 7* STORAGE-214 WORDS.

D111A A* CHERRY T-1 67
 D111A O*WEIGHTS AND ZEROES OF CHERYSHEV POLYNOMIALS
 D111A B*MATH D1 F4 SR6600 SCOPE
 D111A C* SW 1 LS 2
 D111A D*F4 SOURCE DECK 83RCDREL. 20BIN
 D111A S**CHEBYSHEV*WEIGHTS*ZEROES
 D111A 10*ON DISK F4 COMPAT WU 09/18/67 REV DECK 06/22/67
 D111A 11* CALL CBSHV(M,K,A,Z) SUPPLIES IN Z THE KTH ZERO
 D111A 12* AND IN A THE KTH WEIGHT FOR MTH ORDER GAUSS-CHEBYSHEV
 D111A 13* QUADRATURE. M MUST BE IN (4,15). IF NOT, 4 IS USED.
 D111A 14*USED PRIMARILY WITH GAUSS(D114A).
 D111A 15* ACCURACY- ERROR .LT. 2.E-13
 D111A 16* STORAGE-142 WORDS.

D112A A* CHERRY T-1 67
 D112A 0*WEIGHTS AND ZEROES OF HERMITE POLYNOMIALS
 D112A B*MATH D1 F4 SR6600 SCOPE
 D112A C* SW 1 LS 4
 D112A D*F4 SOURCE 222BCDRELOCATABLE 48BIN
 D112A S**HERMITE*WEIGHTS*ZEROES
 D112A 10*ON DISK F4 COMPAT WU 09/18/67 REV DECK 06/22/67
 D112A 11* CALL HRMTE(M,K,A,Z) SUPPLIES THE KTH ZERO ,Z, AND
 D112A 12* WEIGHT, A, FOR MTH ORDER GAUSS-HERMITE QUADRATURE.
 D112A 13* M MUST BE IN (4,20). IF NOT, 4 IS USED. USED PRIMARILY
 D112A 14*WITH GAUSS(D114A). ERROR .LT. 3.E-13
 D112A 15* STORAGE 294 WORDS.

D113A A* CHERRY T-1 67
 D113A 0*ZEROES AND WEIGHTS OF LAGUERRE POLYNOMIALS
 D113A B*MATH D1 F4 SR6600 SCOPE
 D113A C* SW 1 LS 4
 D113A D*F4 SOURCE 237BCDRELOCATABLE 50BIN
 D113A S**LAGUERRE*WEIGHTS*ZEROES
 D113A 10*ON DISK F4 COMPAT WU 09/18/67 REV DECK 06/22/67
 D113A 11* CALL LAGRE(M,K,A,Z) SUPPLIES THE KTH ZERO ,Z,
 D113A 12* AND WEIGHT, A, FOR MTH ORDER GAUSS-LAGUERRE QUADRATURE.
 D113A 13* M MUST BE IN (4,15). IF NOT, 4 IS USED. USED PRIMARILY
 D113A 14*WITH GAUSS(D114A). ERROR .LT. 5.E-13
 D113A 15* STORAGE 267 WORDS.

D114A A* CHERRY T-1 67
 D114A 0*GENERALIZED GAUSS QUADRATURE
 D114A B*MATH D1 F4 SR6600 SCOPE
 D114A C* SW 4 LS 1
 D114A D*F4 SOURCE DECK 60BCDREL. 22BIN
 D114A S**GAUSS*QUADRATURE*INTEGRATION
 D114A 10*ON DISK F4 COMPAT WU 06/22/67 DECK 06/22/67
 D114A 11* CALLED BY A=GAUSS(N,Y,M,TBL)
 D114A 12* APPROXIMATES A MULTIPLE INTEGRAL BY QUADRATURE.
 D114A 13* Y IS A FUNCTION WHICH COMPUTES THE INTEGRAND
 D114A 14* N IS THE NUMBER OF INTEGRALS, M IS A TABLE OF NUMBER OF
 D114A 15* POINTS PER INTEGRAL
 D114A 16* TBL IS A SUBROUTINE TO SUPPLY WEIGHTS AND ZEROES TO
 D114A 17* GAUSS. STORAGE=289 WORDS.
 D114A 18* USES LABRT(N103A).

D115A *(RKA,RKB) HAS BEEN REDESIGNATED D203A.

D115B *(RKA,RKB) HAS BEEN REDESIGNATED D203B.

D116A A* G. WILLBANKS T-1 67
 D116A 0*TABULAR INTEGRATION BY TAYLOR EXPANSION AND TRAPEZOIDS
 D116A B*MATHEMATICS D1 F4 SR6600 SCOPE
 D116A C* SW 2 LS 1
 D116A D*F4 SOURCE CARDS 26BCDF4 OBJECT CARDS 24BIN
 D116A S**TABULAR*INTEGRATION BY*TAYLOR*EXPANSION AND*TRAPEZOIDS
 D116A 10*ON DISK F4 COMPAT WU 10/17/67 DECK 10/17/67
 D116A 11*A = TABINT(NP,X,Y) WHERE NP = NO OF POINTS AND X,Y ARE THE
 D116A 12*LOCATIONS OF TABLES IN X AND Y RESPECTIVELY.
 D116A 13*STORAGE = 339 WORDS
 D116A 14*THIS ROUTINE USES NO OUTSIDE ROUTINES.

D117A A* B. FAGAN T-1 T. JORDAN 68
 D117A 0*TABULAR AND SPLINE INTEGRATION
 D117A B*MATHEMATICS D1 F4 SR6600 SCOPE
 D117A C* SW 4 LS 2
 D117A D*F4 SOURCE CARDS 81BCDF4 OBJECT CARDS 21BIN
 D117A S**TABULAR AND*SPLINE*INTEGRATION
 D117A 10*ON DISK F4 COMPAT WU 03/15/68 DECK 03/15/68
 D117A 11*Z=SPLINT(N,X,F,W,IJ,A,B) WHERE N IS NUMBER OF POINTS, X IS
 D117A 12*ORIGIN OF TABLE OF INDEPENDENT VARIABLE, F IS ORIGIN OF TABLE
 D117A 13*OF DEPENDENT VARIABLE, W IS ORIGIN OF TABLE OF SECOND
 D117A 14*DERIVATIVES, IJ IS SPACING WITHIN F AND W TABLES, A IS THE
 D117A 15*LOWER LIMIT OF THE INTEGRAL DESIRED, B IS THE UPPER LIMIT OF
 D117A 16*THE INTEGRAL. ERROR COMMENTS AND RETURN WITH NO CALC. WHEN
 D117A 17*A.LT.X(X); OR .B.ST.X(1Y).
 D117A 18*STORAGE = 457 WORDS.
 D117A 19*USES SEARCH (E101A) AND LABRT (N103A).

D118A A* T JORDAN C DO B FAGAN 68
 D118A 0*TWO-DIMENSIONAL SPLINE INTEGRATION
 D118A B*MATHEMATICS D1 F4 SR6600 SCOPE
 D118A C* SW 5 LS 1
 D118A D*F4 SOURCE CARDS 37BCDF4 OBJECT CARDS 14BIN
 D118A S**TWO-DIMENSIONAL*SPLINE*INTEGRATION
 D118A 10*ON DISK F4 COMPAT WU 09/16/68 DECK 09/16/68
 D118A 11*Y=SPLINT2(INX,X,NY,Y,F,FX,FY,FXXY,MAXY,A,B,C,D,T1,T2)WHERE
 D118A 12*NX IS NUMBER OF X POINTS, X IS TABLE OF ASCENDING VALUES OF
 D118A 13*THE X VARIABLE, NY IS NUMBER OF Y POINTS, Y IS TABLE OF
 D118A 14*ASCENDING VALUES OF Y VARIABLE, F IS 2-DIMENSIONAL TABLE OF
 D118A 15*FUNCTION VALUES, FX,FY, AND FXXY ARE 2-DIMENSIONAL TABLES
 D118A 16*OF SECOND DERIVATIVES AT EACH VALUE OF THE FUNCTION, MAXY IS
 D118A 17*INTEGER EQUAL TO FIRST DIMENSION OF F TABLE, A AND B ARE THE
 D118A 18*LOWER AND UPPER INTEGRATION LIMITS OF X, C AND D ARE SAME FOR
 D118A 19*Y, T1 AND T2 = TEMPORARY ARRAYS EACH .GE. NY, STORAGE-217.
 D118A 20*NO ERROR RETURNS. USES SPLINT(D117A), SEARCH(EI01A) AND
 D118A 21*LABRT(N103A).

D119A A* DAVID K. KAHANER C-6 69
 D119A B*ADAPTIVE NEWTON COTES QUADRATURE SEVEN POINT
 D119A C*F4 SR6600 SCP.3.1
 D119A D* SW 2 LS 2 TYPE 1
 D119A E*SOURCE CARDS 84 BCD OBJECT CARDS 17 BIN
 D119A F**QUADRATURE*INTEGRATION*NEWTON COTES
 D119A G*CARDS F4 COMPAT WU 06/19/69 REV 1 DECK 02/04/69
 D119A 1*QNC7 COMPUTES THE APPROXIMATE VALUE OF THE INTEGRAL FROM
 D119A 2*A TO B OF THE FUNCTION, FUNC.
 D119A 3*CALLING SEQUENCE IS Y = QNC7 (FUNC,A,B,RE,KOUNT)
 D119A 4*STORAGE IS 1030 (OCTAL) WORDS.

D119B A* A SOLEM C-4 D KAHANER 72
 D119B B*ADAPTIVE NEWTON COTES QUADRATURE SEVEN POINT
 D119B C*F4 SR7600 CROS
 D119B D* SW 1 LS 3 TYPE 1
 D119B E*SOURCE CARDS 89 BCD OBJECT CARDS 19 BIN
 D119B F**QUADRATURE*INTEGRATION*NEWTON COTES
 D119B G*ON DISK F4 COMPAT WU 03/17/72 DECK 03/17/72
 D119B 1*FORM: CALL QNC7(FUNC,A,B,RE,KOUNT)
 D119B 2*PURPOSE: COMPUTE THE APPROXIMATE VALUE OF THE INTEGRAL
 D119B 3* FROM A TO B OF THE FUNCTION, FUNC. SEE WRITEUP FOR
 D119B 4* D119A FOR FURTHER DETAILS.
 D119B 5*ROUTINE NAME: QNC7
 D119B 6*ENTRY NAME: QNC7
 D119B 7*STORAGE: 1044 (OCTAL) WORDS.
 D119B 8*ROUTINES CALLED: LIBMSG(SYSTEM)

D120A A* DAVID K. KAHANER C-6 69
 D120A B*ADAPTIVE NEWTON COTES QUADRATURE TEN POINT
 D120A C*F4 SR6600 SCP.3.1
 D120A D* SW 2 LS 2 TYPE 1
 D120A E*SOURCE CARDS 92 BCD OBJECT CARDS 19 BIN
 D120A F**QUADRATURE*INTEGRATION*NEWTON COTES
 D120A G*CARDS F4 COMPAT WU 06/19/69 REV 1 DECK 02/04/69
 D120A 1*QUAD COMPUTES THE APPROXIMATE VALUE OF THE INTEGRAL FROM
 D120A 2*A TO B OF THE FUNCTION, FUNC.
 D120A 3*CALLING SEQUENCE IS Y = QUAD (FUNC,A,B,RE,KOUNT)
 D120A 4*STORAGE IS 1166 (OCTAL) WORDS.

D121A A* DAVID K. KAHANER C-6 69
 D121A B*SHANKS ITERATIVE QUADRATURE
 D121A C*F4 SR6600 SCP.3.1
 D121A D* SW 2 LS 1 TYPE 1
 D121A E*SOURCE CARDS 36 BCD OBJECT CARDS 14 BIN
 D121A F*QUADRATURE*INTEGRATION*WYNN*SHANK
 D121A G*CARDS F4 COMPAT WU 06/17/70REV 2 DECK 06/17/70REV 1
 D121A 1*USE: Y = SHNK(FUNC,A,B,RE,KOUNT)
 D121A 2*PURPOSE: COMPUTES THE APPROXIMATE VALUE OF THE INTEGRAL
 D121A 3*FROM A TO B OF THE FUNCTION, FUNC.
 D121A 4*STORAGE: 1103 (OCTAL) WORDS.
 D121A 5*SELF CONTAINED.

D122A A* DAVID K. KAHANER C-6 69
 D122A B*NUMERICAL QUADRATURE BY ADAPTIVE ITERATIVE METHODS
 D122A C*F4 SR6600 SCP 3.1
 D122A D* SW 2 LS 2 TYPE 1
 D122A E*SOURCE CARDS 107 BCD OBJECT CARDS 30 BIN
 D122A F**QUADRATURE*INTEGRATION*QABS
 D122A G*CARDS F4 COMPAT WU 10/14/69 DECK 10/14/69
 D122A 1*CALL NAME: QABS(F,A,B,EPS,NO)
 D122A 2*PURPOSE: NUMERICAL QUADRATURE TO ABSOLUTE ACCURACY.
 D122A 3*STORAGE: 1,043 (OCTAL) WORDS.
 D122A 4*SELF CONTAINED.

D123A A* DAVID K. KAHANER C-6 69
 D123A B*GENERALIZED GAUSS QUADRATURE
 D123A C*F4 SR6600 SCP 3.1
 D123A D* SW 4 LS 1 TYPE 1.1
 D123A E*SOURCE CARDS 41 BCD OBJECT CARDS 21 BIN
 D123A F**GENGSQ*GAUSS*QUADRATURE*INTEGRATION
 D123A G*CARDS F4 COMPAT WU 10/14/69 DECK 10/14/69
 D123A 1*CALL NAME: GENGSQ(M,B,G,A,W,WF,JS,EL,ER,FM,JORTH,EPS,
 D123A 2*ISWTCH,NIT).
 D123A 3*PURPOSE: TO DO GENERALIZED GAUSS QUADRATURE.
 D123A 4*STORAGE: 1,371 (OCTAL) WORDS.
 D123A 5*ROUTINES CALLED: PHI(D124A),STLTJS(D125A),GAUSSQ(D126A).

D123B A* DAVID K. KAHANER C-6 D KAHANER 73
 D123B B*GENERALIZED GAUSS QUADRATURE
 D123B C*F4 SR7600 CROS
 D123B D* SW 4 LS 2 TYPE 1.1
 D123B E*SOURCE CARDS 41 BCD OBJECT CARDS 21 BIN
 D123B F**GENGSQ*GAUSS*QUADRATURE*INTEGRATION
 D123B G*DISK F4 COMPAT WU 08/01/73 DECK 08/01/73
 D123B 1*FORM: CALL GENGSQ(M,B,G,A,W,WF,JS,EL,ER,FM,JORTH,EPS,
 D123B 2* ISWTCH,NIT).
 D123B 3*PURPOSE: DO GENERALIZED GAUSS QUADRATURE.
 D123B 4*ROUTINE NAME: GENGSQ
 D123B 5*ENTRY NAMES: GENGSQ
 D123B 6*STORAGE: 1377 OCTAL WORDS
 D123B 7*ROUTINES CALLED: PHI(D124B),STLTJS(D125B),GAUSSQ(D126B).

D124A A* DAVID K. KAHANER C-6 D.KAHANER 69
 D124A B*PRIVATE SUBROUTINE FOR D123A (GENGSQ)
 D124A C*F4 SR6600 SCP 3.1
 D124A D* SW 1 LS 1 TYPE 1.1
 D124A E*SOURCE CARDS 6 BCD OBJECT CARDS 6 BIN
 D124A F**PHI*GAUSS
 D124A G*CARDS F4 COMPAT WU 05/22/73REV.1 DECK 05/22/73REV.1
 D124A 1*FORM: $DX = PHI(DY,DPHI,A,B)$
 D124A 2*PURPOSE: CHANGES INTERVAL FOR GENERALIZED GAUSS QUADRATURE
 D124A 3* FROM (-1,1) TO (A,B). PRESENTLY CODED FOR A,B FINITE.
 D124A 4*ROUTINE NAME: PHI
 D124A 5*ENTRY NAMES: PHI
 D124A 6*STORAGE: 52 (OCTAL) WORDS.
 D124A 7*SELF CONTAINED.

D124B A* DAVID K. KAHANER C-6 D. KAHANER 73
 D124B B*PRIVATE SUBROUTINE FOR D123B (GENGSQ)
 D124B C*F4 SR7600 CROS
 D124B D* SW 1 LS 1 TYPE 1.1
 D124B E*SOURCE CARDS 6 RCD OBJECT CARDS 6 BIN
 D124B F**PHI*GAUSS
 D124B G*DISK F4 COMPAT WU 05/22/73 DECK 05/22/73
 D124B 1*FORM: DX = PHI(DY,DPHI,A,B)
 D124B 2*PURPOSE: CHANGES INTERVAL FOR GENERALIZED GAUSS QUADRATURE
 D124B 3* FROM (-1,1) TO (A,B). PRESENTLY CODED FOR A,B FINITE.
 D124B 4*ROUTINE NAME: PHI
 D124B 5*ENTRY NAMES: PHI
 D124B 6*STORAGE: 55 (OCTAL) WORDS.
 D124B 7*SELF CONTAINED.

D125A A* DAVID K. KAHANER C-6 D. KAHANER 69
 D125A B*PRIVATE SUBROUTINE FOR D123A (GENGSQ).--STLTJS
 D125A C*F4 SR6600 SCP 3.1
 D125A D* SW 1 LS 2 TYPE 1.1
 D125A E* SOURCE 83 CARDS OBJECT 43 CARDS
 D125A F**STLTJS*GAUSS
 D125A G*CARDS F4 COMPAT WU 07/12/73 REV.1 DECK 07/12/73REV.1
 D125A 1*FORM: CALL STLTJS(M,NIT,R,G,FM,JS,WF,PHI,EL,ER)
 D125A 2*PURPOSE: GENERATE COEFFICIENTS OF THREE TERM ORTHOGONAL
 D125A 3* POLYNOMIAL RECURSION
 D125A 4*ROUTINE NAME: STLTJS
 D125A 5*ENTRY NAMES: STLTJS
 D125A 6*STORAGE: 51111 OCTAL WORDS
 D125A 7*ROUTINES CALLED: PHI(D124A),WF

D125B A* DAVID K. KAHANER C-6 D. KAHANER 73
 D125B B*PRIVATE SUBROUTINE FOR D123B (GENGSQ).--STLTJS
 D125B C*F4 SR7600 CROS
 D125B D* SW 1 LS 2 TYPE 1.1
 D125B E* SOURCE 83 CARDS OBJECT 43 CARDS
 D125B F**STLTJS*GAUSS
 D125B G*DISK F4 COMPAT WU 07/12/73 DECK 07/12/73
 D125B 1*FORM: CALL STLTJS(M,NIT,R,G,FM,JS,WF,PHI,EL,ER)
 D125B 2*PURPOSE: GENERATE COEFFICIENTS OF THREE TERM ORTHOGONAL
 D125B 3* POLYNOMIAL RECURSION
 D125B 4*ROUTINE NAME: STLTJS
 D125B 5*ENTRY NAMES: STLTJS
 D125B 6*STORAGE: 51117 OCTAL WORDS
 D125B 7*ROUTINES CALLED: PHI(D124B),WF

D126A A* DAVID K. KAHANER C-6 D KAHANER 69
 D126A B*PRIVATE SUBROUTINE FOR D123A(GENGSQ). -- GAUSSQ
 D126A C*F4 SR6600 SCP 3.1
 D126A D* SW 1 LS 2 TYPE 1.1
 D126A E* SOURCE 82 CARDS OBJECT 45 CARDS
 D126A F**GAUSSQ*GAUSS*MATRIX*EIGENVALUES
 D126A G*CARDS F4 COMPAT WU 07/12/73 REV.1 DECK 07/12/73 REV.1
 D126A 1*FORM: CALL GAUSSQ(M,ATEMP,WTEMP,B,G,FM)
 D126A 2*PURPOSE: FINDS EIGENVALUES OF TRIDIAGONAL MATRIX BY Q-R
 D126A 3* DECOMPOSITION FOR GENERALIZED QUADRATURE.
 D126A 4*ROUTINE NAME: GAUSSQ
 D126A 5*ENTRY NAMES: GAUSSQ
 D126A 6*STORAGE: 2552 OCTAL WORDS
 D126A 7*ROUTINES CALLED: SELF CONTAINED

D126B A* DAVID K. KAHANER C-6 D KAHANER 73
 D126B B*PRIVATE SUBROUTINE FOR D123A(GENGSQ). -- GAUSSQ
 D126B C*F4 SR7600 CROS
 D126B D* SW 1 LS 2 TYPE 1.1
 D126B E* SOURCE 82 CARDS OBJECT 45 CARDS
 D126B F**GAUSSQ*GAUSS*MATRIX*EIGENVALUES
 D126B G*DISK F4 COMPAT WU 07/12/73 DECK 07/12/73
 D126B 1*FORM: CALL GAUSSQ(M,ATEMP,WTEMP,B,G,FM)
 D126B 2*PURPOSE: FINDS EIGENVALUES OF TRIDIAGONAL MATRIX BY Q-R
 D126B 3* DECOMPOSITION FOR GENERALIZED QUADRATURE.
 D126B 4*ROUTINE NAME: GAUSSQ
 D126B 5*ENTRY NAMES: GAUSSQ
 D126B 6*STORAGE: 2556 OCTAL WORDS
 D126B 7*ROUTINES CALLED: SELF CONTAINED

D127A A* R M FRANK C-4 70
 D127A B*RECURSIVE SIMPSONS RULE INTEGRATION
 D127A C*F4 SR6600 SCP 3.1
 D127A D* SW 3 LS 1 TYPE 1
 D127A E*SOURCE CARDS 43 BCD OBJECT CARDS 16 BIN
 D127A F**RECURSIVE*SIMPSON*INTEGRATION
 D127A G*CARDS F4 COMPAT WU 01/09/70 DECK 01/09/70
 D127A 1*CALL NAME: SMP(S,X1,X2,N,ANS,FUNCT,DUMMY,SMP(S))
 D127A 2*PURPOSE: RECURSIVELY CALLED SIMPSON INTEGRATION ROUTINE
 D127A 3*STORAGE: 412 (OCTAL) WORDS.
 D127A 4*SELF CONTAINED.

D128A A* R M FRANK C-4 70
 D128A B*RECURSIVE SIMPSONS RULE INTEGRATION FOR TABULAR FUNCTIONS
 D128A C*F4 SR6600 SCP 3.1
 D128A D* SW 3 LS 1 TYPE 1
 D128A E*SOURCE CARDS 52 BCD OBJECT CARDS 18 BIN
 D128A F*RECURSIVE*SIMPSON*INTEGRATION FOR*TABULAR*FUNCTIONS
 D128A G*CARDS F4 COMPAT WU 01/09/70 DECK 01/09/70
 D128A 1*CALL NAME: SIMTAB(I1,I2,DELTA,ANS,FUNCT,DUMMY,SIMTAB)
 D128A 2*PURPOSE: RECURSIVELY CALLED SIMPSON INTEGRATION ROUTINE FOR
 D128A 3*TABULAR FUNCTIONS.
 D128A 4*STORAGE: 444 (OCTAL) WORDS.
 D128A 5*SELF CONTAINED.

U129A A* DAVID K. KAHANER C-6 D KAHANER /1
 U129A B*QUADRATIC INTEGRATION OVER UNEVENLY SPACED POINTS
 U129A C*F4 SR6600 SCP 3.1
 U129A D* SW 3 LS 2 TYPE 1.1
 U129A E*F4 SOURCE CARDS 58 BCD OBJECT CARDS 16 BIN
 U129A F**QUADRATIC*INTEGRATION
 U129A G*CARDS F4 COMPAT WU 07/02/73REV.2 DECK 04/06/73REV.1
 U129A 1*FORM: CALL SIMPUN(XX,FX,NX,I,AX)
 U129A 2*PURPOSE: QUADRATIC INTEGRATION OVER UNEVENLY SPACED POINTS.
 U129A 3* XX = INPUT ARRAY OF NX STRICTLY-INCREASING ABSCISSAS
 U129A 4* AT WHICH THE INTEGRAND IS EVALUATED.
 U129A 5* FX = INPUT ARRAY OF NX INTEGRAND VALUES AT THE
 U129A 6* POINTS XX(J), J=1,2,...,NX.
 U129A 7* NX = NUMBER OF POINTS IN XX, FX, AND AX.
 U129A 8* I = DIRECTION OF INTEGRATION.
 U129A 9* AX = OUTPUT ARRAY OF NX VALUES OF INTEGRAL ON
 U129A 10* SUBINTERVALS. IF I.GE.0, AX(J) IS APPROXIMATELY
 U129A 11* EQUAL TO INTEGRAL FROM XX(1) TO XX(J). IF I.LT.0,
 U129A 12* AX(J) IS APPROXIMATELY EQUAL TO INTEGRAL FROM XX(J)
 U129A 13* TO XX(NX).
 U129A 14*ROUTINE NAME: SIMPUN
 U129A 15*ENTRY NAME: SIMPUN
 U129A 16*STORAGE: 310 OCTAL WORDS
 U129A 17*ROUTINES CALLED: SELF CONTAINED

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U129B A*          DAVID K. KAHANER C-6          D KAHANER          /3
U129B B*QUADRATIC INTEGRATION OVER UNEVENLY SPACED POINTS
U129B C#F4          SR7600   CRUS
U129B D*          SW 3      LS 2      TYPE 1.1
U129B E#F4 SOURCE CARDS 58 BCD   OBJECT CARDS 16 BIN
U129B F**QUADRATIC*INTEGRATION
U129B G#QN DISK     F4 COMPAT   WU 07/02/73REV.1 DECK 04/06/73
U129B 1*FORM: CALL SIMPUN(XX,FX,NX,I,AX)
U129B 2*PURPOSE: QUADRATIC INTEGRATION OVER UNEVENLY SPACED POINTS.
U129B 3* XX = INPUT ARRAY OF NX STRICTLY-INCREASING ABSCISSAS
U129B 4*     AT WHICH THE INTEGRAND IS EVALUATED.
U129B 5* FX = INPUT ARRAY OF NX INTEGRAND VALUES AT THE
U129B 6*     POINTS XX(J), J=1,2,...,NX.
U129B 7* NX = NUMBER OF POINTS IN XX, FX, AND AX.
U129B 8* I = DIRECTION OF INTEGRATION.
U129B 9* AX = OUTPUT ARRAY OF NX VALUES OF INTEGRAL ON
U129B 10*    SUBINTERVALS. IF I.GE.0, AX(J) IS APPROXIMATELY
U129B 11*    EQUAL TO INTEGRAL FROM XX(1) TO XX(J). IF I.LT.0,
U129B 12*    AX(J) IS APPROXIMATELY EQUAL TO INTEGRAL FROM XX(J)
U129B 13*    TO XX(NX).
U129B 14*ROUTINE NAME: SIMPUN
U129B 15*ENTRY NAME: SIMPUN
U129B 16*STORAGE: 313 OCTAL WORDS.
U129B 17*ROUTINES CALLED: SELF CONTAINED

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D1AA A*          D. KAHANER          C-6          71
D1AA B*CIRCLE - INTEGRATE F(X,Y) OVER CIRCUMFERENCE OF A CIRCLE
D1AA C#F4          SR6600   SCP 3.1
D1AA D*          SW 1      LS 1      TYPE 2
D1AA E#F4 SOURCE CARDS 14 BCD   OBJECT CARDS 7 BIN
D1AA F**CIRCLE*INTEGRATE
D1AA G#CARDS      F4 COMPAT   WU 09/27/71      DECK 09/27/71
D1AA 1*FORM: Y = CIRCLE (F, U, V, R, M)
D1AA 2*PURPOSE: INTEGRATE FUNCTION F OF 2 VARIABLES OVER THE
D1AA 3*     CIRCLE WITH CENTER (U,V) AND RADIUS R. M DENOTES
D1AA 4*     THE ORDER OF THE APPROXIMATION. METHOD IS THE
D1AA 5*     STANDARD GAUSS FORMULA.
D1AA 6*ROUTINE NAME: CIRCLE
D1AA 7*ENTRY NAME: CIRCLE
D1AA 8*STORAGE: 104 OCTAL WORDS
D1AA 9*ROUTINES CALLED: SIN(B106A), COS(B106A).

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DIAB A* D. KAHANER C=6 71
 DIAB B*SPHERE - INTEGRATE F(X,Y,Z) OVER UNIT SPHERE
 DIAB C*F4 SR6600 SCP 3.1
 DIAB D* SW 1 LS 3 TYPE 2
 DIAB E*F4 SOURCE CARDS 137 BCD OBJECT CARDS 33 BIN
 DIAB F**SPHERE*INTEGRATE
 DIAB G*CARDS F4 COMPAT WU 09/27/71 DECK 09/27/71
 DIAB 1*FORM Y = SPHERE (F,NPTS)
 DIAB 2*PURPOSE: INTEGRATE FUNCTION F OF 3 VARIABLES OVER THE
 DIAB 3* UNIT SPHERE. NPTS CAN BE 50, 72, OR 128, AND
 DIAB 4* INDICATES THE NUMBER OF POINTS TO BE USED IN THE
 DIAB 5* APPROXIMATION. INCORRECT NPTS GIVES WARNING MESSAGE
 DIAB 6* AND RUNS LIKE NPTS = 128. FOR NPTS = 50 AND 72,
 DIAB 7* METHOD IS IN A.D. MCLAREN, MATH COMP
 DIAB 8* V 17, P.361-383 (1963).
 DIAB 9* FOR NPTS = 128 METHOD IS THE STANDARD SPHERICAL PRODUCT
 DIAB 10* GAUSS FORMULA.
 DIAB 11*ACCURACY: FOR NPTS = 50 IT IS EXACT FOR SPHERICAL
 DIAB 12* POLYNOMIALS OF DEGREE 11 OR LESS.
 DIAB 13* FOR NPTS = 72 IT IS EXACT FOR SPHERICAL POLYNOMIALS
 DIAB 14* OF DEGREE 14 OR LESS.
 DIAB 15*ROUTINE NAME: SPHERE
 DIAB 16*ENTRY NAME: SPHERE
 DIAB 17*STORAGE: 564 OCTAL WORDS
 DIAB 18*ROUTINES CALLED: SQRT (B408A), SIN (B106A), COS (B106A)

DIAC A* DUANE HARDER C=4 D.KAHANER 72
 DIAC B*SIMPSONS RULE INTEGRATION
 DIAC C*F4 SR6600 SCP 3.1
 DIAC D* SW 3 LS 3 TYPE 2
 DIAC E*F4 SOURCE CARDS 87 BCD OBJECT CARDS 21 BIN
 DIAC F**ADAPTIVE*SIMPSONS RULE*INTEGRATION
 DIAC G*ON DISK F4 COMPAT WU 09/22/72 DECK 09/22/72
 DIAC 1*FORM: ANS = SIMPSN(ARG,A,B,EPS).
 DIAC 2*PURPOSE: SIMPSONS RULE INTEGRATION
 DIAC 3* ARG IS A FUNCTION SUBPROGRAM WHICH EVALUATES THE
 DIAC 4* FUNCTION BEING INTEGRATED.
 DIAC 5* A IS THE LOWER LIMIT OF INTEGRATION,
 DIAC 6* B IS THE UPPER LIMIT.
 DIAC 7* EPS IS A CONVERGENCE CRITERION.
 DIAC 8*ROUTINE NAME: SIMPSN
 DIAC 9*ENTRY NAME: SIMPSN
 DIAC 10*SELF CONTAINED.

DIAD A* M. BOLSTERLI T-9 D. KAHANER 72
 DIAD B*ABSCISSAS AND WEIGHTS FOR GAUSS-LAGUERRE INTEGRATION
 DIAD C*FORTRAN SR6600 SCP 3.1
 DIAD D* SW 2 LS 1 TYPE 2
 DIAD E*F4 SOURCE CARDS 21 BCD OBJECT CARDS 9 BIN
 DIAD F**ABSCISSAS AND*WEIGHTS FOR*GAUSS-LAGUERRE*INTEGRATION
 DIAD G*CARDS F4 COMPAT WU 10/31/72 DECK 10/31/72
 DIAD 1*FORM: CALL ABWTLG(N,X,W,C,T)
 DIAD 2*PURPOSE: COMPUTE ABSCISSAS AND WEIGHTS FOR GAUSS-LAGUERRE
 DIAD 3* INTEGRATION.
 DIAD 4*ROUTINE NAME: ABWTLG
 DIAD 5*ENTRY NAME: ABWTLG
 DIAD 6*STORAGE: 147 OCTAL WORDS
 DIAD 7*TIMING: SEE WRITEUP
 DIAD 8*ACCURACY: SEE WRITEUP
 DIAD 9*ROUTINES CALLED: S3DVAL(F222).

DIAE A* M. BOLSTERLI T-9 D. KAHANER 72
 DIAE B*ABSCISSAS AND WEIGHTS FOR GAUSS-LEGENDRE INTEGRATION
 DIAE C*FORTRAN SR6600 SCP 3.1
 DIAE D* SW 2 LS 1 TYPE 2
 DIAE E*F4 SOURCE CARDS 23 BCD OBJECT CARDS 10 BIN
 DIAE F*ABSCISSAS AND*WEIGHTS FOR*GAUSS-LEGENDRE*INTEGRATION
 DIAE G*CARDS F4 COMPAT WU 10/31/72 DECK 10/31/72
 DIAE 1*FORM: CALL ABWTLEG(N,X,W,C,T)
 DIAE 2*PURPOSE: COMPUTE ABSCISSAS AND WEIGHTS FOR GAUSS-LEGENDRE
 DIAE 3* INTEGRATION
 DIAE 4*ROUTINE NAME: ABWTLEG
 DIAE 5*ENTRY NAME: ABWTLEG
 DIAE 6*STORAGE: 160 OCTAL WORDS
 DIAE 7*TIMING: SEE WRITEUP
 DIAE 8*ACCURACY: SEE WRITEUP
 DIAE 9*ROUTINES CALLED: S3DVAL(F222).

D2 NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

REVIEWER: J. SOPKA, C-4

D203A A* DON DICKMAN C-4 J.SOPKA 72
 D203A B*RK - INTERVAL DETERMINING RUNGE-KUTTA
 D203A C*CMP SR6600 SCP 3.1
 D203A D* SW 5 LS 19 TYPE 1
 D203A E*CMP SOURCE CARDS 804 BCD OBJECT CARDS 34 BIN
 D203A F**RK*INTERVAL*DETERMINING*RUNGE*KUTTA
 D203A G*ON DISK F4 COMPAT WU 08/24/72 DECK 08/29/72
 D203A 1*INITIALIZING CALL FORM:
 D203A 2* CALL RKA(XZ,HZ,YI,UP,Y4,FY,ACC,XF,SH,NF,IND,N)
 D203A 3*INTEGRATION CALL FORM:
 D203A 4* CALL RKB
 D203A 5*PURPOSE: INTEGRATE N SIMULTANEOUS, FIRST ORDER,
 D203A 6* DIFFERENTIAL EQUATIONS. ROUTINE IS SELF
 D203A 7* TESTING AND INTERVAL DETERMINING.
 D203A 8*ROUTINE NAME: RKB
 D203A 9*ENTRY NAMES: RKA,RKB
 D203A 10*STORAGE: 410 LOCATIONS PLUS DATA IN CALL SEQ.
 D203A 11*ROUTINES CALLED: LABRT(N103A).

D203B A* DON DICKMAN C-4 J.SOPKA 72
 D203B B*RK - INTERVAL DETERMINING RUNGE KUTTA
 D203B C*CMP SR7600 CROS
 D203B D* SW 1 LS 19 TYPE 1
 D203B E*CMP SOURCE CARDS 810 BCD OBJECT CARDS 35 BIN
 D203B F**RK*INTERVAL*DETERMINING*RUNGE*KUTTA
 D203B G*ON DISK F4 COMPAT WU 08/29/72 DECK 08/29/72
 D203B 1*INITIALIZING CALL FORM:
 D203B 2* CALL RKA(XZ,HZ,YI,YP,Y4,FY,ACC,XF,SH,NF,IND,N)
 D203B 3*INTEGRATION CALL FORM:
 D203B 4* CALL RKB
 D203B 5*PURPOSE: INTEGRATE N SIMULTANEOUS, FIRST ORDER DIFFERENTIAL
 D203B 6* EQUATIONS. ROUTINE IS SELF TESTING AND INTERVAL
 D203B 7* DETERMINING. SEE WRITUP FOR RKB(D203A) FOR FURTHER
 D203B 8* DETAILS.
 D203B 9*ROUTINE NAME: RKB
 D203B 10*ENTRY NAMES: RKA,RKB
 D203B 11*STORAGE: 635 (OCTAL) WORDS
 D203B 12*ROUTINES USED: LABRT(N103B) LIBMSG(SYSTEM).

D3 NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS
 REVIEWER F DORR, C-4

D301A A* B L BUZBEE C-4 73
 D301A B*TRUNCATED BUNEMAN POISSON SOLVER
 D301A C*F-4 SR6600 SCP 3.1
 D301A D* SW 12 LS 8 TYPE 1
 D301A E*SOURCE CARDS 359 BCD OBJECT CARDS 85 BIN
 D301A F**SOLVER*BUNEMAN POISSON SOLVER
 D301A G*CARDS F4 COMPAT WU 04/11/73REV.1 DECK 02/15/73
 D301A 1*FORM: CALL TBPSDN(N,NY,U,LX,T,LB,DZDX,DRDY,CC,ETA,LC,R1)
 D301A 2*PURPOSE: USING A UNIFORM RECTANGULAR MESH, SOLVE THE
 D301A 3* FIVE POINT DIFFERENCE APPROXIMATION TO POISSON#S
 D301A 4* EQUATION IN X-Y OR Z-R COORDINATES.
 D301A 5*ROUTINE NAME: TBPSDN
 D301A 6*ENTRY NAME: TBPSDN
 D301A 7*STORAGE: 2144 (OCTAL) WORDS
 D301A 8*ROUTINES CALLED: FACTTD(F418A), SOLTDM(F419A)

D301B A* B L BUZBEE C-4 73
 D301B B*TRUNCATED BUNEMAN POISSON SOLVER
 D301B C*F-4 SR7600 CROS
 D301B D* SW 12 LS 8 TYPE 1
 D301B E*SOURCE CARDS 359 BCD OBJECT CARDS 85 BIN
 D301B F**SOLVER*BUNEMAN POISSON SOLVER
 D301B G*ON DISK F4 COMPAT WU 04/11/73REV.1 DECK 02/15/73
 D301B 1*FORM: CALL TBPSDN(N,NY,U,LX,T,LB,DZDX,DRDY,CC,ETA,LC,R1)
 D301B 2*PURPOSE: USING A UNIFORM RECTANGULAR MESH, SOLVE THE
 D301B 3* FIVE POINT DIFFERENCE APPROXIMATION TO POISSON#S
 D301B 4* EQUATION IN X-Y OR Z-R COORDINATES.
 D301B 5*ROUTINE NAME: TBPSDN
 D301B 6*ENTRY NAME: TBPSDN
 D301B 7*STORAGE: 2151 (OCTAL) WORDS
 D301B 8*TIMING: WITH N=41 AND NY=65, AVERAGE 7600 TIME IS 36MS.
 D301B 9*ROUTINES CALLED: FACTTD(F418B), SOLTDM(F419B)

E APPROXIMATION THEORY AND CURVE FITTING

E1 INTERPOLATION AND TABLE LOOK-UP

REVIEWER: B. SWARTZ, C-6

E101A *(SEARCH) HAS BEEN REDESIGNATED M118A.

E102A A* TOM JORDAN CDO BERTHA FAGAN 67
 E102A B*SPLINE INTERPOLATION-COEFFICIENT EVALUATION
 E102A C*FORTRAN SR6600 SCP 3.1
 E102A D* SW 4 LS 3 TYPE 1
 E102A E*F4 SOURCE CARDS 174 BCD OBJECT CARDS 57 BIN
 E102A F**FIND*COEFFICIENTS OF*CUBIC FOR*SPLINE*INTERPOLATION
 E102A G*ON DISK F4 COMPAT WU 04/25/69 REV3 DECK 01/20/67
 E102A 1*CALL SPL1D1(N,X,F,W,IOP,IJ,A,B,C) WHERE N, .GE.,3, IS NUMBER
 E102A 2*OF POINTS, X IS ORIGIN OF TABLE OF INDEPENDENT VARIABLE, F
 E102A 3*IS ORIGIN OF TABLE OF DEPENDENT VARIABLE, IOP IS AN ARRAY
 E102A 4*OF DIMENSION 2 CONTAINING COMBINATIONS OF INTEGERS 1 THRU 5
 E102A 5*FOR SPECIFYING BOUNDARY CONDITIONS, IJ IS SPACING IN TABLES
 E102A 6*F AND W. A,B,C ARE ARRAYS OF DIMENSION N USED FOR TEMPORARY
 E102A 7*STORAGE. N SECOND DERIVATIVES ARE COMPUTED AND STORED
 E102A 8*IN W, AT STORAGE INTERVAL IJ, TIME IS A LINEAR FUNCTION OF N,
 E102A 9*STORAGE=1214 WORDS.
 E102A 10*THIS SUBROUTINE IS SELF CONTAINED.

E103A A* TOM JORDAN T-1 67
 E103A 0*SPLINE INTERPOLATION-FUNCTION EVALUATION
 E103A B*MATHEMATICS E1 F4 SR6600 SCOPE
 E103A C* SW 2 LS 1
 E103A D*F4 SOURCE CARDS 45BCDF4 OBJECT CARDS 11BIN
 E103A S**SPLINE*INTERPOLATION*FUNCTION*EVALUATION
 E103A 10*ON DISK F4 COMPAT WU 07/12/67 REV DECK 01/20/67
 E103A 11*CALL SPL1D2(N,X,F,W,IJ,Y,TAB) WHERE N IS NUMBER OF POINTS,
 E103A 12*X IS ORIGIN OF TABLE OF INDEPENDENT VARIABLE, F IS ORIGIN
 E103A 13*OF TABLE OF DEPENDENT VARIABLE, W IS ORIGIN OF TABLE OF
 E103A 14*SECOND DERIVATIVES, IJ IS SPACING IN TABLES F AND W, Y IS
 E103A 15*THE POINT AT WHICH INTERPOLATION IS DESIRED, TAB IS AN
 E103A 16*ARRAY OF DIMENSION ,GE.,3 WHICH CONTAINS THE RESULTS OF THE
 E103A 17*INTERPOLATION; TAB(1) CONTAINS F(Y), TAB(2) CONTAINS F*(Y),
 E103A 18*AND TAB(3) CONTAINS F**(Y).
 E103A 19*STORAGE=276 WORDS.
 E103A 20*THIS ROUTINE USES SEARCH(E101A).

E104A A* THOMAS L. JORDAN T-1 67
 E104A 0*TWO DIMENSIONAL BI-CUBIC SPLINE INTERPOLATION-COEFF. CALC.
 E104A B*BASIC NUMERIC E1 F4 SR6600 SCOPE
 E104A C* SW 8 LS 1
 E104A D*FORTRAN SOURCE CARDS 38BCDFORTRAN OBJECT CARDS 14BIN
 E104A S*TWO*DIMENSIONAL*BICUBIC*SPLINE*INTERPOLATION
 E104A 10*ON DISK F4 COMPAT WU 12/15/67 DECK 11/03/67
 E104A 11*CALL SPL2D1 (NBRX, X, NBRY, Y, F, FX, FY, FXY, MAXY, IBD,
 E104A 12* T1, T2, T3)
 E104A 13*PURPOSE - TO CALCULATE THE COEFFICIENTS OF A BICUBIC
 E104A 14* POLYNOMIAL FOR USE IN SMOOTH TWO DIMENSIONAL
 E104A 15* INTERPOLATION
 E104A 16*TIMING - TIME IS A LINEAR FUNCTION OF M*N
 E104A 17*STORAGE - 227 WORDS
 E104A 18*USES SPL1D1(E102A).

E105A A* THOMAS L. JORDAN T-1 67
 E105A 0*TWO DIMENSIONAL BI-CUBIC SPLINE INTERPOLATION-FUNCT.EVAL.
 E105A B*BASIC NUMERIC E1 F4 SR6600 SCOPE
 E105A C* SW 3 LS 2
 E105A D*FORTRAN SOURCE CARDS 71BCDFORTRAN OBJECT CARDS 22BIN
 E105A S*TWO*DIMENSIONAL*BICUBIC*SPLINE*INTERPOLATION
 E105A 10*ON DISK F4 COMPAT WU 12/15/67 DECK 11/03/67
 E105A 11* Y = SPL2D2(XB, YB, NBRX, X, NBRY, Y, F, FX, FY, FXY, MAXY, K, L)
 E105A 12* AND
 E105A 13* Y = SPL2D3(K, L). THIS IS IN LIB AS E107A.
 E105A 14*PURPOSE TO INTERPOLATE FOR A FUNCTION VALUE OR A
 E105A 15* SPECIFIED DERIVATIVE OF A TWO DIMENSIONAL
 E105A 16* FUNCTION. E104A MUST BE USED PRIOR TO USING
 E105A 17* THIS PROGRAM TO COMPUTE INTERPOLATION COEFFS.
 E105A 18*TIMING-THE CALCULATION IS EQUIVALENT TO 5 CUBIC EVALUATIONS
 E105A 19* FOR EACH INTERPOLATION.
 E105A 20*STORAGE - 345 WORDS.
 E105A 21*USES SEARCH(E101A).

E106A A* BILL BUZBEE C-4 B. SWARTZ 68
 E106A B*INTERPOLATION BY AITKENS REPEATED PROCESS
 E106A C*F4 SR6600 SCP 3.1
 E106A D* SW 2 LS 2 TYPE 1.1
 E106A E* SOURCE 68 CARDS OBJECT 20 CARDS
 E106A F**INTERPOLATION*AITKENS*REPEATED*PROCESS
 E106A G*DISK F4 COMPAT WU 05/31/73 REV 4 DECK 05/31/73 REV.4
 E106A 1*FORM: A = AKNINT(XBAR,N,M,X,Y,T)
 E106A 2*PURPOSE: GIVEN IABS(N) POINTS FROM THE GRAPH OF A FUNCTION,
 E106A 3* I.E. (X(I),F(X(I))),I=1,2,...,IABS(N), AKNINT EVALUATES A
 E106A 4* MTH DEGREE LAGRANGIAN INTERPOLANT OF THIS FUNCTION AT
 E106A 5* XBAR.
 E106A 6*ROUTINE NAME: AKNINT
 E106A 7*ENTRY NAME: AKNINT
 E106A 8*STORAGE: 354 OCTAL WORDS.
 E106A 9*ROUTINES CALLED: LABRT(N103A).

E106B A* BILL BUZBEE C-4 B SWARTZ 72
 E106B B*INTERPOLATION BY AITKENS REPEATED PROCESS
 E106B C*F4 SR7600 CROS
 E106B D* SW 2 LS 2 TYPE 1.1
 E106B E* SOURCE 68 CARDS OBJECT 20 CARDS
 E106B F**INTERPOLATION*AITKENS*REPEATED*PROCESS
 E106B G*DISK F4 COMPAT WU 05/31/73 REV 1 DECK 05/31/73 REV 4
 E106B 1*FORM: A = AKNINT(XBAR,N,M,X,Y,T)
 E106B 2*PURPOSE: GIVEN IABS(N) POINTS FROM THE GRAPH OF A FUNCTION,
 E106B 3* I.E. (X(I),F(X(I))),I=1,2,...,IABS(N), AKNINT EVALUATES A
 E106B 4* MTH DEGREE LAGRANGIAN INTERPOLANT OF THIS FUNCTION AT
 E106B 5* XBAR.
 E106B 6*ROUTINE NAME: AKNINT
 E106B 7*ENTRY NAME: AKNINT
 E106B 8*TIMING: AVERAGE TIME PER CALL ON THE 7600 IS .8 MS.
 E106B 9*STORAGE: 361 OCTAL WORDS.
 E106B 10*ROUTINES CALLED: LABRT(N103B).

E107A A* THOMAS L. JORDAN CDO 67
 E107A 0*SPLINE INTERPOLATION FUNCTION TO BE USED ONLY WITH E105A
 E107A B*BASIC NUMERICS E1 F4 SR6600 SCOPE
 E107A C* SW 2 LS 1
 E107A D*FORTRAN SOURCE CARDS 16BCDFORTRAN OBJECT CARDS 8BIN
 E107A S*TWO*DIMENSIONAL*SPLINE*INTERPOLATION
 E107A 10*ON DISK F4 COMPAT WU 11/03/67 DECK 11/03/67
 E107A 11*THIS FUNCTION SUBPROGRAM IS USED BY E105A WHEN A
 E107A 12*SUCCESSION OF VALUES IS DESIRED.
 E107A 13*STORAGE - 98 WORDS
 E107A 14*USES SPL2D2, SPL2D3(E105A).

E109A *(ESEARCH) HAS BEEN REDESIGNATED M119A.

E1AA A* R. MILLS MP-9 JAMESON AND MILLS 72
E1AA B*SI0G20 - 2D SEARCH, INTERPOLATION ON DISTORTED RECT. GRID
E1AA C*F4 MP6600 SCP 3.1
E1AA D* SW 4 LS 3 TYPE 2
E1AA E*F4 SOURCE CARDS 155 BCD OBJECT CARDS NONE
E1AA F*TWO-DIMENSIONAL*SEARCH*INTERPOLATION*DISTORTED*RECTANGULAR GRD
E1AA G*CARDS F4 COMPAT WU 03/15/72 DECK 03/15/72
E1AA 1*FORM; MAIN PROGRAM
E1AA 2*PURPOSE: RESTORE DATA FROM A KNOWN, BUT DISTORTED.
E1AA 3* RECTANGULAR GRID TO A TRUE GRID. THIS WRITEUP IS THE
E1AA 4* SAME AS THE INFORMAL REPORT LA-4891-MS.

E2 LEAST SQUARES APPROXIMATION AND CURVE FITTING

REVIEWER: B. SWARTZ, C-6

E203A A* T. JORDAN CDO 67
 E203A O*LEAST-SQUARE SPLINE APPROXIMATION
 E203A B*MATH E2 F4 SR6600 SCOPE
 E203A C* SW 5 LS 6
 E203A D*F4 SOURCE CARDS 335BCDREL COL BIN CARDS 93BIN
 E203A S**LEAST-SQUARES*SPLINE*APPROXIMATION
 E203A 10*ON DISK F4 COMPAT WU 01/20/67 DECK 01/20/67
 E203A 11*CALL SMOOTH(J,I,IOP,T,X,Y,W,F,A) WHERE J IS NUMBER OF DATA
 E203A 12*POINTS, I IS TWICE THE NUMBER OF KNOTS, IOP IS ARRAY OF
 E203A 13*DIMENSION 2 CONTAINING COMBINATIONS OF INTEGERS 1 THRU 5
 E203A 14*FOR SPECIFYING BOUNDARY CONDITIONS, T IS TABLE OF ABCISSAS
 E203A 15*OF DATA POINTS, X IS TABLE OF KNOTS, Y IS TABLE OF
 E203A 16*ORDINATES OF DATA POINTS, W IS TABLE OF WEIGHTS, A IS ARRAY
 E203A 17*OF DIMENSION .GE. I**2 USED FOR TEMPORARY STORAGE, SECOND
 E203A 18*DERIVATIVES AND FUNCTION VALUES ARE COMPUTED AND STORED IN
 E203A 19*F, LENGTH I. THERE ARE NO ERROR MESSAGES, CODE OCCUPIES OCT
 E203A 20*STORAGE=4212 WORDS. USES SEARCH(E101A) AND LSS(F404A).

E205A A* T. JORDAN CDO B. FAGAN 67
 E205A O*ORTHOGONAL POLYNOMIAL LEAST SQUARES PACKAGE
 E205A B*MATHEMATICS E2 F4 SR6600 SCOPE
 E205A C* SW 7 LS 6
 E205A D*F4 SOURCE CARDS 306BCDF4 OBJECT CARDS 98BIN
 E205A S*ORTHOGONAL*POLYNOMIAL*LEAST SQUARES
 E205A 10*CARDS F4 COMPAT WU 03/08/68 REV DECK 03/08/68 REV
 E205A 11*ORTHOGONAL POLYNOMIAL LEAST SQUARES ROUTINE. PACKAGE BINARY
 E205A 12*DECK NEEDS ID CARD IN FRONT, DATA CARDS IN BACK. FITS POLYNO
 E205A 13*MIALS UP TO A SPECIFIED MAXIMUM WITH OPTIONS TO PLOT, OBTAIN
 E205A 14*LEGENDRE COEF, EVALUATE FIT OVER A SPECIFIED INTERVAL, WITH
 E205A 15*OR WITHOUT WEIGHTS, VARIABLE INPUT FORMAT. FITS OBTAINED IN
 E205A 16*TERMS OF ORTHOGONAL POLYNOMIALS. MAXIMUM DEGREE OF
 E205A 17*FIT=20, FOR LEGENDRE POLYN.=10. FIELD LENGTH ON JOB CARD
 E205A 18*IS 060000.
 E205A 19*CONTAINS POLEY1
 E205A 20*USES PLT(J516A) AND GRAPH(J511A) FOR PLOTTING.

E207A A* B L BUZBEE C-4 B. SWARTZ 67
 E207A B*RATIONAL APPROXIMATION ROUTINE
 E207A C*F4 SR6600 SCP 3,1
 E207A D* SW 5 LS 4 TYPE 1
 E207A E*F4 SOURCE CARDS 178 BCD OBJECT CARDS 87 BIN
 E207A F**RATIONAL*APPROXIMATION ROUTINE
 E207A G*CARDS F4 COMPAT WU 08/02/72REV 3 DECK 11/14/68REV 2
 E207A 1*FORM: CALL RPROX(N,M,NP,N2,X,Y,S,EPS,A,B,IE,AA,U,W,E)
 E207A 2*PURPOSE: COMPUTE A RATIONAL APPROXIMATION, P (N)/Q(M),
 E207A 3* TO A TABULAR FUNCTION.
 E207A 4*STORAGE: 2262 OCTAL WORDS.
 E207A 5*ROUTINES CALLED: DRPOLY(C2AC), DCPOLY(C2AD), DRPOLE(C212A),
 E207A 6* DCPOLE(C213A), DGLSS(F406A), AND LABRT(N103A).

E208A A* BLAIR SWARTZ C-6 67
 E208A O*ORTHOGONAL POLYNOMIAL LEAST SQUARES SUBROUTINE
 E208A B*MATHEMATICS E2 F4 SR6600 SCOPE
 E208A C* SW 6 LS 5
 E208A D*F4 SOURCE CARDS 251BCDF4 OBJECT CARDS 77BIN
 E208A S**ORTHOGONAL*POLYNOMIAL*LEAST SQUARES
 E208A 10*CARDS F4 COMPAT WU 07/14/67 DECK 07/07/67
 E208A 11* CALL PFTS(M,KM,IW,IOR,LP,IP,LOOK,MID,K,SIGMA,X,F,W,Y,DELY,
 E208A 12* B,SB,T,ST,C,SC,A). PFTS PRODUCES (WEIGHTED) LEAST SQUARES
 E208A 13* POLYNOMIAL FITS, Y(X), OF DEGREE KM LE. 29, TO POINTS
 E208A 14* (X(I), F(I)), I=1,...,M LE. 300. ARGUMENTS IW THROUGH MID
 E208A 15* CONTROL OPTIONS CONCERNING THE WEIGHTS, THE TYPE OF RESULTS
 E208A 16* PRINTED, AND EXAMINATION OF THE INTERMEDIATE FITS. SIGMA
 E208A 17* AND Y THROUGH A ARE COMPUTED FOR EACH FIT TO DEGREE KM,
 E208A 18* E.G. B CONTAINS THE COEFFICIENTS OF Y(X). X THRU A HAVE
 E208A 19* DIMENSION REQUIREMENTS, E.G. A(30,30). STORAGE IS 2187 WDS.
 E208A 20* PFTS USES SQRT(B408A).

E3

SMOOTHING TABULAR DATA

REVIEWER: B. SWARTZ, C-6

E302A A* BAKER, L. H. ENG-7 GAYER, STEPHEN J. 71
 E302A B*TIMAV TABULAR FUNCTION SMOOTHING ROUTINE
 E302A C*F4 SR6600 SCP 3.1
 E302A D* SW 2 LS 4 TYPE 1
 E302A E*F4 SOURCE CARDS 160 BCD OBJECT CARDS 41 BIN
 E302A F**TIMAV*TABULAR*SMOOTHING
 E302A G*CARDS F4 COMPAT WU 09/02/71 DECK 09/02/71
 E302A 1*FORM: CALL TIMAV(TMCON,ARRAY,LRAY,ORRAY,ISING)
 E302A 2*PURPOSE: GIVEN A TABULAR SET OF ABCISSAS AND ORDINATES,
 E302A 3* PRODUCE A NEW SET OF SMOOTHED ORDINATES.
 E302A 4*ROUTINE NAME: TIMAV
 E302A 5*ENTRY NAME: TIMAV
 E302A 6*STORAGE: 1012 OCTAL WORDS
 E302A 7*ROUTINE CALLED: TINT(E302A).

E302B A* BAKER, L. H. ENG-7 GAYER, STEPHEN J. 71
 E302B B*TIMAV TABULAR FUNCTION SMOOTHING ROUTINE
 E302B C*F4 SR7600 CROS
 E302B D* SW 2 LS 5 TYPE 1
 E302B E*F4 SOURCE CARDS 160 BCD OBJECT CARDS 41 BIN
 E302B F**TIMAV*TABULAR*SMOOTHING
 E302B G*CARDS F4 COMPAT WU 09/02/71 DECK 09/02/71
 E302B 1*FORM: CALL TIMAV(TMCON,ARRAY,LRAY,ORRAY,ISING)
 E302B 2*PURPOSE: TO PRODUCE VALUES FOR A SMOOTHED OUT TABULAR
 E302B 3* FUNCTION AT TIMES INPUT WITH ORIGINAL TABLE
 E302B 4*ROUTINE NAME: TIMAV
 E302B 5*ENTRY NAME: TIMAV
 E302B 6*STORAGE: 1020 OCTAL WORDS
 E302B 7*ROUTINE CALLED: TINT(E302B).

E4

NON-LINEAR OPTIMIZATION

REVIEWER: M. KLEIN, C-6

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E4AA  A*          TOM DOYLE          C-6          M. KLEIN          71
E4AA  B*OPTIMIZ A CONTINUOUS N-PARAMETER SYSTEM
E4AA  C*F4          SR7600          CROS
E4AA  D*          SW 12          LS 0          TYPE 2
E4AA  E*          SOURCE TAPE NO. LE441L00
E4AA  F**OPTIMIZE*CONTINUOUS*N-PARAMETER*SYSTEM
E4AA  G*TAPE          F4 COMPAT          WU 04/27/73REV.2 DECK 04/27/73REV.2
E4AA  1*FORM: CALL OPTIMIZ(U,V)
E4AA  2*          CALL PHIGRAD(V)
E4AA  3*PURPOSE: TO OPTIMIZ A CONTINUOUS N-PARAMETER SYSTEM
E4AA  4*          BY EITHER MINIMIZING OR MAXIMIZING A SUM OF SQUARES
E4AA  5*ROUTINE NAME: OPTIMIZ
E4AA  6*ENTRY NAMES: OPTIMIZ,PSEARCH,GLSS,BOUNDS,HSLECS,ETASRCH,
E4AA  7*          PHIGRAD
E4AA  8*STORAGE: 66800 OCTAL WORDS OF SCM
E4AA  9*          ALL OF LCM
E4AA  10*ROUTINES CALLED: SECOND(Q115B),DOTPRO(F124B),SQRT(B408B),
E4AA  11*          LABRT(N103B),VECPROD(F133B),VECSUM(F133B),ADDVEC(F133B),
E4AA  12*          DSQRT(B410B),ECDR/ECWR(SYSTEM)
E4AA  13*OTHER EXTERNALS:
E4AA  14*          DOYLE1,DOYLE2,DOYLE3,DOYLE4,DOYLE5,DOYLE6,
E4AA  15*          DOYLE7 (ALL COMMONS), PHIGRAD (ALSO A COMMON BLOCK)

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F

NUMERICAL LINEAR ALGEBRA

F1 VECTOR AND MATRIX OPERATIONS

REVIEWER: B. BUZBEE, C-4

F115A A* J. DURAN T-1 I. CHERRY 68
 F115A O*VECTOR MAXIMUM,MINIMUM,MAXIMUM ABS.,OR MINIMUM ABS.
 F115A B*VECTORS F1 F4 SR6600 SCOPE
 F115A C* SW 1 LS 1
 F115A D*F4SOURCE DECK 32BCD 9BIN
 F115A S**VECTOR*MAXIMUM*MINIMUM
 F115A 10*ON DISK F4 COMPAT WU 06/03/68 REV DECK 04/16/68 REV
 F115A 11* CALLED BY MAXV(X,IX,N,I,Y),OR MINV, MAXAV, MINAV
 F115A 12* DETERMINES THE MAXIMUM, MINIMUM, MAXIMUM ABSOLUTE,
 F115A 13* MINIMUM ABSOLUTE OF N NUMBER OF ELEMENTS OF A VECTOR X.
 F115A 14* IX IS THE SPACING AT WHICH THE X VALUES ARE TO BE EXAMINED.
 F115A 15* THE LENGTH OF VECTOR X MUST BE AT LEAST(N-1)*IX +1.
 F115A 16* THE DESIRED ELEMENT IS STORED IN Y AND I .GE.1 AND
 F115A 17* I.LE.N IS THE ELEMENT NUMBER. 96 WORDS OF STORAGE.
 F115A 18*SELF-CONTAINED.

F1158 A* J.DURAN C-4 B.BUZBEE 72
 F1158 B*VECTOR MAXIMUM MINIMUM MAXIMUM ABS., OR MINIMUM ABS.
 F1158 C*F4 SR7600 CROS
 F1158 D* SW 1 LS 2 TYPE 1
 F1158 E*F4 SOURCE CARDS 52 BCD OBJECT CARDS 15 BIN
 F1158 F**VECTOR*MAXIMUM*MINIMUM
 F1158 G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 F1158 1*FORM: CALL MAXV(X,IX,N,I,Y) OR MINV, MAXAV, MINAV
 F1158 2*PURPOSE: DETERMINES THE MAXIMUM, MINIMUM, MAXIMUM ABSOLUTE,
 F1158 3* MINIMUM ABSOLUTE OF N NUMBER OF ELEMENTS OF A VECTOR X.
 F1158 4* IX IS THE SPACING AT WHICH THE X VALUES ARE TO BE
 F1158 5* EXAMINED. THE LENGTH OF VECTOR X MUST BE AT LEAST
 F1158 6* (N-1)*IX+1. THE DESIRED ELEMENT IS STORED IN Y AND
 F1158 7* I .GE.1 AND I.LE.N IS THE ELEMENT NUMBER.
 F1158 8*ROUTINE NAME: MAXV
 F1158 9*ENTRY NAMES: MAXV,MINV,MAXAV,MINAV
 F1158 10*STORAGE: 245 OCTAL WORDS
 F1158 11*ROUTINES CALLED: LIBMSG(SYSTEM).

F112
 F116A A* CHERRY T-1 R. ANDERSON 68
 F116A 0*MATRIX MAXIMUM,MINIMUM,MAXIMUM ABSOLUTE,MINIMUM ABS.
 F116A B*MATRICES F1 F4 SR6600 SCOPE
 F116A C* SW 1 LS 1
 F116A D*F4 SOURCE DECK 35BCDBINARY 12BIN
 F116A S**MAXIMUM*MINIMUM*MATRIX ELEMENT
 F116A 10*ON DISK F4 COMPAT WU 04/18/68 DECK 04/18/68
 F116A 11*CALLED BY MAXM(A,IA,N,M,I,J,B) OR MINM,MAXAM,MINAM
 F116A 12*DETERMINES THE MAXIMUM, MINIMUM, MAXIMUM ABSOLUTE,
 F116A 13*OR MINIMUM ABSOLUTE ELEMENT AND THE INDICES OF THAT
 F116A 14*ELEMENT IN MATRIX A. IA IS THE COLUMN LENGTH OF A AS
 F116A 15*SPECIFIED IN THE DIMENSION STATEMENT, I.E. DIMENSION
 F116A 16*A(IA,KA). N AND M ARE THE NUMBER OF ROWS AND COLUMNS
 F116A 17*RESPECTIVELY. I IS THE ROW(FIRST) INDEX TO THE
 F116A 18*RESULTANT ELEMENT. J IS THE COLUMN(SECOND) INDEX TO
 F116A 19*THE RESULTANT ELEMENT. B CONTAINS THE DESIRED ELEMENT.
 F116A 20* 120 WORD STORAGE. SELF CONTAINED.

F116B A* I.CHERRY C-4 B.BUZBEE 72
 F116B B*MATRIX MAXIMUM,MINIMUM,MAXIMUM ABSOLUTE,MINIMUM ABS.
 F116B C*F4 SR7600 CROS
 F116B D* SW 1 LS 2 TYPE 1
 F116B E*F4 SOURCE CARDS 55 BCD OBJECT CARDS 18 BIN
 F116B F**MAXIMUM*MINIMUM*MATRIX ELEMENT
 F116B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 F116B 1*FORM: CALL MAXM(A,IA,N,M,I,J,B) OR MINM,MAXAM,MINAM
 F116B 2*PURPOSE: DETERMINES THE MAXIMUM, MINIMUM, MAXIMUM ABSOLUTE,
 F116B 3* OR MINIMUM ABSOLUTE ELEMENT AND THE INDICES OF THAT
 F116B 4* ELEMENT IN MATRIX A.
 F116B 5* IA IS THE COLUMN LENGTH OF A AS SPECIFIED IN THE
 F116B 6* DIMENSION STATEMENT, I.E. DIMENSION A(IA,KA).
 F116B 7* N AND M ARE THE NUMBER OF ROWS AND COLUMNS RESPECTIVELY.
 F116B 8* I IS THE ROW(FIRST) INDEX TO THE RESULTANT ELEMENT.
 F116B 9* J IS THE COLUMN(SECOND) INDEX TO THE RESULTANT ELEMENT.
 F116B 10* B CONTAINS THE DESIRED ELEMENT.
 F116B 11*ROUTINE NAME: MAXM
 F116B 12*ENTRY NAMES: MAXM,MINM,MAXAM,MINAM
 F116B 13*STORAGE: 312 OCTAL WORDS
 F116B 14*ROUTINES CALLED: LIBMSG(SYSTEM).

F117A A* PAUL HARPER T-1 67
 F117A 0*MATRIX IDENTITY GENERATOR
 F117A B*MATRICES F1 F4 SR6600 SCOPE
 F117A C* SW 1 LS 1
 F117A D*F4 SOURCE CARDS 8RCREL BIN 4BIN
 F117A S**IDENTITY*MATRIX*GENERATOR
 F117A 10*ON DISK F4 COMPAT WU 08/25/67 DECK 08/25/67
 F117A 11*CALL GENID(A,N,IA). GENERATES A STANDARD N BY N IDENTITY
 F117A 12*MATRIX IN A WHERE N IS THE ORDER OF A AND IA IS THE SPACING
 F117A 13*BETWEEN COLUMNS OF A AS SPECIFIED IN THE DIMENSION STATEMENT.
 F117A 14*USEFUL FOR SOLVING $BX = I$. THE TEST PROGRAM PRINTS EITHER
 F117A 15*(GENID RESULTS ARE CORRECT) OR (GENID RESULTS ARE INCOR-
 F117A 16*RECT). STORAGE = 30 WORDS.
 F117A 17*SELF CONTAINED.

F117B A* B.L.BUZBEE C-4 72
 F117B B*MATRIX IDENTITY GENERATOR
 F117B C*F4 SR7600 CROS
 F117B D* SW 1 LS 1 TYPE 1
 F117B E*F4 SOURCE CARDS 13 BCD OBJECT CARDS 6 BIN
 F117B F**IDENTITY*MATRIX*GENERATOR
 F117B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 F117B 1*FORM: CALL GENID(A,N,IA)
 F117B 2*PURPOSE: GENERATES A STANDARD N BY N IDENTITY MATRIX IN
 F117B 3* A WHERE N IS THE ORDER OF A AND IA IS THE SPACING
 F117B 4* BETWEEN COLUMNS OF A AS SPECIFIED IN THE DIMENSION
 F117B 5* STATEMENT. USEFUL FOR SOLVING $BX = I$.
 F117B 6*ROUTINE NAME: GENID
 F117B 7*ENTRY NAME: GENID
 F117B 8*STORAGE: 52 OCTAL WORDS.
 F117B 9*ROUTINES CALLED: LIBMSG(SYSTEM).

F119A A* IVAN CHERRY T-1 TOM JORDAN 67
 F119A 0*MATRIX TRANSPOSE IN PLACE
 F119A B*MATRICES F1 F4 SR6600 SCOPE
 F119A C* SW 1 LS 1
 F119A D*F4 SOURCE CARDS 15BCDF4 OBJECT CARDS 5BIN
 F119A S**MATRIX*TRANSPOSE
 F119A 10*ON DISK F4 COMPAT WU 01/23/67 DECK 01/23/67
 F119A 11*CALLED BY=MATRS (A,IA,N,M)
 F119A 12*PURPOSE. TO TRANSPOSE THE MATRIX A. THAT IS,
 F119A 13*A(N,M) IS REPLACED BY A(M,N).
 F119A 14*A IS THE ORIGIN OF MATRIX A. IA IS THE SPACING BETWEEN
 F119A 15*COLUMNS OF A. I.E., A(IA,J) AS SPECIFIED BY THE DIMENSION
 F119A 16*STATEMENT. N IS THE NUMBER OF ROWS. M IS THE NUMBER
 F119A 17*OF COLUMNS. IA MUST BE GREATER THAN OR EQUAL TO
 F119A 18*THE MAXIMUM OF M AND N. THE DIMENSIONS OF A MUST
 F119A 19*BE AT LEAST AS GREAT AS THE MAXIMUM OF MXM AND NXN.
 F119A 20*SELF CONTAINED STORAGE REQUIREMENT 46 WORDS

F119B A* IVAN CHERRY C-4 B.BUZBEE 72
 F119B B*MATRIX TRANSPOSE IN PLACE
 F119B C*F4 SR7600 CROS
 F119B D* SW 1 LS 1 TYPE 1
 F119B E*F4 SOURCE CARDS 20 BCD OBJECT CARDS 7 BIN
 F119B F**MATRIX*TRANSPOSE
 F119B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 F119B 1*FORM: CALL MATRS(A,IA,N,M)
 F119B 2*PURPOSE: TRANSPOSE THE MATRIX A. THAT IS, A(N,M) IS
 F119B 3* REPLACED BY A(M,N).
 F119B 4* A IS THE ORIGIN OF MATRIX A.
 F119B 5* IA IS THE SPACING BETWEEN COLUMNS OF A, I.E., A(IA,J)
 F119B 6* AS SPECIFIED BY THE DIMENSION STATEMENT.
 F119B 7* N IS THE NUMBER OF ROWS.
 F119B 8* M IS THE NUMBER OF COLUMNS.
 F119B 9* IA MUST BE GREATER THAN OR EQUAL TO THE MAXIMUM
 F119B 10* OF M AND N. THE DIMENSIONS OF A MUST BE AT LEAST AS
 F119B 11* GREAT AS THE MAXIMUM OF MXM AND MXN.
 F119B 12*ROUTINE NAME: MATRS
 F119B 13*ENTRY NAME: MATRS
 F119B 14*STORAGE: 70 OCTAL WORDS.
 F119B 15*ROUTINES CALLED: LIBMSG(SYSTEM).

F120A A* IVAN CHERRY T-1 TOM JORDAN 67
 F120A O*MATRIX MOVE
 F120A B*MATRICES F1 F4 SR6600 SCOPE
 F120A C* SW 1 LS 1
 F120A D*F4 SOURCE CARDS 7BCDF4 OBJECT CARDS 5BIN
 F120A S**MATRIX*MOVE
 F120A 10*ON DISK F4 COMPAT WU 01/23/67 DECK 01/23/67
 F120A 11*CALLED BY- MATMOV (N,M,A,IA,B,IB)
 F120A 12*TO MOVE AN N X M MATRIX EMBEDDED IN A TO A MATRIX B WITH
 F120A 13*POSSIBLY DIFFERENT DIMENSIONS. N IS THE NUMBER OF ROWS IN A
 F120A 14*M IS THE NUMBER OF COLUMNS IN A.
 F120A 15*A IS THE ORIGIN OF THE MATRIX A
 F120A 16*B IS THE ORIGIN OF THE MATRIX B
 F120A 17*IA AND IB ARE THE SPACINGS BETWEEN COLUMNS OF THE MATRICES A
 F120A 18*AND B RESPECTIVELY, I.E.,A(IA,J) AS SPECIFIED IN THE
 F120A 19*DIMENSION STATEMENT.
 F120A 20*SELF CONTAINED. STORAGE REQUIREMENT 35 WORDS

F120B A* IVAN CHERRY C-4 B.BUZZBEE 72
 F120B B*MATRIX MOVE
 F120B C*F4 SR7600 CROS
 F120B D* SW 1 LS 1 TYPE 1
 F120B E*F4 SOURCE CARDS 12 BCD OBJECT CARDS 6 BIN
 F120B F**MATRIX*MOVE
 F120B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 F120B 1*FORM: CALL MATMOV (N,M,A,IA,B,IB)
 F120B 2*PURPOSE: MOVE AN N X M MATRIX EMBEDDED IN A TO A MATRIX B
 F120B 3* WITH POSSIBLY DIFFERENT DIMENSIONS.
 F120B 4* N IS THE NUMBER OF ROWS IN A
 F120B 5* M IS THE NUMBER OF COLUMNS IN A
 F120B 6* A IS THE ORIGIN OF THE MATRIX A
 F120B 7* B IS THE ORIGIN OF THE MATRIX B
 F120B 8* IA AND IB ARE THE SPACINGS BETWEEN COLUMNS OF THE
 F120B 9* MATRICES A AND B RESPECTIVELY, I.E.,A(IA,J) AS SPECIFIED
 F120B 10* IN THE DIMENSION STATEMENT.
 F120B 11*ROUTINE NAME: MATMOV
 F120B 12*ENTRY NAME: MATMOV
 F120B 13*STORAGE: 60 OCTAL WORDS
 F120B 14*ROUTINES CALLED: LIBMSG(SYSTEM).

F121A A* IVAN CHERRY T-1 TOM JORDAN 67
 F121A 0*MATRIX MOVE AND TRANSPOSE
 F121A B*MATRICES F1 F4 SR6600 SCOPE
 F121A C* SW 1 LS 1
 F121A D*F4 SOURCE CARDS 7RCDF4 OBJECT CARDS 5BIN
 F121A S*MATRIX*TRANSPOSE*MOVE
 F121A 10*ON DISK F4 COMPAT WU 01/23/67 DECK 01/23/67
 F121A 11*CALLED BY= MATTRA(N,M,A,IA,B,IB)
 F121A 12*PURPOSE= STORES THE TRANSPOSE OF THE NXM MATRIX IN MATRIX B.
 F121A 13*N IS THE NUMBER OF ROWS (1ST INDEX) IN THE MATRIX.
 F121A 14*M IS THE NUMBER OF COLUMNS (2ND INDEX) IN THE MATRIX.
 F121A 15*A AND B ARE THE ORIGINS OF THE MATRICES.
 F121A 16*IA AND IB ARE THE SPACINGS BETWEEN THE COLUMNS OF THE
 F121A 17*MATRICES A AND B RESPECTIVELY, E.G., A(IA,J) AS SPECIFIED
 F121A 18*IN THE DIMENSION STATEMENT.
 F121A 19*SELF CONTAINED. STORAGE REQUIREMENT 37 WORDS.

F121B A* IVAN CHERRY C-4 B.BUZBEE 72
 F121B B*MATRIX MOVE AND TRANSPOSE
 F121B C*F4 SR7600 CROS
 F121B D* SW 1 LS 1 TYPE 1
 F121B E*F4 SOURCE CARDS 12 BCD OBJECT CARDS 6 BIN
 F121B F**MATRIX*TRANSPOSE*MOVE
 F121B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 F121B 1*FORM: CALL MATTRA(N,M,A,IA,B,IB)
 F121B 2*PURPOSE: STORES THE TRANSPOSE OF THE NXM MATRIX A IN
 F121B 3* MATRIX B.
 F121B 4* N IS THE NUMBER OF ROWS (1ST INDEX) IN THE MATRIX.
 F121B 5* M IS THE NUMBER OF COLUMNS (2ND INDEX) IN THE MATRIX.
 F121B 6* A AND B ARE THE ORIGINS OF THE MATRICES.
 F121B 7* IA AND IB ARE THE SPACINGS BETWEEN THE COLUMNS OF THE
 F121B 8* MATRICES A AND B RESPECTIVELY, E.G., A(IA,J) AS
 F121B 9* SPECIFIED IN THE DIMENSION STATEMENT.
 F121B 10*ROUTINE NAME: MATTRA
 F121B 11*ENTRY NAME: MATTRA
 F121B 12*STORAGE: 62 OCTAL WORDS
 F121B 13*ROUTINES CALLED: LIBMSG(SYSTEM).

F122A A* B. L. BUZBEE C-4 IVAN CHERRY 67
 F122A O*MATRIX MULTIPLY ROUTINE
 F122A B*MATRICES F1 F4 SR6600 SCOPE
 F122A C* SW 1 LS 1
 F122A D*F4 SOURCE CARDS 7BCDF4 OBJECT CARDS 6BIN
 F122A S**MATRIX*MULTIPLY
 F122A 10*ON DISK F4 COMPAT WU 10/18/68REV DECK 10/18/68REV
 F122A 11* CALLED BY- MATMPY (N,M,L,A,IA,B,IB,C,IC)
 F122A 12* MULTIPLIES NXM MATRIX A BY MXL MATRIX B
 F122A 13* TO FORM NXL MATRIX C. IA, IB, IC ARE THE
 F122A 14* COLUMN LENGTHS AS SPECIFIED IN DIMENSION STATEMENT,
 F122A 15* I.E. DIMENSION A(IA,KA), B(IB,KB), C(IC,KC).
 F122A 16* THE ELEMENTS OF THE PRODUCT ARE COMPUTED IN DOUBLE
 F122A 17* PRECISION PRIOR TO STORING IN C.
 F122A 18* USES DOTPRO (F124A). STORAGE REQUIREMENT 51 WORDS.

F123A A* B BUZBEE C-4 B BUZBEE 67
 F123A B*MATRIX TRANSPOSE MULTIPLY ROUTINE
 F123A C*F-4 SR6600 SCP 3.1
 F123A D* SW 1 LS 1 TYPE 1.1
 F123A E*SOURCE CARDS 7 BCD OBJECT CARDS 7 BIN
 F123A F**MATRIX*TRANSPOSE*MULTIPLY
 F123A G*DISK F4 COMPAT WU 04/03/73REV.1 DECK 04/03/73REV.1
 F123A 1*FORM: CALL MTMPY (M,N,L,A,IA,B,IB,C,IC)
 F123A 2*PURPOSE: MULTIPLY THE TRANSPOSE OF MXN MATRIX A BY
 F123A 3* MXL MATRIX B TO FORM NXL MATRIX C. IA, IB, IC ARE THE
 F123A 4* COLUMN LENGTHS AS SPECIFIED IN THE DIMENSION
 F123A 5* STATEMENT, I.E. DIMENSION A(IA,KA), B(IB,KB),
 F123A 6* C(IC,KC). THE ELEMENTS OF THE PRODUCT ARE COMPUTED
 F123A 7* WITH DOUBLE PRECISION ACCUMULATION.
 F123A 8*ROUTINE NAME: MTMPY
 F123A 9*ENTRY NAME: MTMPY
 F123A 10* STORAGE 64 OCTAL WORDS
 F123A 11*ROUTINES CALLED: DOTPRO (F124A)

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F123B A*          B BUZBEE          C-4          B BUZBEE          73
F123B B*MATRIX TRANSPOSE MULTIPLY ROUTINE
F123B C*F-4          SR7600          CROS
F123B D*          SW 1          LS 1          TYPE 1.1
F123B E*SOURCE CARDS          7          BCD          OBJECT CARDS          7          BIN
F123B F**MATRIX*TRANSPOSE*MULTIPLY
F123B G*DISK          F4          COMPAT          WU 04/03/73          DECK 04/03/73
F123B 1*FORM: CALL MTMPY (M,N,L,A,IA,B,IB,C,IC)
F123B 2*PURPOSE: MULTIPLY THE TRANSPOSE OF MXN MATRIX A BY
F123B 3*          MXL MATRIX B TO FORM NXL MATRIX C. IA, IB, IC ARE THE
F123B 4*          COLUMN LENGTHS AS SPECIFIED IN THE DIMENSION
F123B 5*          STATEMENT, I.E. DIMENSION A(IA,KA), B(IB,KR),
F123B 6*          C(IC,KC). THE ELEMENTS OF THE PRODUCT ARE COMPUTED
F123B 7*          WITH DOUBLE PRECISION ACCUMULATION.
F123B 8*ROUTINE NAME: MTMPY
F123B 9*ENTRY NAME: MTMPY
F123B 10* STORAGE 70 OCTAL WORDS
F123B 11*ROUTINES CALLED: DOTPRO (F124B)

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F124A A*          B. L. BUZBEE          C-4          R. M. FRANK          67
F124A B*INNER PRODUCT OF TWO VECTORS (DOT PRODUCT)
F124A C*COMPASS          SR6600          SCP 3.1
F124A D*          SW 1          LS 3          TYPE 1
F124A E*CMP SOURCE CARDS          107          BCD          OBJECT CARDS          5          BIN
F124A F**VECTOR*PRODUCT
F124A G*ON DISK          F4          COMPAT          WU 10/02/72REV 4          DECK 10/02/72REV 4
F124A 1*FORM: Z=DOTPRO(N,X,IX,Y,IY)
F124A 2*PURPOSE: PRODUCES INNER PRODUCT OF TWO VECTORS WHERE X AND Y
F124A 3*          ARE REAL VECTORS EACH CONTAINING N ELEMENTS. IX AND IY
F124A 4*          ARE THE SPACINGS BETWEEN ELEMENTS OF X AND Y RESPECTIVELY.
F124A 5*          THE RESULT IS THE INNER PRODUCT (X.Y) OF THE VECTORS
F124A 6*          X AND Y, I.E., THE SUM OF X(I)*Y(I) FROM I = 1 TO N.
F124A 7*          THE RESULT IS ZERO IF N = 0, INFINITE IF N.LT.0.
F124A 8*          RESULT IS DOUBLE PRECISION BUT MAY BE USED AS SINGLE
F124A 9*          DEPENDING ON CALLING PROGRAM DEFINITION OF DOTPRO.
F124A 10*ROUTINE NAME: DOTPRO
F124A 11*ENTRY NAME: DOTPRO
F124A 12*STORAGE: 26 OCTAL WORDS.
F124A 13*SELF CONTAINED.

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F124B A* B. L. BUZBEE C-4 R. M. FRANK 72
 F124B B*INNER PRODUCT OF TWO VECTORS (DOT PRODUCT)
 F124B C*COMPASS SR7600 CROS
 F124B D* SW 1 LS 3 TYPE 1
 F124B E*CMP SOURCE CARDS 107 BCD OBJECT CARDS 5 BIN
 F124B F**VECTOR*PRODUCT
 F124B G*ON DISK F4 COMPAT WU 10/02/72 DECK 10/02/72
 F124B 1*FORM: Z=DOTPRO(N,X,IX,Y,IY)
 F124B 2*PURPOSE: PRODUCES INNER PRODUCT OF TWO VECTORS WHERE X AND Y
 F124B 3* ARE REAL VECTORS EACH CONTAINING N ELEMENTS. IX AND IY
 F124B 4* ARE THE SPACINGS BETWEEN ELEMENTS OF X AND Y RESPECTIVELY.
 F124B 5* THE RESULT IS THE INNER PRODUCT (X,Y) OF THE VECTORS
 F124B 6* X AND Y, I.E., THE SUM OF X(I)*Y(I) FROM I = 1 TO N.
 F124B 7* THE RESULT IS ZERO IF N = 0, INFINITE IF N.LT.0.
 F124B 8* RESULT IS DOUBLE PRECISION BUT MAY BE USED AS SINGLE
 F124B 9* DEPENDING ON CALLING PROGRAM DEFINITION OF DOTPRO.
 F124B 10*ROUTINE NAME: DOTPRO
 F124B 11*ENTRY NAME: DOTPRO
 F124B 12*STORAGE: 26 OCTAL WORDS.
 F124B 13*SELF CONTAINED.

F125A A* PAUL HARPER CDO 67
 F125A O*CORRECTION OF AN APPROXIMATE INVERSE MATRIX
 F125A B*MATRIX THEORY F1 F4 6600 SCOPE
 F125A C* SW 2 LS 1
 F125A D*F4 SOURCE CARDS 48BCDREL BIN 16BIN
 F125A S**MATRIX*INVERSE*CORRECTOR
 F125A 10*ON DISK F4 COMPAT WU 08/18/67 DECK 08/18/67
 F125A 11*CALL CORINV(A,B,N,IA,D) CORRECTS AN APPROXIMATE INVERSE
 F125A 12*MATRIX B OF THE MATRIX A. A IS THE NAME OF THE MATRIX FOR
 F125A 13*WHICH B IS THE APPROXIMATE INVERSE. N IS THE NUMBER OF ROWS
 F125A 14*IN A, IA IS THE FIRST DIMENSION OF A(IA,N) AND B(IA,N) AS
 F125A 15*SPECIFIED IN THE DIMENSION STATEMENT OF CALLING PROGRAM, AND
 F125A 16*D IS THE NAME OF N(N+1) WORDS OF SINGLE DIMENSIONED TEMPORARY
 F125A 17*STORAGE.
 F125A 18*USES LABRT(N103A). STORAGE 189 WORDS

F128A A* B.L.BUZBEE C-4
 F128A B*MODIFIED GRAM-SCHMIDT ORTHOGONALIZATION
 F128A C*F4 SR6600 SCP 3.1
 F128A D* SW 3 LS 2 TYPE 1.1
 F128A E*F4 SOURCE CARDS 70 BCD OBJECT CARDS 19 BIN
 F128A F*MODIFIED*GRAM-SCHMIDT*ORTHOGONALIZATION
 F128A G*ON DISK F4 COMPAT WU 03/22/73REV 3 DECK 03/22/73REV 2
 F128A 1*FORM: CALL MGS(M,N,A,IA,NR)
 F128A 2*PURPOSE: ORTHOGONALIZES THE COLUMNS OF THE M BY N MATRIX
 F128A 3* STORED IN ARRAY A, THE COLUMN LENGTH OF A IS IA, AND
 F128A 4* THE RANK OF THE MATRIX IS RETURNED IN NR.
 F128A 5*ROUTINE NAME: MGS
 F128A 6*ENTRY NAME: MGS
 F128A 7*STORAGE: 333 OCTAL WORDS
 F128A 8*ROUTINES CALLED: SQRT(B408A),DOTPRO(F124A).

F128B A* B.L.BUZBEE C-4
 F128B B*MODIFIED GRAM-SCHMIDT ORTHOGONALIZATION
 F128B C*F4 SR7600 CROS
 F128B D* SW 3 LS 2 TYPE 1.1
 F128B E*F4 SOURCE CARDS 70 BCD OBJECT CARDS 19 BIN
 F128B F*MODIFIED*GRAM-SCHMIDT*ORTHOGONALIZATION
 F128B G*ON DISK F4 COMPAT WU 03/22/73 DECK 03/22/73
 F128B 1*FORM: CALL MGS(M,N,A,IA,NR)
 F128B 2*PURPOSE: ORTHOGONALIZES THE COLUMNS OF THE M BY N MATRIX
 F128B 3* STORED IN ARRAY A, THE COLUMN LENGTH OF A IS IA, AND
 F128B 4* THE RANK OF THE MATRIX IS RETURNED IN NR.
 F128B 5*ROUTINE NAME: MGS
 F128B 6*ENTRY NAME: MGS
 F128B 7*7600 TIMING: N=10, M=100, .035 SEC.
 F128B 8*STORAGE: 336 OCTAL WORDS
 F128B 9*ROUTINES CALLED: SQRT(B408), DOTPRO(F124).

F129A *(GNSM) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F1AA.

F130A *(GSM) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F1AB.

F131A *(GHM) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F1AC.

F132A A* B. L. BUZBEE C-4 B L BUZBEE 67
 F132A B*MATRIX INVERSE
 F132A C* SR6600 SCP 3.1
 F132A D* SW 2 LS 3 TYPE 1.1
 F132A E*SOURCE CARDS 99 BCD OBJECT CARDS 35 BIN
 F132A F**MATRIX*INVERSE
 F132A G*ON DISK F4 COMPAT WU 04/06/73REV 5 DECK 04/06/73REV 4
 F132A 1*FORM: CALL MATINV(A,IA,N,R,DET)
 F132A 2*PURPOSE: FIND THE INVERSE OF A MATRIX A.
 F132A 3*TIMING: 87 MILLISECONDS FOR N = 20.
 F132A 4*ROUTINE NAME: MATINV
 F132A 5*ENTRY NAME: MATINV
 F132A 6*STORAGE= 655 (OCTAL) WORDS.
 F132A 7*ROUTINES CALLED: LABRT (N103A), DOTPRO (F124A).

F132B A* B. L. BUZBEE C-4 B L BUZBEE 73
 F132B B*MATRIX INVERSE
 F132B C* SR7600 CROS
 F132B D* SW 2 LS 3 TYPE 1.1
 F132B E*SOURCE CARDS 99 BCD OBJECT CARDS 35 BIN
 F132B F**MATRIX*INVERSE
 F132B G*ON DISK F4 COMPAT WU 04/06/73 DECK 04/06/73
 F132B 1*FORM: CALL MATINV(A,IA,N,R,DET)
 F132B 2*PURPOSE: FIND THE INVERSE OF A MATRIX A.
 F132B 3*TIMING: 14 MILLISECONDS FOR N = 20
 F132B 4*ROUTINE NAME: MATINV
 F132B 5*ENTRY NAME: MATINV
 F132B 6*STORAGE= 665 (OCTAL) WORDS.
 F132B 7*ROUTINES CALLED: LABRT (N103B), DOTPRO (F124B).

F133A A* B L BUZBEE C-4 B.L.BUZBEE 69
 F133A B*VECTOR ADDITION
 F133A C*COMPASS SR6600 SCP 3.1
 F133A D* SW 3 LS 3 TYPE 1.1
 F133A E* SOURCE 91 CARDS OBJECT 6 CARDS
 F133A F**VECTOR*ADDITION*SUM*PRODUCT
 F133A G*DISK F4 COMPAT WU 05/01/73 REV.3 DECK 05/01/73 REV.3
 F133A 1*FORM: CALL ADDVEC (N,A,X,NX,Y,NY,Z,NZ)
 F133A 2* CALL VEC SUM (Y,X,A,Z,N)
 F133A 3* CALL VEC PROD (B,X,A,Z,N)
 F133A 4*PURPOSE: COMPUTE $Z = A * X + Y$ WHERE A IS SCALAR AND
 F133A 5* X, Y, AND Z ARE N-DIMENSIONAL VECTORS.
 F133A 6*ROUTINE NAME: ADDVEC
 F133A 7*ENTRY NAMES: ADDVEC, VEC SUM, VEC PROD
 F133A 8*STORAGE: 44 OCTAL WORDS
 F133A 9*ROUTINES CALLED: SELF CONTAINED

F133B A* B L BUZBEE C-4 B.L.BUZBEE 73
 F133B B*VECTOR ADDITION
 F133B C*COMPASS SR7600 CROS
 F133B D* SW 3 LS 3 TYPE 1.1
 F133B E* SOURCE 91 CARDS OBJECT 6 CARDS
 F133B F**VECTOR*ADDITION*SUM*PRODUCT
 F133B G*DISK F4 COMPAT WU 05/01/73 DECK 05/01/73
 F133B 1*FORM: CALL ADDVEC (N,A,X,NX,Y,NY,Z,NZ)
 F133B 2* CALL VECSUM (Y,X,A,Z,N)
 F133B 3* CALL VECPROD (B,X,A,Z,N)
 F133B 4*PURPOSE: COMPUTE $Z = A * X + Y$ WHERE A IS SCALAR AND
 F133B 5* X, Y, AND Z ARE N-DIMENSIONAL VECTORS.
 F133B 6*TIMING: ON CDC 7600, AS N INCREASES AVERAGE TIME/ELEMENT
 F133B 7* GOES FROM 3.8 TO 0.4 MILLISEC.
 F133B 8*ROUTINE NAME: ADDVEC
 F133B 9*ENTRY NAMES: ADDVEC, VECSUM, VECPROD
 F133B 10*STORAGE: 44 OCTAL WORDS
 F133B 11*ROUTINES CALLED: SELF CONTAINED

F134A A* B. L. BUZBEE C-4 70
 F134A B*ECS MATRIX MULTIPLY
 F134A C*F4 SR6600 SCP 3.1
 F134A D* SW 3 LS 2 TYPE 1
 F134A E*SOURCE CARDS 40 BCD OBJECT CARDS 13 BIN
 F134A F**MATRIX*MULTIPLY*ECS
 F134A G*CARDS F4 COMPAT WU 09/08/71REV1 DECK 09/08/71REV1
 F134A 1*FORM: CALL ECMATPY (NN,MM,LL,KA,LA,MA,KB,LB,MB,KC,LC,MC,T)
 F134A 2*PURPOSE: TO FORM THE PRODUCT IN ECS OF TWO MATRICES STORED
 F134A 3* IN ECS.
 F134A 4*ROUTINE NAME: ECMATPY
 F134A 5*ENTRY NAME : ECMATPY
 F134A 6*STORAGE: 222 (OCTAL) WORDS.
 F134A 7*TIMING: 4.34 SEC. FOR $NN=MM=LL=100$.
 F134A 8*ROUTINES CALLED: DOTPRO(F124A), ECR(K203A), ECW(K204A).

F134B A* B. L. BUZBEE C-4 72
 F134B B*ECS MATRIX MULTIPLY
 F134B C*F4 SR7600 CROS
 F134B D* SW 1 LS 2 TYPE 1
 F134B E*SOURCE CARDS 40 BCD OBJECT CARDS 13 BIN
 F134B F**MATRIX*MULTIPLY*ECS
 F134B G*ON DISK F4 COMPAT WU 03/16/72 DECK 03/16/72
 F134B 1*FORM: CALL ECMATPY(NN,MM,LL,KA,LA,MA,KB,LB,MB,KC,LC,MC,T)
 F134B 2*PURPOSE: FORM THE PRODUCT IN ECS OF TWO MATRICES STORED
 F134B 3* IN ECS. SEE ECMATPY(F134A) FOR FURTHER DETAILS.
 F134B 4*ROUTINE NAME: ECMATPY
 F134B 5*ENTRY NAME: ECMATPY
 F134B 6*STORAGE: 226 (OCTAL) WORDS.
 F134B 7*TIMING: .696 SEC. FOR NN=MM=LL=100.
 F134B 8*ROUTINES CALLED: DOTPRO(F124B), ECR(K203B), ECW(K204B).

F135A A* B. L. BUZBEE C-4 70
 F135A B*ECS MATRIX TRANSPOSE MULTIPLY
 F135A C*F4 SR6600 SCP 3.1
 F135A D* SW 3 LS 2 TYPE 1
 F135A E*SOURCE CARDS 40 BCD OBJECT CARDS 12 BIN
 F135A F**MATRIX*TRANSPOSE*MULTIPLY*ECS
 F135A G*CARDS F4 COMPAT WU 09/08/71REV.1 DECK 09/08/71REV.1
 F135A 1*FORM: CALL ECMTRPY(MM,NN,LL,KA,LA,MA,KB,LB,MB,KC,LC,MC,T)
 F135A 2*PURPOSE: TO FORM THE PRODUCT IN ECS OF THE TRANSPOSE OF A
 F135A 3* MATRIX IN ECS WITH A MATRIX IN ECS.
 F135A 4*ROUTINE NAME: ECMTRPY
 F135A 5*ENTRY NAME: ECMTRPY
 F135A 6*STORAGE: 214 (OCTAL) WORDS.
 F135A 7*ROUTINES CALLED: DOTPRO(F124A), ECR(K203A), ECW(K204A).

F135B A* B. L. BUZBEE C-4 72
 F135B B*ECS MATRIX TRANSPOSE MULTIPLY
 F135B C*F4 SR7600 CROS
 F135B D* SW 3 LS 2 TYPE 1
 F135B E*SOURCE CARDS 40 BCD OBJECT CARDS 12 BIN
 F135B F**MATRIX*TRANSPOSE*MULTIPLY*ECS
 F135B G*ON DISK F4 COMPAT WU 03/16/72 DECK 03/16/72
 F135B 1*FORM: CALL ECMTRPY(MM,NN,LL,KA,LA,MA,KB,LB,MB,KC,LC,MC,T)
 F135B 2*PURPOSE: TO FORM THE PRODUCT IN ECS OF THE TRANSPOSE OF A
 F135B 3* MATRIX IN ECS WITH A MATRIX IN ECS.
 F135B 4*ROUTINE NAME: ECMTRPY
 F135B 5*ENTRY NAME: ECMTRPY
 F135B 6*STORAGE: 220 (OCTAL) WORDS.
 F135B 7*ROUTINES CALLED: DOTPRO(F124A), ECR(K203A), ECW(K204A).

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F136A A*          B L BUZBEE          C-4          70
F136A B*INNER PRODUCT OF TWO COMPLEX VECTORS
F136A C*F4          SR6600   SCP 3.1
F136A D*          SW 1          LS 1          TYPE 1
F136A E*SOURCE CARDS          14          BCD          OBJECT CARDS          9          BIN
F136A F**INNER*PRODUCT*VECTOR
F136A G*CARDS          F4          COMPAT          WU 04/26/73REV.1 DECK 11/11/70
F136A 1*USE: Z=COTPRO(N,X,IX,Y,IY)
F136A 2*          Z=CDOTPRO(N,X,IX,Y,IY)
F136A 3*PURPOSE: Z=COTPRO(N,X,IX,Y,IY) COMPUTES THE
F136A 4*COMPLEX SUM Z=X(1)*Y(1)+X(1+IX)*Y(1+IY)+...
F136A 5*+X(1+(N-1)*IX)*Y(1+(N-1)*IY) WHERE X AND Y ARE
F136A 6*COMPLEX VECTORS OF LENGTH N.
F136A 7*Z=CDOTPRO(N,X,IX,Y,IY) IS THE SAME AS COTPRO
F136A 8*EXCEPT ALL X(I)*S ARE CONJUGATED.
F136A 9*TIMING: N=100, .0015 SEC.
F136A 10*STORAGE: 133 (OCTAL WORDS).
F136A 11*ROUTINE NAME: COTPRO
F136A 12*ENTRY NAMES: COTPRO, CDOTPRO
F136A 13*ROUTINES CALLED: F124A(DOTPRO).

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F136B A*          B.L.BUZBEE          C-4          B.L.BUZBEE          73
F136B B*INNER PRODUCT OF TWO COMPLEX VECTORS
F136B C*F4          SR7600   CROS
F136B D*          SW 1          LS 1          TYPE 1
F136B E*SOURCE CARDS          14          BCD          OBJECT CARDS          10          BIN
F136B F**INNER*PRODUCT*VECTOR
F136B G*ON DISK          F4          COMPAT          WU 04/26/73REV.1 DECK 03/02/73
F136B 1*FORM: Z=COTPRO(N,X,IX,Y,IY)
F136B 2*          Z=CDOTPRO(N,X,IX,Y,IY)
F136B 3*PURPOSE: Z=COTPRO(N,X,IX,Y,IY) COMPUTES THE COMPLEX SUM,
F136B 4* Z=X(1)*Y(1)+X(1+IX)*Y(1+IY)+...+X(1+(N-1)*IX)*Y(1+(N-1)*IY)
F136B 5* WHERE X AND Y ARE COMPLEX VECTORS OF LENGTH N.
F136B 6*          Z=CDOTPRO(N,X,IX,Y,IY) IS THE SAME AS COTPRO
F136B 7* EXCEPT ALL X(I) S ARE CONJUGATED.
F136B 8*ROUTINE NAME: COTPRO
F136B 9*ENTRY NAME: COTPRO, CDOTPRO
F136B 10*STORAGE: 153 (OCTAL ) WORDS
F136B 11*ROUTINES CALLED: DOTPRO(F124B).

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F137A A* B L BUZBEE C-4 70
 F137A B*COMPLEX MATRIX INVERSION
 F137A C*F4 SR6600 SCP 3.1
 F137A D* SW 1 LS 3 TYPE 1.1
 F137A E*SOURCE CARDS 98 BCD OBJECT CARDS 41 BIN
 F137A F**COMPLEX*MATRIX*INVERSION
 F137A G*CARDS F4 COMPAT WU 11/04/70 DECK 11/04/70
 F137A 1*USE: CALL CATINV(A,IA,IN,R,DET) WHERE THE ARGUMENTS ARE
 F137A 2*IDENTICAL TO F132A EXCEPT ALL FLOATING POINT ARGUMENTS
 F137A 3*A,R, AND DET MUST BE COMPLEX.
 F137A 4*PURPOSE: TO INVERT A COMPLEX MATRIX USING ORDER N**2
 F137A 5*STORAGE LOCATIONS.
 F137A 6*STORAGE: 777 OCTAL WORDS
 F137A 7*ROUTINES CALLED: COTPRO(F136A), LABRT(N103A).

F137B A* B.L.BUZBEE C-4 73
 F137B B*COMPLEX MATRIX INVERSION
 F137B C*F4 SR7600 CROS
 F137B D* SW 1 LS 3 TYPE 1.1
 F137B E*F4 SOURCE CARDS 98 BCD OBJECT CARDS 41 BIN
 F137B F**COMPLEX*MATRIX*INVERSION
 F137B G*ON DISK F4 COMPAT WU 03/02/73 DECK 03/02/73
 F137B 1*FORM: CALL CATINV(A,IA,IN,R,DET)
 F137B 2*PURPOSE: TO INVERT A COMPLEX MATRIX USING ORDER N**2, THE
 F137B 3* THE ARGUMENTS ARE IDENTICAL TO MATINV(F132B) EXCEPT
 F137B 4* ALL FLOATING POINT ARGUMENTS A,R, AND DET MUST BE COMPLEX.
 F137B 5*ROUTINE NAME: CATINV
 F137B 6*ENTRY NAME: CATINV
 F137B 7*7600 TIMING: .009 SEC. FOR N=10.
 F137B 8*STORAGE: 1005 OCTAL WORDS.
 F137B 9*ROUTINES CALLED: COTPRO(F136B), LABRT(ON THE SYSTEM).

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F138A A*          PAUL IWANCHUK      C-4
F138A B*SUMVEC ... A FAST SUMMATION OF VECTOR ELEMENTS
F138A C*COMPASS      SR6600    SCP 3.1
F138A D*              SW 1      LS 2      TYPE 1
F138A E*SOURCE CARDS      74      RCD      OBJECT CARDS      4      BIN
F138A F**SUMVEC*VECTOR ELEMENTS
F138A G*CARDS          F4 COMPAT      WU 05/10/72      DECK 05/10/72
F138A 1*FORM; SUM = SUMVEC(N,X,INCX)
F138A 2*      WHERE:      X = REAL VECTOR
F138A 3*              N = NUMBER OF ELEMENTS TO BE SUMMED
F138A 4*              INCX = SPACING OF SUCCESSIVE ELEMENTS OF X
F138A 5*PURPOSE: PROVIDE A CAPABILITY OF SUMMING A REAL VECTOR OF
F138A 6*      N ELEMENTS FASTER THAN THE EQUIVALENT FORTRAN CODE.
F138A 7*              SUM = 0.0
F138A 8*              LENX = N*INCX
F138A 9*              DO 1 I = 1,LENX,INCX
F138A 10*             1 SUM = SUM+X(I)
F138A 11*             SUMVEC WILL RETURN A ZERO IF N = 0, AND AN INDEFINITE
F138A 12*             IF N IS LESS THAN 0.
F138A 13*STORAGE: 25 (OCTAL) WORDS
F138A 14*ROUTINES CALLED: SELF CONTAINED

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F138B A*          PAUL IWANCHUK      C-4          B.L.BUZBEE          72
F138B B*SUMVEC...A FAST SUMMATION OF VECTOR ELEMENTS
F138B C*COMPASS      SR7600    CROS
F138B D*              SW 1      LS 3      TYPE 1
F138B E*CMP SOURCE CARDS      83      RCD      OBJECT CARDS      5      BIN
F138B F**SUMVEC*VECTOR ELEMENTS
F138B G*ON DISK      F4 COMPAT      WU 10/12/72REV 1 DECK 10/12/72REV 1
F138B 1*FORM; SUM = SUMVEC(N,X,INCX)
F138B 2*      WHERE:      X = REAL VECTOR
F138B 3*              N = NUMBER OF ELEMENTS TO BE SUMMED
F138B 4*              INCX = SPACING OF SUCCESSIVE ELEMENTS OF X
F138B 5*PURPOSE: PROVIDE A CAPABILITY OF SUMMING A REAL VECTOR OF
F138B 6*      N ELEMENTS FASTER THAN THE FORTRAN EQUIVALENT CODE.
F138B 7*              SUM = 0.0
F138B 8*              LENX = N*INCX
F138B 9*              DO 1 I = 1,LENX,INCX
F138B 10*             1 SUM = SUM+X(I)
F138B 11*             SUMVEC WILL RETURN A ZERO IF N = 0, AND AN INDEFINITE
F138B 12*             IF N IS LESS THAN 0.
F138B 13*ROUTINE NAME: SUMVEC
F138B 14*ENTRY NAME: SUMVEC
F138B 15*TIMING ON 7600 MACHINE:
F138B 16*              N = 10      N*.72 MICROSEC: EQUIVALENT TO FORTRAN
F138B 17*              N = 100     N*.21 MICROSEC: 2.5 TIMES FASTER THAN FORTRAN
F138B 18*              N = 1000    N*.15 MICROSEC: 3.5 TIMES FASTER THAN FORTRAN
F138B 19*STORAGE: 50 OCTAL WORDS,
F138B 20*ROUTINES CALLED: LIBMSG(SYSTEM).

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F1AA A* B.L. BUZBEE C-4 72
 F1AA B*GENERATE NONSYMMETRIC MATRIX
 F1AA C*F4 SR6600 SCP 3.1
 F1AA D* SW 3 LS 1 TYPE 2
 F1AA E*F4 SOURCE CARDS 23 BCD OBJECT CARDS 9 BIN
 F1AA F*GENERATE*NONSYMMETRIC*MATRIX
 F1AA G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F1AA 1*FORM: CALL GNSM(N,M,A)
 F1AA 2*PURPOSE: GENERATE A REAL NONSYMMETRIC MATRIX WITH
 F1AA 3* KNOWN REAL AND/OR COMPLEX EIGENVALUES.
 F1AA 4*ROUTINE NAME: GNSM
 F1AA 5*ENTRY NAME: GNSM
 F1AA 6*STORAGE: 82 OCTAL WORDS.
 F1AA 7*SELF CONTAINED.

F1AB A* B.L. BUZBEE C-4 72
 F1AB B*GENERATE SYMMETRIC MATRIX
 F1AB C*F4 SR6600 SCP 3.1
 F1AB D* SW 2 LS 1 TYPE 2
 F1AB E*F4 SOURCE CARDS 14 BCD OBJECT CARDS 7 BIN
 F1AB F*GENERATE*SYMMETRIC*MATRIX
 F1AB G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F1AB 1*FORM: CALL GSM(N,M,A,B)
 F1AB 2*PURPOSE: GENERATE A REAL SYMMETRIC MATRIX WITH KNOWN
 F1AB 3* EIGENVALUES.
 F1AB 4*ROUTINE NAME: GSM
 F1AB 5*ENTRY NAME: GSM
 F1AB 6*STORAGE: 60 OCTAL WORDS.
 F1AB 7*SELF CONTAINED.

F1AC A* B.L. BUZBEE C-4 72
 F1AC B*GENERATE HERMITIAN MATRIX
 F1AC C*F4 SR6600 SCP 3.1
 F1AC D* SW 2 LS 1 TYPE 2
 F1AC E*F4 SOURCE CARDS 25 BCD OBJECT CARDS 14 BIN
 F1AC F*GENERATE*HERMITIAN*MATRIX
 F1AC G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F1AC 1*FORM: CALL GHM(N,M,A,B)
 F1AC 2*PURPOSE: GENERATE A HERMITIAN MATRIX WITH KNOWN EIGENVALUES.
 F1AC 3*ROUTINE NAME: GHM
 F1AC 4*ENTRY NAME: GHM
 F1AC 5*STORAGE: 173 OCTAL WORDS.
 F1AC 6*SELF CONTAINED.

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F1AD  A*          BRENDAN GODFREY  T-6          B BUZBEE          73
F1AD  B*TRANS
F1AD  C*F4      CMP      MP7600   CROS   ALL OF LCM
F1AD  D*          SW      3       LS      5       TYPE 2
F1AD  D*F4 SOURCE CARDS      133   BCD   OBJECT CARDS      40   BIN
F1AD  F**MATRIX*COMPLEX MATRIX*MATRIX TRANSPOSE
F1AD  G*CARDS      F4   COMPAT   WU 03/23/73      DECK 03/23/73
F1AD  1*FORM:  PROGRAM TRANS (FSET4,FSET6)
F1AD  2*PURPOSE: TRANSPOSE A VERY LARGE COMPLEX MATRIX
F1AD  3*          STORED BY ROWS ON FSET4.
F1AD  4*ROUTINE NAME:  TRANS
F1AD  5*ENTRY NAME:  TRANS
F1AD  6*STORAGE:  ALL OF SCM AND LCM
F1AD  7*TIMING:  SEE FULL WRITEUP
F1AD  8*ROUTINES CALLED:  BUFPEI, ECSRW, ENDFIL, IOCHK, LOCF,
F1AD  9*          SYSTEM, LSHIFT, BS4020,GETRA, IOUTIL,
F1AD  10*         SYSFS (ALL SYSTEM)
F1AD  11*         REWINM(W301B), SETQ(Q414B), MEMORY(Q305B),
F1AD  12*         SKIPR(W304B), BOI(W201B), OPEN(W115B).

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F2 EIGENVALUES AND EIGENVECTORS
MATRIX DECOMPOSITIONS.

REVIEWER: B. BUZBEE, C-4

F206A A* B L BUZBEE T-1 D. WILLIAMS 67
 F206A 0*GENERAL REAL MATRIX EIGENVALUE-EIGENVECTOR ROUTINE
 F206A B*MATH F2 F4 SR6600 SCOPE
 F206A C* SW 4 LS 1
 F206A D*F4 SOURCE CARDS 19BCDF4 OBJECT CARDS 10BIN
 F206A S*GENERAL REAL*MATRIX*EIGENVALUE*EIGENVECTOR ROUTINE
 F206A 10*ON DISK F4 COMPAT WU 09/18/67 REV DECK 01/09/67
 F206A 11*CALL REVEV(N,M,A,E,V,T,K) FINDS THE SINGLE PRECISION EIGEN-
 F206A 12*VALUES AND EIGENVECTORS OF AN ARBITRARY REAL SINGLE PRECISION
 F206A 13*MATRIX. STORAGE=100 WORDS. TIMING, N=20, 6 SEC.
 F206A 14*USES= F207, LABRT(N103A), AND DSQRT(B*10A).

F207A A* B L BUZBEE T-1 67
 F207A 0*GENERAL REAL MATRIX EIGENVALUE EIGENVECTOR ROUTINE
 F207A B*MATH F2 F4 SR6600 SCOPE
 F207A C* SW 1 LS 8
 F207A D*F4 SOURCE CARDS 475BCDF4 OBJECT CARDS 223BIN
 F207A S*GENERAL REAL*MATRIX*EIGENVALUE*EIGENVECTOR ROUTINE
 F207A 10*ON DISK F4 COMPAT WU 04/27/67 DECK 04/27/67
 F207A 11*F207A IS CALLED BY F206A AND IT IS TO BE USED ONLY IN
 F207A 12*CONJUNCTION WITH IT. SEE F206A WRITEUP FOR DETAILS.
 F207A 13*STORAGE=2998 WORDS.
 F207A 14*USES=DSQRT.

F208A A* B L BUZBEE T-1 67
 F208A 0*GENERAL REAL MATRIX EIGENVALUE ROUTINE
 F208A B*MATH F2 F4 SR6600 SCOPE
 F208A C* SW 3 LS 1
 F208A D*F4 SOURCE CARDS 28BCDF4 OBJECT CARDS 14BIN
 F208A S*GENERAL REAL*MATRIX*EIGENVALUE ROUTINE
 F208A 10*ON DISK F4 COMPAT WU 01/19/67 DECK 01/19/67
 F208A 11*CALL REVAL(N,M,A,E,V,K) FINDS THE SINGLE PRECISION EIGEN-
 F208A 12*VALUES OF AN ARBITRARY REAL SINGLE PRECISION MATRIX.
 F208A 13*TIMING, N=20, 4 SEC. STORAGE=145 WORDS.
 F208A 14*USES F209A AND LABRT.

F209A A* B L. BUZBEE T-1 67
 F209A O*GENERAL REAL MATRIX EIGENVALUE ROUTINE
 F209A B*MATH F2 F4 SR6600 SCOPE
 F209A C* SW 1 LS 6
 F209A D*F4 SOURCE CARDS 349BCDF4 OBJECT CARDS I47BIN
 F209A S*GENERAL REAL*MATRIX*EIGENVALUE ROUTINE
 F209A 10*ON DISK F4 COMPAT WU 04/27/67 DECK 04/27/67
 F209A 11*CALLED BY F208A AND F214A. THIS ROUTINE SHOULD ONLY BE USED
 F209A 12*IN CONJUNCTION WITH THOSE ROUTINES.
 F209A 13*STORAGE=1981 WORDS.
 F209A 14*USES=DSQRT(B410A).

F210A *(RSEVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AA.

F211A *(RSEVEV) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AB.

F212A *(HEVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AC.

F213A *(HEVEV) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AD.

F214A *(DREVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AE.

F215A *(DRSVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AF.

F216A *(TREVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AG.

F217A *(TRSEVV) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AH.

F218A *(DTRVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AJ.

F219A *(THEVAL) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AK.

F220A *(THEVEV) DEMOTED TO TYPE 2 STATUS AND IS NOW DESIGNATED F2AL.

F221A A* B L BUZBEE C-4 G. WILLBANKS 67
 F221A B*EIGENVALUES AND EIGENVECTORS OF A COMPLEX MATRIX
 F221A C*FIV SR6600 SCP 3.1
 F221A D* SW 3 LS 7 TYPE 1
 F221A E*F4 SOURCE CARDS 367 BCD OBJECT CARDS 89 BIN
 F221A F**EIGENVALUES AND*EIGENVECTORS OF A COMPLEX MATRIX
 F221A G*CARDS F4 COMPAT WU 04/01/70REV 2 DECK 04/01/70REV 2
 F221A 1*CALL MATVEC(N,IVEC,A,E,V,IM,AL,TRAC,SUM,DET,PROD,IE) FINDS
 F221A 2*THE EIGENVALUES AND EIGENVECTORS OF # COMPLEX MATRIX.
 F221A 3*TIMING= .57 SEC. FOR N=10. STORAGE= 2203(OCTAL) WORDS.
 F221A 4*USES SQRT(B408A).

F222A A* B. L. BUZBEE C-4 69
 F222A B*EIGENVALUE ROUTINE - REAL SYMMETRIC MATRIX
 F222A C*F4 SR6600 SCP 3.1
 F222A D* SW 3 LS 3 TYPE 1
 F222A E*SOURCE CARDS 123 BCD OBJECT CARDS 32 BIN
 F222A F**EIGENVALUE*MATRIX*SYMMETRIC*SMEVAL*STEVAL
 F222A G*ON DISK F4 COMPAT WU 08/02/71REV 3 DECK 08/02/710REV 2
 F222A 1*FORM: CALL SMEVAL(NN,T,R,S,EPL,KE,M)
 F222A 2* CALL STEVAL(NN,B,R,S,EPL,KE)
 F222A 3* CALL S3DVAL(NN,T,R,S,EPL,KE,M)
 F222A 4*PURPOSE: TO COMPUTE THE EIGENVALUES OF A REAL SYMMETRIC
 F222A 5* MATRIX OR OF A SYMMETRIC TRIDIAGONAL MATRIX.
 F222A 6*ROUTINE NAME: SMEVAL
 F222A 7*ENTRY NAMES: SMEVAL, STEVAL, S3DVAL
 F222A 8*STORAGE: 646 (OCTAL) WORDS
 F222A 9*ROUTINES CALLED: SMHTR(F223A),DOTPRO(F124A),SQRT(B408A),
 F222A 10* LABRT(N103A).

F222B A* B.L.BUZBEE C-4 72
 F222B B*EIGENVALUE ROUTINE - REAL SYMMETRIC MATRIX
 F222B C*F4 SR7600 CROS
 F222B D* SW 1 LS 4 TYPE 1
 F222B E*SOURCE CARDS 138 BCD OBJECT CARDS 36 BIN
 F222B F**EIGENVALUE*MATRIX*SYMMETRIC*SMEVAL*STEVAL
 F222B G*ON DISK F4 COMPAT WU 05/12/72 DECK 05/12/72
 F222B 1*FORM: CALL SMEVAL(NN,T,R,S,EPL,KE,M)
 F222B 2* CALL STEVAL(NN,B,R,S,EPL,KE)
 F222B 3* CALL S3DVAL(NN,T,R,S,EPL,KE,M)
 F222B 4*PURPOSE: COMPUTE THE EIGENVALUES OF A REAL SYMMETRIC MATRIX
 F222B 5* OR OF A SYMMETRIC TRIDIAGONAL MATRIX. SEE WRITEUP
 F222B 6* FOR SMEVAL(F222A) FOR FURTHER DETAILS.
 F222B 7*ROUTINE NAME: SMEVAL
 F222B 8*ENTRY NAMES: SMEVAL, STEVAL, S3DVAL
 F222B 9*STORAGE: 732 (OCTAL) WORDS
 F222B 10*TIMING: TIME FOR N = 40 IS .1 SEC.
 F222B 11*ROUTINES CALLED: SMHHTR(F223B),DOTPRO(F124B),SQRT(B408B).
 F222B 12* LABRT(N103B),LIBMSG(SYSTEM).

F223A A* B. L. BUZBEE C-4 69
 F223A B*TRIDIAGONALIZE REAL SYMMETRIC MATRIX
 F223A C*F4 SR6600 SCP 3.1
 F223A D* SW 3 LS 3 TYPE 1
 F223A E*F4SOURCE CARDS 103 BCD OBJECT CARDS 28 BIN
 F223A F**MATRIX*SYMMETRIC*TRIDIAGONAL*SMHHTR*STHHTR
 F223A G*ON DISK F4 COMPAT WU 05/12/72REV.3 DECK 05/12/72REV.2
 F223A 1*FORM: CALL SMHHTR(IN,A,T,KE,IA)
 F223A 2* CALL STHHTR(IN,B,T,KE)
 F223A 3*PURPOSE: TRANSFORM A FULL SYMMETRIC MATRIX INTO A
 F223A 4* TRIDIAGONAL SYMMETRIC MATRIX.
 F223A 5*ROUTINE NAME: SMHHTR
 F223A 6*ENTRY NAMES: SMHHTR, STHHTR
 F223A 7*STORAGE: 546 (OCTAL) WORDS.
 F223A 8*ROUTINES CALLED: DOTPRO(F124A), LABRT(N103A), SQRT(B408A).


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F223B A*           B. L. BUZBEE           C-4           72
F223B B*TRIDIAGONALIZE REAL SYMMETRIC MATRIX
F223B C*F4           SR7600           CROS
F223B D*           SW 1           LS 3           TYPE 1
F223B E*F4SOURCE CARDS           103           BCD           OBJECT CARDS 29           BIN
F223B F**MATRIX*SYMMETRIC*TRIDIAGONAL*SMHHTR*STHHTR
F223B G*ON DISK           F4 COMPAT           WU 05/12/72           DECK 5/12/72
F223B 1*FORM: CALL SMHHTR(IN,A,T,KE,IA)
F223B 2*           CALL STHHTR(IN,B,T,KE)
F223B 3*PURPOSE: TRANSFORM A FULL SYMMETRIC MATRIX INTO A
F223B 4*           TRIDIAGONAL SYMMETRIC MATRIX,
F223B 5*           SEE SMHHTR(F223A) FOR FURTHER DETAILS.
F223B 6*ROUTINE NAME: SMHHTR
F223B 7*ENTRY NAMES: SMHHTR, STHHTR
F223B 8*STORAGE: 565 (OCTAL) WORDS,
F223B 9*TIMING: TIME FOR N = 40 IS .1 SEC.
F223B 10*ROUTINES CALLED: DOTPRO(F124B), LABRT(N103B), SQRT(B408B).

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F224A A*           B. L. BUZBEE           C-4           69
F224A B*EIGENVALUE-EIGENVECTOR ROUTINE FOR REAL SYMMETRIC MATRIX
F224A C*F4           SR6600           SCP 3.1
F224A D*           SW 4           LS 3           TYPE 1
F224A E*SOURCE CARDS           134           BCD           OBJECT CARDS 38           BIN
F224A F**MATRIX*EIGENVALUE*EIGENVECTOR*SYMMETRIC*SMEVEV*STEVEV
F224A G*CARDS           F4 COMPAT           WU 12/14/71REV 4 DECK 12/14/71REV 3
F224A 1*FORM: CALL SMEVEV(NN,T,R,V,S,EPL,KE,M)
F224A 2*           CALL STEVEV(NN,B,R,V,S,EPL,KE,M)
F224A 3*           CALL S3DVEV(NN,T,R,V,S,EPL,KE,M)
F224A 4*PURPOSE: TO FIND THE EIGENVALUES AND EIGENVECTORS OF A REAL
F224A 5*           SYMMETRIC MATRIX.
F224A 6*ROUTINE NAME: SMEVEV.
F224A 7*ENTRY NAMES: SMEVEV, STEVEV, S3DVEV
F224A 8*TIMING: N = 25, .36 SEC.
F224A 9*STORAGE: 757 OCTAL WORDS.
F224A 10*ROUTINES CALLED: SMHHTR(F223A), PRODDH(F225A), DOTPRO(F124A),
F224A 11*           SQRT(B408A), LABRT(N103A).

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F224B A*          B. L. BUZBEE      C-4                      72
F224B B*EIGENVALUE-EIGENVECTOR ROUTINE FOR REAL SYMMETRIC MATRIX
F224B C*F4          SR7600    CROS
F224B D*          SW 1      LS 4      TYPE 1
F224B E*F4 SOURCE CARDS      134 BCD    OBJECT CARDS      40    BIN
F224B F**MATRIX*EIGENVALUE*EIGENVECTOR*SYMMETRIC*SMEVEV*STEVEV
F224B G*ON DISK      F4 COMPAT  WU 05/12/72    DECK 05/12/72
F224B 1*FORM: CALL SMEVEV(NN,T,R,V,S,EPL,KE,M)
F224B 2*          CALL STEVEV(NN,B,R,V,S,ERL,KE,M)
F224B 3*          CALL S3DVEV(NN,T,R,V,S,EPL,KE,M)
F224B 4*PURPOSE: TO FIND THE EIGENVALUES AND EIGENVECTORS OF A REAL
F224B 5*          SYMMETRIC MATRIX.
F224B 6*FOR MORE DETAILS SEE SMEVEV(F224A) WRITEUP.
F224B 7*ROUTINE NAME: SMEVEV
F224B 8*ENTRY NAMES: SMEVEV, STEVEV, S3DVEV
F224B 9*TIMING: 7600 TIME FOR N = 40 IS .26 SEC.
F224B 10*STORAGE: 1020 OCTAL WORDS.
F224B 11*ROUTINES CALLED: SMHTR(F223B),PRODHH(F225B),DOTPRO(F124B),
F224B 12*          SQRT(B408B),LABRT(N103B).

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F225A A*          B. L. BUZBEE      C-4                      69
F225A B*COMPUTE TRANSFORM WHICH TRIDIAGONALIZES A SYMMETRIC MATRIX
F225A C*F4          SR6600    SCP 3.1
F225A D*          SW 2      LS 2      TYPE 1
F225A E*SOURCE CARDS      41 BCD    OBJECT CARDS      17    BIN
F225A F**PRODHH*TRANSFORM*TRIDIAGONAL*SYMMETRIC*MATRIX
F225A G*CARDS      F4 COMPAT  WU 09/20/71REV.1 DECK 09/20/71REV.1
F225A 1*FORM: CALL PRODHH(IN,A,T,KE,V,IV)
F225A 2*PURPOSE: COMPUTES THE SIMILARITY TRANSFORMATION USED BY
F225A 3*          SMHTR(F223A) TO TRIDIAGONALIZE A SYMMETRIC MATRIX.
F225A 4*ROUTINE NAME: PRODHH
F225A 5*ENTRY NAME: PRODHH
F225A 6*STORAGE: 303 OCTAL WORDS
F225A 7*ROUTINES CALLED: DOTPRO(F124A), LABRT(N103A).

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F225B A* B. L. BUZBEE C-4 72
 F225B B*COMPUTE TRANSFORM WHICH TRIDIAGONALIZES A SYMMETRIC MATRIX
 F225B C*F4 SR7600 CROS
 F225B D* SW 1 LS 2 TYPE 1
 F225B E*F4 SOURCE CARDS 41 BCD OBJECT CARDS 17 BIN
 F225B F**PRODHH*TRANSFORM*TRIDIAGONAL*SYMMETRIC*MATRIX
 F225B G*ON DISK F4 COMPAT WU 05/12/72 DECK 05/12/72
 F225B 1*FORM: CALL PRODHH(IN,A,T,KE,V,IV)
 F225B 2*PURPOSE: COMPUTES THE SIMILARITY TRANSFORMATION USED BY
 F225B 3* SMHTR(F223B) TO TRIDIAGONALIZE A SYMMETRIC MATRIX.
 F225B 4*FOR MORE DETAILS SEE PRODHH(F225A) WRITEUP
 F225B 5*ROUTINE NAME: PRODHH
 F225B 6*ENTRY NAME: PRODHH
 F225B 7*STORAGE: 306 OCTAL WORDS.
 F225B 8*ROUTINES CALLED: DOTPRO(F124B), LABRT(N103B).

F226A A* B L BUZBEE C-4 71
 F226A B*EIGENVALUE ROUTINE-COMPLEX HERMITIAN MATRIX
 F226A C*F4 SR6600 SCP 3.1
 F226A D* SW 1 LS 4 TYPE 1.1
 F226A E*F4 SOURCE CARDS 150 BCD OBJECT CARDS 39 BIN
 F226A F*EIGENVALUE*MATRIX*HERMITIAN
 F226A G*CARDS F4 COMPAT WU 09/16/71 DECK 09/16/71
 F226A 1*FORM: CALL HMEVAL(NN,T,R,A,EPL,KE,M),
 F226A 2* CALL HTEVAL(NN,B,R,A,EPL,KE)
 F226A 3* CALL H3DVAL(NN,T,R,A,EPL,KE,M)
 F226A 4*PURPOSE: COMPUTE EIGENVALUES OF A COMPLEX HERMITIAN
 F226A 5* MATRIX. ARGUMENTS ARE IDENTICAL TO SMEVAL(F222A)
 F226A 6* EXCEPT T,B,R, AND A MUST BE COMPLEX.
 F226A 7*ROUTINE NAME: HMEVAL
 F226A 8*ENTRY NAMES: HMEVAL, HTEVAL, H3DVAL.
 F226A 9*STORAGE: 1002 OCTAL WORDS
 F226A 10*ROUTINES CALLED: HMMHTR(F227A), SQRT(B408A), CABS(A203A)

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F226B A*          B,L.BUZBEE          C=4          73
F226B B*EIGENVALUE ROUTINE=COMPLEX HERMITIAN MATRIX
F226B C*F4          SR7600          CROS
F226B D*          SW 1          LS 4          TYPE 1.1
F226B E*F4 SOURCE CARDS          150 BCD          OBJECT CARDS          41          BIN
F226B F**EIGENVALUE*MATRIX*HERMITIAN
F226B G*ON DISK          F4 COMPAT          WU 03/02/73          DECK 03/02/73
F226B 1*FORM: CALL HMEVAL (NN,T,R,A,EPL,KE,M)
F226B 2*          CALL HTEVAL (NN,B,R,A,EPL,KE)
F226B 3*          CALL H3DVAL (NN,T,R,A,EPL,KE,M)
F226B 4*PURPOSE: COMPUTE EIGENVALUES OF A COMPLEX HERMITIAN
F226B 5*          MATRIX. ARGUMENTS ARE IDENTICAL TO SMEVAL(F222B)
F226B 6*          EXCEPT T,B,R, AND A MUST BE COMPLEX.
F226B 7*ROUTINE NAME: HMEVAL
F226B 8*ENTRY NAMES: HMEVAL, HTEVAL, H3DVAL.
F226B 9*7600 TIMING: .4 SEC. FOR N=50.
F226B 10*STORAGE: 1040 OCTAL WORDS
F226B 11*ROUTINES CALLED: HMMHTR(F227B), SQRT,CABS(ON THE SYSTEM).

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F227A A*          B L BUZBEE          C=4          71
F227A B*TRIDIAGONALIZE COMPLEX HERMITIAN MATRIX
F227A C*F4          SR6600          SCP 3.1
F227A D*          SW 1          LS 3          TYPE 1
F227A E*F4 SOURCE CARDS          118 BCD          OBJECT CARDS          37          BIN
F227A F*MATRIX*HERMITIAN*TRIDIAGONAL
F227A G*CARDS          F4 COMPAT          WU 09/16/71          DECK 09/16/71
F227A 1*FORM: CALL HMMHTR(IN,A,T,KE,IA)
F227A 2*          CALL HTHHTR(IN,B,T,KE)
F227A 3*PURPOSE: TRANSFORM A COMPLEX HERMITIAN MATRIX INTO A
F227A 4*          TRIDIAGONAL MATRIX. ARGUMENTS ARE IDENTICAL TO
F227A 5*          SMHHTR,STHHTR(F223A) EXCEPT A,B, AND T MUST BE
F227A 6*          COMPLEX.
F227A 7*ROUTINE NAME: HMMHTR
F227A 8*ENTRY NAMES: HMMHTR, HTHHTR
F227A 9*STORAGE: 732 OCTAL WORDS
F227A 10*ROUTINES CALLED: COTPRO (F136A), LABRT(N103A)

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F227B A* B.L.BUZBEE C-4 73
 F227B B*TRIDIAGONALIZE COMPLEX HERMITIAN MATRIX
 F227B C*F4 SR7600 CROS
 F227B D* SW 1 LS 3 TYPE 1.1
 F227B E*F4 SOURCE CARDS 118 BCD OBJECT CARDS 38 BIN
 F227B F**MATRIX*HERMITIAN*TRIDIAGONAL
 F227B G*ON DISK F4 COMPAT WU 03/02/73 DECK 03/02/73
 F227B 1*FORM: CALL HMMHTR(IN,A,T,KE,IA)
 F227B 2* CALL HTHHTR(IN,B,T,KE)
 F227B 3*PURPOSE: TRANSFORM A COMPLEX HERMITIAN MATRIX INTO A
 F227B 4* TRIDIAGONAL MATRIX. ARGUMENTS ARE IDENTICAL TO
 F227B 5* SMHTR,STHHTR(F223B) EXCEPT A,B, AND T MUST BE
 F227B 6* COMPLEX.
 F227B 7*ROUTINE NAME: HMMHTR
 F227B 8*ENTRY NAMES: HMMHTR, HTHHTR
 F227B 9*STORAGE: 751 OCTAL WORDS
 F227B 10*ROUTINES CALLED: COTPRO(F136B), LABRT(ON THE SYSTEM).

F228A A* B L BUZBEE C-4 71
 F228A B*EIGENVALUE-EIGENVECTOR ROUTINE FOR HERMITIAN MATRIX
 F228A C*F4 SR6600 SCP 3.1
 F228A D* SW 1 LS 4 TYPE 1
 F228A E*F4 SOURCE CARDS 163 BCD OBJECT CARDS 48 BIN
 F228A F*MATRIX*EIGENVALUE*EIGENVECTOR*HERMITIAN
 F228A G*CARDS F4 COMPAT WU 09/16/71 DECK 09/16/71
 F228A 1*FORM: CALL HMEVEV(NN,T,R,V,A,EPL,KE,M)
 F228A 2* CALL HTEVEV(NN,B,R,V,A,EPL,KE,M)
 F228A 3* CALL H3DVEV(NN,T,B,V,A,EPL,KE,M)
 F228A 4*PURPOSE: FIND THE EIGENVALUES AND EIGENVECTORS OF A
 F228A 5* HERMITIAN MATRIX. THE ARGUMENTS ARE IDENTICAL TO
 F228A 6* THOSE OF STEVEV(F224A), EXCEPT THAT T,B,R,V, AND A
 F228A 7* MUST BE COMPLEX. SEE STEVEV(F224A) WRITEUP FOR
 F228A 8* DETAILS. HTEVEV INPUT IS THE LOWER TRIANGLE.
 F228A 9* H3DVEV INPUT IS THE DIAGONAL AND SUPERDIAGONAL.
 F228A 10*TIMING: N=20, .62 SEC.
 F228A 11*ROUTINE NAME: HMEVEV
 F228A 12*ENTRY NAMES: HMEVEV, HTEVEV, H3DVEV
 F228A 13*STORAGE: 1176 OCTAL WORDS
 F228A 14*ROUTINES CALLED: HMMHTR(F227A), PROHHH(F229A), COTPRO(F136A),
 F228A 15* DOTPRO(F124A), CABS(A203A), SQRT(B408A).

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F228B A*          B L BUZBEE          C=4          72
F228B B*EIGENVALUE-EIGENVECTOR ROUTINE FOR HERMITIAN MATRIX
F228B C*F4          SR7600    CROS
F228B D*          SW 1      LS 4      TYPE 1
F228B E*F4 SOURCE CARDS 163 BCD OBJECT CARDS 50 BIN
F228B F**MATRIX*EIGENVALUE*EIGENVECTOR*HERMITIAN
F228B G*ON DISK F4 COMPAT WU 04/12/72 DECK 04/12/72
F228B 1*FORM: CALL HMEVEV(NN,T,R,V,A,EPL,KE,M)
F228B 2*          CALL HTEVEV(NN,B,R,V,A,EPL,KE,M)
F228B 3*          CALL H3DVEV(NN,T,B,V,A,EPL,KE,M)
F228B 4*PURPOSE: FIND THE EIGENVALUES AND EIGENVECTORS OF A
F228B 5*          HERMITIAN MATRIX. THE ARGUMENTS ARE IDENTICAL TO
F228B 6*          THOSE OF STEVEV(F224A), EXCEPT THAT T,B,R,V, AND A
F228B 7*          MUST BE COMPLEX. SEE STEVEV(F224A) WRITEUP FOR
F228B 8*          DETAILS. HTEVEV INPUT IS THE LOWER TRIANGLE.
F228B 9*          H3DVEV INPUT IS THE DIAGONAL AND SUPERDIAGONAL.
F228B 10*TIMING: N=20, .12 SEC.
F228B 11*ROUTINE NAME: HMEVEV
F228B 12*ENTRY NAMES: HMEVEV, HTEVEV, H3DVEV
F228B 13*STORAGE: 1234 OCTAL WORDS
F228B 14*ROUTINES CALLED: HMMHTR(F227B), PROHHH(F229B), COTPRO(F136B),
F228B 15*          DOTPRO(F124B), CABS(A203B), SQRT(B408B).

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F229A A*          B L BUZBEE          C=4          71
F229A B*COMPUTE TRANSFORM TO TRIDIAGONALIZE HERMITIAN MATRIX
F229A C*F4          SR6600    SCP 3.1
F229A D*          SW 1      LS 2      TYPE 1
F229A E*F4 SOURCE CARDS 49 BCD OBJECT CARDS 20 BIN
F229A F*TRANSFORM*TRIDIAGONAL*HERMITIAN*MATRIX
F229A G*CARDS F4 COMPAT WU 07/13/72REV.1 DECK 09/16/71
F229A 1*FORM: CALL PROHHH(IN,A,T,KE,V,IV)
F229A 2*PURPOSE: COMPUTE THE SIMILARITY TRANSFORMATION USED BY
F229A 3*          HMMHTR(F227A) AND HTHHTR(F227A) TO TRIDIAGONALIZE A
F229A 4*          HERMITIAN MATRIX. THE ARGUMENTS ARE IDENTICAL TO
F229A 5*          THOSE OF PRODHH(F225A) EXCEPT THAT A,T,AND V
F229A 6*          MUST BE COMPLEX. SEE PRODHH(F225A) WRITEUP FOR DETAILS.
F229A 7*ROUTINE NAME: PROHHH
F229A 8*ENTRY NAME: PROHHH
F229A 9*STORAGE: 354 OCTAL WORDS.
F229A 10*ROUTINES CALLED: COTPRO(F136A), LABRT(N103A)

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F229B A* B L BUZBEE C-4 72
 F229B B*COMPUTE TRANSFORM TO TRIDIAGONALIZE HERMITIAN MATRIX
 F229B C*F4 SR7600 CROS
 F229B D* SW 1 LS 2 TYPE 1
 F229B E*F4 SOURCE CARDS 49 BCD OBJECT CARDS 20 BIN
 F229B F*TRANSFORM*TRIDIAGONAL*HERMITIAN*MATRIX
 F229B G* ON DISK F4 COMPAT WU 07/13/72REV.1 DECK 04/12/72
 F229B 1*FORM: CALL PROHHH(IN,A,T,KE,V,IV)
 F229B 2*PURPOSE: COMPUTE THE SIMILARITY TRANSFORMATION USED BY
 F229B 3* HHHTR(F227A) AND HTHHTR(F227A) TO TRIDIAGONALIZE A
 F229B 4* HERMITIAN MATRIX. THE ARGUMENTS ARE IDENTICAL TO
 F229B 5* THOSE OF PRODHH(F225A) EXCEPT THAT A,T,AND V
 F229B 6* MUST BE COMPLEX. SEE PRODHH(F225A) WRITEUP FOR DETAILS.
 F229B 7*ROUTINE NAME: PROHHH
 F229B 8*ENTRY NAME: PROHHH
 F229B 9*STORAGE: 360 OCTAL WORDS.
 F229B 10*ROUTINES CALLED: COTPRO(F136B), LABRT(N103B)

F230A A* B. L. BUZBEE C-4 71
 F230A B*COMPUTE SUBSET OF EIGENVALUES OF TRIDIAGONAL MATRIX
 F230A C*F4 SR6600 SCP 3.1
 F230A D* SW 4 LS 2 TYPE 1
 F230A E*F4 SOURCE CARDS 88 BCD OBJECT CARDS 28 BIN
 F230A F**EIGENVALUES*TRIDIAGONAL*BISECTION
 F230A G*CARDS F4 COMPAT WU 06/29/71 DECK 06/29/71
 F230A 1*FORM: CALL BISECT (N,A,IA,E,EP,T)
 F230A 2*PURPOSE: COMPUTE SPECIFIED SUBSET OF EIGENVALUES OF A
 F230A 3* QUASI-SYMMETRIC, TRIDIAGONAL MATRIX.
 F230A 4*ROUTINE NAME: BISECT
 F230A 5*ENTRY NAME: BISECT
 F230A 6*STORAGE: 547 (OCTAL) WORDS.
 F230A 7*ROUTINES USED: SQRT(B408A), OUTPTC(ON THE SYSTEM).

F2AA A* B.L. BUZBEE C-4
 F2AA B*REAL SYMMETRIC MATRIX EIGENVALUE ROUTINE
 F2AA C*F4 SR6600 SCP 3.1
 F2AA D* SW 3 LS 1 TYPE 2
 F2AA E*F4 SOURCE CARDS 21 OBJECT CARDS 10 BIN
 F2AA F*REAL*SYMMETRIC MATRIX*EIGENVALUE
 F2AA G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AA 1*FORM: CALL RSEVAL(N,M,A,E,T,K)
 F2AA 2*PURPOSE: COMPUTE THE SINGLE PRECISION EIGENVALUES OF A
 F2AA 3* REAL SYMMETRIC MATRIX WITH SINGLE PRECISION ELEMENTS.
 F2AA 4*ROUTINE NAME: RSEVAL
 F2AA 5*ENTRY NAME: RSEVAL
 F2AA 6*TIMING: N=40, 2 SEC.
 F2AA 7*STORAGE: 94 OCTAL WORDS.
 F2AA 8*USES DTRVAL(F2AJ) AND LABRT(N103A).

F2AB A* B. L. BUZBEE C-4 72
 F2AB B*SYMMETRIC MATRIX EIGENVALUE EIGENVECTOR ROUTINE
 F2AB C*F4 SR6600 SCP 3.1
 F2AB D* SW 3 LS 1 TYPE 2
 F2AB E*F4 SOURCE CARDS 15 BCD OBJECT CARDS 7 BIN
 F2AB F**REAL*SYMMETRIC MATRIX*EIGENVALUE*EIGENVECTOR ROUTINE
 F2AB G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AB 1*FORM: CALL RSEVEV(N,M,A,E,V,T,K)
 F2AB 2*PURPOSE: COMPUTE THE SINGLE PRECISION EIGENVALUES AND
 F2AB 3* EIGENVECTORS OF A REAL SYMMETRIC MATRIX.
 F2AB 4*ROUTINE NAME: RSEVEV
 F2AB 5*ENTRY NAME: RSEVEV
 F2AB 6*TIMING: N=20, 5 SEC.
 F2AB 7*STORAGE: 49 OCTAL WORDS.
 F2AB 8*USES: TRSEVV(F2AH).

F2AC A* B.L. BUZBEE C-4 72
 F2AC B*EIGENVALUES OF A HERMITIAN MATRIX
 F2AC C*F4 SR6600 SCP 3.1
 F2AC D* SW 2 LS 1 TYPE 2
 F2AC E*F4 SOURCE CARDS 18 BCD OBJECT CARDS 9 BIN
 F2AC F**EIGENVALUES OF A*HERMITIAN MATRIX
 F2AC G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AC 1*FORM: CALL HEVAL(N,M,A,E,T,K)
 F2AC 2*PURPOSE: FIND THE EIGENVALUES OF A NTH ORDER HERMITIAN
 F2AC 3* MATRIX.
 F2AC 4*ROUTINE NAME: HEVAL
 F2AC 5*ENTRY NAME: HEVAL
 F2AC 6*TIMING: N=30, 5 SEC.
 F2AC 7*STORAGE: 69 OCTAL WORDS.
 F2AC 8*USES: LABRT(N103A) AND THEVAL(F2AK).

F2AD A* B.L. BUZBEE C-4 72
 F2AD B*EIGENVALUES AND EIGENVECTORS OF A HERMITIAN MATRIX
 F2AD C*F4 SR6600 SCP 3.1
 F2AD D* SW 3 LS 1 TYPE 2
 F2AD E*F4 SOURCE CARDS 15 BCD OBJECT CARDS 7 BIN
 F2AD F**EIGENVALUES AND*EIGENVECTORS OF A*HERMITIAN MATRIX
 F2AD G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AD 1*FORM: CALL HEVEV(N,M,A,E,V,T,K)
 F2AD 2*PURPOSE: FIND THE EIGENVALUES AND ASSOCIATED EIGENVECTORS
 F2AD 3* OF A HERMITIAN MATRIX.
 F2AD 4*ROUTINE NAME: HEVEV
 F2AD 5*ENTRY NAME: HEVEV
 F2AD 6*TIMING: N=20, 4 SEC.
 F2AD 7*STORAGE: 57 OCTAL WORDS.
 F2AD 8*USES: THEVEV(F2AL).

F2AE A* B.L. BUZBEE C-4 72
 F2AE B*DOUBLE PRECISION REAL MATRIX EIGENVALUE ROUTINE
 F2AE C*F4 SR6600 SCP 3.1
 F2AE D* SW 3 LS 1 TYPE 2
 F2AE E*F4 SOURCE CARDS 26 BCD OBJECT CARDS 12 BIN
 F2AE F**DOUBLE*PRECISION REAL*MATRIX*EIGENVALUE
 F2AE G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AE 1*FORM: CALL DREVAL(N,M,V,E,K)
 F2AE 2*PURPOSE: FIND THE DOUBLE PRECISION EIGENVALUES OF A
 F2AE 3* REAL N BY N MATRIX WITH DOUBLE PRECISION ELEMENTS.
 F2AE 4*ROUTINE NAME: DREVAL
 F2AE 5*ENTRY NAME: DREVAL
 F2AE 6*TIMING: N=8, 2 SEC.
 F2AE 7*STORAGE: 106 OCTAL WORDS.
 F2AE 8*USES: F209A AND LABRT(N103A).

F2AF A* B. L. BUZBEE C-4 72
 F2AF B*DOUBLE PRECISION REAL SYMMETRIC MATRIX EIGENVALUE ROUTINE
 F2AF C*F4 SR6600 SCP 3.1
 F2AF D* SW 3 LS 1 TYPE 2
 F2AF E*F4 SOURCE CARDS 19 BCD OBJECT CARDS 8 BIN
 F2AF F**DOUBLE*PRECISION REAL*SYMMETRIC MATRIX*EIGENVALUE
 F2AF G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AF 1*FORM: CALL DRSVAL(N,M,DA,DE,T,K)
 F2AF 2*PURPOSE: COMPUTE DOUBLE PRECISION EIGENVALUES OF A REAL
 F2AF 3* SYMMETRIC MATRIX WITH DOUBLE PRECISION ELEMENTS.
 F2AF 4*ROUTINE NAME: DRSVAL
 F2AF 5*ENTRY NAME: DRSVAL
 F2AF 6*TIMING: N=30, 6 SEC.
 F2AF 7*STORAGE: 58 OCTAL WORDS.
 F2AF 8*USES: DTRVAL(F2AJ) AND LABRT(N103A).

F2AG A* B.L. BUZBEE C-4 72
 F2AG B*REAL SYMMETRIC MATRIX EIGENVALUE ROUTINE
 F2AG C*F4 SR6600 SCP 3.1
 F2AG D* SW 3 LS 1 TYPE 2
 F2AG E*F4 SOURCE CARDS 20 BCD OBJECT CARDS 9 BIN
 F2AG F**REAL*SYMMETRIC MATRIX*EIGENVALUE
 F2AG G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AG 1*FORM: CALL TREVAL(N,TR,E,T,K)
 F2AG 2*PURPOSE: COMPUTE THE SINGLE PRECISION EIGENVALUES OF A
 F2AG 3* SINGLE PRECISION, REAL SYMMETRIC MATRIX USING ONLY THE
 F2AG 4* UPPER OR LOWER TRIANGLE OF THE MATRIX.
 F2AG 5*ROUTINE NAME: TREVAL
 F2AG 6*ENTRY NAME: TREVAL
 F2AG 7*TIMING: N=40, 2 SEC.
 F2AG 8*STORAGE: 81 OCTAL WORDS.
 F2AG 9*USES: DTRVAL(F2AJ) AND LABRT(N103A).

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F2AH A*          B.L. BUZBEE          C=4          72
F2AH B*REAL SYMMETRIC MATRIX EIGENVALUE-EIGENVECTOR ROUTINE
F2AH C*F4          SR6600          SCP 3.1
F2AH D*          SW 4          LS 9          TYPE 2
F2AH E*F4 SOURCE CARDS          413          BCD          OBJECT CARDS          158          BIN
F2AH F*REAL*SYMMETRIC MATRIX*EIGENVALUE*EIGENVECTOR
F2AH G*CARDS          F4          COMPAT          WU 05/18/72          DECK 05/18/72
F2AH 1*FORM: CALL TRSEVV(N,M,B,E,V,T,K)
F2AH 2*PURPOSE: COMPUTE SINGLE PRECISION EIGENVALUES AND
F2AH 3*          EIGENVECTORS OF A SINGLE PRECISION REAL SYMMETRIC
F2AH 4*          MATRIX USING ONLY THE UPPER OR LOWER TRIANGLE OF THE
F2AH 5*          MATRIX.
F2AH 6*ROUTINE NAME: TRSEVV
F2AH 7*ENTRY NAME: TRSEVV
F2AH 8*TIMING: N=20, 5 SEC.
F2AH 9*STORAGE: 2081 OCTAL WORDS.
F2AH 10*USES: DSQRT(B410A) AND LABRT(N103A).

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F2AJ A*          B.L. BUZBEE          C=4          72
F2AJ B*DOUBLE PRECISION REAL SYMMETRIC MATRIX EIGENVALUE ROUTINE
F2AJ C*F4          SR6600          SCP 3.1
F2AJ D*          SW 3          LS 6          TYPE 2
F2AJ E*F4 SOURCE CARDS          280          BCD          OBJECT CARDS          95          BIN
F2AJ F*DOUBLE PRECISION REAL*SYMMETRIC MATRIX*EIGENVALUE
F2AJ G*CARDS          F4          COMPAT          WU 05/18/72          DECK 05/18/72
F2AJ 1*FORM: CALL DTRVAL(N,DTR,DE,T,K)
F2AJ 2*PURPOSE: COMPUTE DOUBLE PRECISION EIGENVALUES OF A DOUBLE
F2AJ 3*          PRECISION, REAL SYMMETRIC MATRIX USING ONLY THE UPPER
F2AJ 4*          OR LOWER TRIANGLE OF THE MATRIX.
F2AJ 5*ROUTINE NAME: DTRVAL
F2AJ 6*ENTRY NAME: DTRVAL
F2AJ 7*STORAGE: 1266 OCTAL WORDS.
F2AJ 8*SELF CONTAINED.

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F2AK A* B.L. BUZBEE C-4 72
 F2AK B*EIGENVALUES OF A HERMITIAN MATRIX
 F2AK C*F4 SR6600 SCP 3.1
 F2AK D* SW 3 LS 7 TYPE 2
 F2AK E*F4 SOURCE CARDS 332 BCD OBJECT CARDS 141 BIN
 F2AK F**EIGENVALUES OF A*HERMITIAN MATRIX
 F2AK G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AK 1*FORM: CALL THEVAL(N,B,E,T,K)
 F2AK 2*PURPOSE: FIND THE EIGENVALUES OF A HERMITIAN MATRIX USING
 F2AK 3* ONLY THE UPPER OR LOWER TRIANGLE OF THE MATRIX.
 F2AK 4*ROUTINE NAME: THEVAL
 F2AK 5*ENTRY NAME: THEVAL
 F2AK 6*TIMING: N=20, 2 SEC.
 F2AK 7*STORAGE: 3561 OCTAL WORDS.
 F2AK 8*USES: DSQRT(B410A) AND LABRT(N103A).

F2AL A* B.L. BUZBEE C-4 72
 F2AL B*EIGENVALUES AND EIGENVECTORS OF A HERMITIAN MATRIX
 F2AL C*F4 SR6600 SCP 3.1
 F2AL D* SW 4 LS 10 TYPE 2
 F2AL E*F4 SOURCE CARDS 498 BCD OBJECT CARDS 231 BIN
 F2AL F**EIGENVALUES AND*EIGENVECTORS OF A HERMITIAN MATRIX
 F2AL G*CARDS F4 COMPAT WU 05/18/72 DECK 05/18/72
 F2AL 1*FORM: CALL THEVEV(N,M,B,E,V,T,K)
 F2AL 2*PURPOSE: FIND THE EIGENVALUES AND ASSOCIATED EIGEN-
 F2AL 3* VECTORS OF A HERMITIAN MATRIX USING ONLY THE LOWER
 F2AL 4* TRIANGLE OF THE MATRIX.
 F2AL 5*ROUTINE NAME: THEVEV
 F2AL 6*ENTRY NAME: THEVEV
 F2AL 7*TIMING: N=30, 6 SEC.
 F2AL 8*STORAGE: 6033 OCTAL WORDS.
 F2AL 9*USES: LABRT(N103A) AND DSQRT(B410A).

F4 SIMULTANEOUS LINEAR EQUATIONS AND LINEAR LEAST SQUARES

REVIEWER: B. BUZBEE, C-4

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F404A A*          B L BUZBEE          C-4          R. M. FRANK          68
F404A B*LINEAR SYSTEM SOLVER
F404A C*F4          SR6600          SCP 3.1
F404A D*          SW 3          LS 2          TYPE 1
F404A E*F4 SOURCE CARDS          76          BCD          OBJECT CARDS          28          BIN
F404A F**MATRIX*EQUATION*SOLVER*DETERMINANT*EVALUATION
F404A G*ON DISK          F4          COMPAT          WU 07/13/73REV.3 DECK 06/14/71REV 2
F404A 1*FORM: CALL LSS(N,M,I,A,B,D,DET)
F404A 2*PURPOSE: TO SOLVE THE NON-SINGULAR MATRIX EQUATION AX=B.
F404A 3*ROUTINE NAME: LSS
F404A 4*ENTRY NAME: LSS
F404A 5*STORAGE: 522 (OCTAL) WORDS.
F404A 6*TIMING: .025 SEC. FOR N=M=10.
F404A 7*ROUTINES CALLED: DOTPRO(F124A), LABRT(N103A).

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F404B A*          B. L. BUZBEE          C-4          R M FRANK          72
F404B B*LINEAR SYSTEM SOLVER
F404B C*F4          SR7600          CROS
F404B D*          SW 3          LS 3          TYPE i
F404B E*F4 SOURCE CARDS          81          BCD          OBJECT CARDS          29          BIN
F404B F**MATRIX*EQUATION*SOLVER*DETERMINANT*EVALUATION
F404B G*ON DISK          F4          COMPAT          WU 07/13/73REV.1 DECK 03/17/72
F404B 1*FORM: CALL LSS(N,M,I,A,B,D,DET)
F404B 2*PURPOSE: TO SOLVE THE NON-SINGULAR MATRIX EQUATION AX=B.
F404B 3*ROUTINE NAME: LSS
F404B 4*ENTRY NAME: LSS
F404B 5*STORAGE: 534 OCTAL WORDS
F404B 6*ROUTINES CALLED: DOTPRO(F124B), LABRT(N103B), LIBMSG(SYSTEM)

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F405A A* B.L.BUZBEE C-4 R.M.FRANK 67
 F405A B*GENERAL LINEAR SYSTEM SOLVER
 F405A C*F4 SR6600 SCP,3.1
 F405A D* SW 5 LS 2
 F405A E*SOURCE CARDS 80 BCD OBJECT DECK 31 BIN
 F405A F*GENERAL*LINEAR*SYSTEM SOLVER
 F405A G*ON DISK F4 COMPAT WU 02/07/69 REV 5DECK 11/12/68 REV 1
 F405A 1*CALL GLSS(M,N,K,L,NR,AA,IA,YA,IY,BA,IB,XA,IX) SOLVES THE
 F405A 2*LINEAR SYSTEM $AX=Y$ WHERE A IS AN M BY N MATRIX, M GREATER
 F405A 3*THAN, EQUAL TO, OR LESS THAN N, AND WHERE A MAY BE SINGULAR
 F405A 4*OR NONSINGULAR IF $M=N$.
 F405A 5*TIMING, $M=10$, $N=8$, 2 SEC.
 F405A 6*STORAGE=602 OCTAL WORDS
 F405A 7*USES! LABRT(N103A) DOTPRO(F124A) VEC SUM(F133A)

F405B A* A.SOLEM, B.BUZBEE C-4 R.M.FRANK 72
 F405B B*GENERAL LINEAR SYSTEM SOLVER
 F405B C*F4 SR7600 CROS
 F405B D* SW 1 LS 3 TYPE 1
 F405B E*SOURCE CARDS 85 BCD OBJECT CARDS 33 BIN
 F405B F**GENERAL*LINEAR*SYSTEM SOLVER
 F405B G*ON DISK F4 COMPAT WU 03/17/72 DECK 03/17/72
 F405B 1*FORM: CALL GLSS(M,N,K,L,NR,AA,IA,YA,IY,BA,IB,XA,IX)
 F405B 2*PURPOSE: SOLVE THE LINEAR SYSTEM $AX=Y$ WHERE A IS AN M BY N
 F405B 3* MATRIX, M GREATER THAN, EQUAL TO, OR LESS THAN N, AND
 F405B 4* WHERE A MAY BE SINGULAR OR NONSINGULAR IF $M=N$. SEE
 F405B 5* WRITEUP FOR GLSS (F405A) FOR FURTHER DETAILS.
 F405B 6*ROUTINE NAME: GLSS
 F405B 7*ENTRY NAME: GLSS
 F405B 8*STORAGE: 617 (OCTAL) WORDS
 F405B 9*ROUTINES USED: LABRT(N103B), DOTPRO(F124B), VEC SUM(F133B),
 F405B 10* LIBMSG(SYSTEM)

F406A A* B L BUZBEE C-4 67
 F406A O*DBLE PRECISION GENERAL LINEAR SYSTEM SOLVER
 F406A B*MATHEMATICS F4 F4 SR6600 SCP 3.1
 F406A C* SW 1 LS 2
 F406A D*F4 SOURCE CARDS 95BCDF4 OBJECT CARDS 46BIN
 F406A S*DBLE PRECISION GENERAL*LINEAR*SYSTEM SOLVER
 F406A 10*CARDS F4 COMPAT WU 11/18/68REV 0 DECK 11/18/68REV 2
 F406A 11*CALL DGLSS(M,N,K,L,NR,A,IA,Y,IY,B,IB,X,IX) IS THE DOUBLE
 F406A 12*PRECISION VERSION OF F405A. USAGE IS IDENTICAL TO F405A
 F406A 13*EXCEPT THAT ALL FLOATING POINT ARGUMENTS MUST BE DOUBLE
 F406A 14*PRECISION.
 F406A 15*STORAGE=570 WORDS.
 F406A 16*USES LABRT(N103A) AND DSQRT(B410A).

F407A A* R. M. FRANK C-4 IVAN CHERRY 67
 F407A 0*LINEAR SYMMETRIC SYSTEM SOLVER
 F407A B*MATH F4 F4 SR6600 SCOPE
 F407A C* SW 3 LS 2
 F407A D*F4 SOURCE CARDS 119BCDF4 OBJECT CARDS 31BIN
 F407A S**LINEAR SYMMETRIC*SYSTEM SOLVER
 F407A 10*ON DISK F4 COMPAT WU 11/29/67 REV DECK 11/29/67 REV
 F407A 11*CALL LSSS(N,NS,A,B,IB,IC) SOLVES THE SYMMETRIC
 F407A 12*LINEAR SYSTEM $AX=B$, WHERE A IS SYMMETRIC AND ONLY
 F407A 13*A TRIANGLE OF IT IS INPUT.
 F407A 14*TIMING=.01 SEC FOR N=12.
 F407A 15*STORAGE=372(DECIMAL) WORDS.
 F407A 16*USES LABRT(N103A).

F408A A* R. M. FRANK C-4 IVAN CHERRY 67
 F408A 0*COMPLEX LINEAR SYSTEM SOLVER
 F408A B*MATRIX THEORY F4 F4 SR6600 SCOPE
 F408A C* SW 3 LS 1
 F408A D*F4 SOURCE CARDS 63BCDF4 OBJECT CARDS 30BIN
 F408A S**COMPLEX*EQUATION*SOLVER
 F408A 10*ON DISK F4 COMPAT WU 11/02/67 DECK 11/02/67
 F408A 11*PURPOSE - TO SOLVE THE MATRIX EQUATION $AX=B$, WHERE A AND B
 F408A 12*HAVE COMPLEX ELEMENTS.
 F408A 13*CALL CLSS(N,M,A,IA,B,IB)
 F408A 14* N - ORDER OF THE SYSTEM M - NUMBER OF COLUMNS IN B
 F408A 15* A - ORIGIN OF NXN MATRIX A B - ORIGIN OF NXM MATRIX B
 F408A 16* IA - FIRST DIMENSION OF A AS SPECIFIED IN CALLING PROGRAM.
 F408A 17* IB - FIRST DIMENSION OF B AS SPECIFIED IN CALLING PROGRAM.
 F408A 18*STORAGE= 362(DECIMAL) WORDS.
 F408A 19*USES LABRT(N103A).

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F408B A*          IVAN CHERRY      C-4          B.L.BUZBEE      72
F408B B*COMPLEX LINEAR SYSTEM SOLVER
F408B C*F4          SR7600      CROS
F408B D*          SW 3          LS 2          TYPE 1
F408B E*F4 SOURCE CARDS 68      BCD          OBJECT CARDS 34  BIN
F408B F**COMPLEX*EQUATION*SOLVER
F408B G*ON DISK      F4 COMPAT  WU 10/12/72      DECK 10/12/72
F408B 1*FORM: CALL CLSS(N,M,A,IA,B,IB)
F408B 2*PURPOSE: SOLVE THE MATRIX EQUATION AX=B, WHERE A AND B
F408B 3*          HAVE COMPLEX ELEMENTS.
F408B 4*          N - ORDER OF THE SYSTEM
F408B 5*          M - NUMBER OF COLUMNS IN B
F408B 6*          A - ORIGIN OF NXN MATRIX A
F408B 7*          B - ORIGIN OF NXM MATRIX B
F408B 8*          IA - FIRST DIMENSION OF A AS SPECIFIED IN CALLING PROGRAM.
F408B 9*          IB - FIRST DIMENSION OF B AS SPECIFIED IN CALLING PROGRAM.
F408B 10*ROUTINE NAME: CLSS
F408B 11*ENTRY NAME: CLSS
F408B 12*STORAGE: 632 OCTAL WORDS.
F408B 13*ROUTINES CALLED: LABRT(N103B),LIBMSG(SYSTEM).

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F409A A*          B. L. BUZBEE      C-4          69
F409A B*LINEAR SYSTEM SOLVER AND MATRIX FACTORIZATION(LU)
F409A C*F4          SR6600      SCP 3.1
F409A D*          SW 4          LS 3          TYPE 1
F409A E*SOURCE CARDS 95      BCD          OBJECT CARDS 33  BIN
F409A F**LINEAR*SYSTEM SOLVER AND*MATRIX*FACTORIZATION
F409A G*CARDS          F4 COMPAT  WU 09/23/70REV 2  DECK 09/23/70REV 2
F409A 1*USE: CALL MATFAC(N, M, IT, A, IA, Y, IY, R, DET)
F409A 2*PURPOSE: SOLVES LINEAR SYSTEM AX=Y BY MATRIX
F409A 3*FACTORIZATION. IF IT=0, INPUT MATRIX IS FACTORED.
F409A 4* IF IT .NE. 0, ROUTINE USES INPUT FACTORS.
F409A 5* SEE WRITEUP FOR DETAILS.
F409A 6*STORAGE: 610 (OCTAL) WORDS.
F409A 7*ROUTINES CALLED: DOTPRO(F124A), LABRT(N103A).

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F409B A* B.L.BUZZBEE C=4 72
 F409B B*LINEAR SYSTEM SOLVER AND MATRIX FACTORIZATION(LU)
 F409B C*F4 SR7600 CROS
 F409B D* SW 4 LS 3 TYPE 1
 F409B E*F4 SOURCE CARDS 95 BCD OBJECT CARDS 33 BIN
 F409B F**LINEAR*SYSTEM SOLVER AND*MATRIX*FACTORIZATION
 F409B G*ON DISK F4 COMPAT WU 08/09/72 DECK 08/09/72
 F409B 1*FORM: CALL MATFAC(N,M,IT,A,IA,Y,IY,R,DET)
 F409B 2*PURPOSE: SOLVES LINEAR SYSTEM AX=Y BY MATRIX
 F409B 3* FACTORIZATION. IF IT=0, INPUT MATRIX IS FACTORED.
 F409B 4* IF IT .NE. 0, ROUTINE USES INPUT FACTORS.
 F409B 5*ROUTINE NAME: MATFAC
 F409B 6*ENTRY NAME: MATFAC
 F409B 7*STORAGE: 624 OCTAL WORDS.
 F409B 8*ROUTINES CALLED: DOTPRO(F124B), LABRT(N103B).

F410A A* B L BUZZBEE C=4 68
 F410A 0*ITERATIVE SOLUTION OF LINEAR SYSTEMS
 F410A B*MATRIX THEORY F4 F4 SR6600 SCP3.1
 F410A C* SW 3 LS 1
 F410A D*F4 SOURCE CARDS 48BCDBINARY DECK 20BIN
 F410A S**LINEAR*SYSTEM SOLVER
 F410A 10*CARDS F4 COMPAT WU 11/04/68 DECK 11/04/68
 F410A 11* CALL LSSIT(N, M, A, B, IA, X, Y, R, IX, T, D)
 F410A 12* SOLVES SYSTEM AX=Y USING ITERATIVE REFINEMENT WITH
 F410A 13* DOUBLE PRECISION ACCUMULATION.
 F410A 14* SEE WRITEUP FOR DETAILS.
 F410A 15* STORAGE 350 OCTAL WORDS.
 F410A 16* USES MATFAC(F409A),DOTPRO(F124A), LABRT(N103A), UNPAK(A101A).

F411A A* B L BUZZBEE C=4 69
 F411A B*BAND MATRIX FACTORIZATION AND LINEAR SYSTEM SOLVER
 F411A C*F4 SR6600 SCP 3.1
 F411A D* SW 4 LS 3 TYPE 1
 F411A E*F4 SOURCE CARDS 105 BCD OBJECT CARDS 34 BIN
 F411A F**MATRIX*BAND*BANMAT*SYSTEM
 F411A G*CARDS F4 COMPAT WU 04/06/72REV 2 DECK 12/15/70REV 1
 F411A 1*FORM: CALL BANMAT(N,L1,L2,NT,IM,A,IA,Y,IY,DE,T)
 F411A 2*PURPOSE: SOLVES A SYSTEM OF LINEAR ALGEBRAIC EQUATIONS WHERE
 F411A 3*THE MATRIX HAS BAND STRUCTURE AND ONLY THE BAND IS STORED.
 F411A 4*THE FIRST CALL TO THE ROUTINE FACTORS THE MATRIX INTO A
 F411A 5*PRODUCT OF TRIANGULAR MATRICES, AND SUBSEQUENT CALLS USE
 F411A 6*THESE FACTORS.
 F411A 7*TIMING: N=81, L1=L2=9, .118 SEC WITH NT=1, AND .032 SEC
 F411A 8*WITH NT .NE. 1.
 F411A 9*STORAGE: 666 (OCTAL) WORDS.
 F411A 10*ROUTINES CALLED: DOTPRO(F124A), ADDVEC(F133A)


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F411B  A*           B L BUZBEE           C=4           72
F411B  B*BAND MATRIX FACTORIZATION AND LINEAR SYSTEM SOLVER
F411B  C*F4           SR7600   CROS
F411B  D*           SW  4           LS  3           TYPE  1
F411B  E*F4 SOURCE CARDS           105   BCD   OBJECT CARDS           34   BIN
F411B  F**MATRIX*BAND*BANMAT*SYSTEM
F411B  G*ON DISK           F4 COMPAT   WU 03/03/72           DECK 03/03/72
F411B  1*FORM: CALL BANMAT(N,L1,L2,NT,IM,A,IA,Y,IY,DE,T)
F411B  2*PURPOSE: SOLVES A SYSTEM OF LINEAR ALGEBRAIC EQUATIONS WHERE
F411B  3* THE MATRIX HAS BAND STRUCTURE AND ONLY THE BAND IS STORED.
F411B  4* THE FIRST CALL TO THE ROUTINE FACTORS THE MATRIX INTO A
F411B  5* PRODUCT OF TRIANGULAR MATRICES, AND SUBSEQUENT CALLS USE
F411B  6* THESE FACTORS.
F411B  7*TIMING: N=81, L1=L2=9, .022 SEC WITH NT=1, AND .0036 SEC
F411B  8* WITH NT .NE. 1.
F411B  9*ROUTINE NAME: BANMAT
F411B  10*ENTRY NAME: BANMAT
F411B  11*STORAGE: 666(OCTAL) WORDS
F411B  12*ROUTINES CALLED: DOTPRO(F124B), ADDVEC(F133B)

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F412A  A*           B L BUZBEE           C=4           69
F412A  B*TRIDIAGONAL LINEAR SYSTEM SOLVER
F412A  C*F4           SR6600   SCP 3.1
F412A  D*           SW  4           LS  3           TYPE  1
F412A  E*SOURCE CARDS           135   BCD   OBJECT CARDS           30   BIN
F412A  F**TRIDIAGONAL*LINEAR*SYSTEM*MATRIX*LSS
F412A  G*CARDS           F4 COMPAT   WU 07/29/70REV.1 DECK 07/29/70REV.1
F412A  1*USE: CALL TLSS(N,AA,IA,M,B,IB,UK,DE,NT)
F412A  2*PURPOSE: SOLVES A SYSTEM OF LINEAR ALGEBRAIC EQUATIONS WHERE
F412A  3*THE MATRIX IS TRIDIAGONAL AND ONLY THE THREE DIAGONALS ARE
F412A  4*STORED. THE FIRST CALL TO THE ROUTINE FACTORS THE MATRIX
F412A  5*INTO A PRODUCT AND SUBSEQUENT CALLS MAY USE THESE FACTORS.
F412A  6*STORAGE: 601 (OCTAL) WORDS
F412A  7*SELF CONTAINED

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F412B A* B.L.BUZBEE C=4 72
 F412B B*TRIDIAGONAL LINEAR SYSTEM SOLVER
 F412B C*F4 SR7600 CROS
 F412B D* SW 4 LS 3 TYPE 1
 F412B E*F4 SOURCE CARDS 135 BCD OBJECT CARDS 30 BIN
 F412B F**TRIDIAGONAL*LINEAR*SYSTEM*MATRIX*LSS
 F412B G*ON DISK F4 COMPAT WU 08/09/72 DECK 08/09/72
 F412B 1*FORM: CALL TLSS(N,AA,IA,M,B,IB,JK,DE,NT)
 F412B 2*PURPOSE: SOLVES A SYSTEM OF LINEAR ALGEBRAIC EQUATIONS
 F412B 3* WHERE THE MATRIX IS TRIIDIAGONAL AND ONLY THE THREE
 F412B 4* DIAGONALS ARE STORED. THE FIRST CALL TO THE ROUTINE
 F412B 5* FACTORS THE MATRIX INTO A PRODUCT AND SUBSEQUENT CALLS
 F412B 6* MAY USE THESE FACTORS.
 F412B 7*ROUTINE NAME: TLSS
 F412B 8*ENTRY NAME: TLSS
 F412B 9*STORAGE: 605 OCTAL WORDS.
 F412B 10*SELF CONTAINED.

F413A A* B. L. BUZBEE C=4 70
 F413A B*SYMMETRIC CONSTANT TRIDIAGONAL LINEAR SYSTEM SOLVER
 F413A C*COMPASS SR6600 SCP 3.1
 F413A D* SW 3 LS 3 TYPE 1
 F413A E*SOURCE CARDS 116 BCD OBJECT CARDS 6 BIN
 F413A F**TRIDIAGONAL*MATRIX*LINEAR SYSTEM
 F413A G*CARDS F4 COMPAT WU 09/28/70REV 1 DECK 09/28/70REV 1
 F413A 1*USE: CALL ABTDSS(N,A,B,C,M,LC,LR,Y,T,NE)
 F413A 2*PURPOSE: SOLVE A TRIDIAGONAL LINEAR SYSTEM WITH CONSTANT
 F413A 3*DIAGONALS.
 F413A 4*TIMING: .001 SEC FOR N=100
 F413A 5*STORAGE: 57 (OCTAL) WORDS
 F413A 6*SELF CONTAINED

F414A A* B. L. BUZBEE C=4 70
 F414A B*SYMMETRIC PERIODIC LINEAR SYSTEM SOLVER
 F414A C*F4 SR6600 SCP. 3.1
 F414A D* SW 3 LS 2 TYPE 1
 F414A E*SOURCE CARDS 87 BCD OBJECT CARDS 34 BIN
 F414A F**SPERLSS*MATRIX*PERIODIC*LINEAR SYSTEM
 F414A G*CARDS F4 COMPAT WU 05/01/70 DECK 05/01/70
 F414A 1*USE: CALL SPERLSS(N,M,A,IA,B,IB,DD,NT)
 F414A 2*PURPOSE: TO SOLVE A SYMMETRIC, PERIODIC LINEAR SYSTEM
 F414A 3*TIMING: .009 SEC FOR N=100
 F414A 4*STORAGE: 703 (OCTAL) WORDS
 F414A 5*SELF CONTAINED

F415A A* MORRIS KLEIN C=6 B. L. BUZBEE 70
 F415A B*ECS GENERAL LINEAR SYSTEM SOLVER
 F415A C*F4 SR6600 SCP 3.1
 F415A D* SW 5 LS 3 TYPE 1
 F415A E*SOURCE CARDS 122 BCD OBJECT CARDS 39 BIN
 F415A F**ECS*GENERAL*LINEAR*SYSTEM*SOLVER
 F415A G*CARDS F4 COMPAT WU 09/23/70 DECK 09/23/70
 F415A 1*USE: CALL ECSGLSS(IM,IN,IK,IL,NR,A,D,IR,IY,B,IB,X,JX,EPS)
 F415A 2*PURPOSE: TO SOLVE IN THE LEAST SQUARES SENSE THE GENERAL
 F415A 3*LINEAR SYSTEM CX=Y WHEN C AND Y ARE STORED COLUMN-WISE IN
 F415A 4*ECS.
 F415A 5*STORAGE: 717 (OCTAL) WORDS. AT LEAST IM*IN*IM*IK WORDS
 F415A 6*RESERVED IN ECS.
 F415A 7*ROUTINES CALLED: DOTPRO(F124A), LABRT(N103A), SQRT(B408A),
 F415A 8*VECPROD,VECSUM(F133A), ECRU,ECWR,EXIT(SYSTEM).

F416A A* B L BUZBEE C=4 70
 F416A B*COMPLEX LINEAR SYSTEM SOLVER
 F416A C*F4 SR6600 SCP 3.1
 F416A D* SW 1 LS 3 TYPE 1.1
 F416A E*SOURCE CARDS 96 BCD OBJECT CARDS 39 BIN
 F416A F**COMPLEX*LINEAR*SYSTEM*SOLVER
 F416A G*CARDS F4 COMPAT WU 11/03/70 DECK 11/03/70
 F416A 1*USE: CALL CATFAC(N,M,IT,A,IA,Y,IY,R,DET)
 F416A 2*WHERE THE ARGUMENTS ARE IDENTICAL TO F409A EXCEPT ALL
 F416A 3*FLOATING POINT ARGUMENTS A,Y,R, AND DET MUST BE COMPLEX.
 F416A 4*PURPOSE: TO SOLVE A COMPLEX LINEAR SYSTEM, AX=Y.
 F416A 5*STORAGE: 733 OCTAL WORDS
 F416A 6*ROUTINES CALLED: COTPRO(F136A), LABRT(N103A).

F416B A* B.L.BUZBEE C=4 73
 F416B B*COMPLEX LINEAR SYSTEM SOLVER
 F416B C*F4 SR7600 CROS
 F416B D* SW 1 LS 3 TYPE 1.1
 F416B E*F4 SOURCE CARDS 96 BCD OBJECT CARDS 39 BIN
 F416B F**COMPLEX*LINEAR*SYSTEM*SOLVER
 F416B G*ON DISK F4 COMPAT WU 03/02/73 DECK 03/02/73
 F416B 1*FORM: CALL CATFAC(N,M,IT,A,IA,Y,IY,R,DET)
 F416B 2*PURPOSE: TO SOLVE A COMPLEX LINEAR SYSTEM, AX=Y. THE
 F416B 3* ARGUMENTS ARE IDENTICAL TO F409 EXCEPT ALL FLOATING
 F416B 4* POINT ARGUMENTS A,Y,R, AND DET MUST BE COMPLEX.
 F416B 5*ROUTINE NAME: CATFAC
 F416B 6*ENTRY NAME: CATFAC
 F416B 7*7600 TIMING: .006 SEC. FOR N=10 AND IT=0
 F416B 8* .002 SEC. FOR N=10 AND IT=1
 F416B 9*STORAGE: 745 OCTAL WORDS.
 F416B 10*ROUTINES CALLED: COTPRO(F136B), LABRT(ON THE SYSTEM).

F417A A* B.L. BUZBEE C-4 70
 F417A B*SOLUTION OF COMPLEX LINEAR SYSTEMS BY ITERATIVE REFINEMENT
 F417A C*F4 SR6600 SCP 3.1
 F417A D* SW 1 LS 2 TYPE 1.1
 F417A E*F4 SOURCE CARDS 46 BCD OBJECT CARDS 23 BIN
 F417A F**COMPLEX*LINEAR SYSTEMS*ITERATIVE*REFINEMENT
 F417A G*CARDS F4 COMPAT WU 11/04/70 DECK 11/04/70
 F417A 1*USE: CALL CLSIT(N,M,A,B,IA,X,Y,R,IX,T,D)
 F417A 2*WHERE ALL ARGUMENTS ARE IDENTICAL TO F410A EXCEPT FLOATING
 F417A 3*POINT ARGUMENTS A,B,X,Y,R,T, AND D MUST BE COMPLEX.
 F417A 4*SEE F410A FOR FURTHER INFORMATION.
 F417A 5*STORAGE: 377 OCTAL WORDS.
 F417A 6*ROUTINES CALLED: UNPAK(A101A), CABS(A203A), DOTPRO(F124A),
 F417A 7*CDOTPRO,COTPRO(F136A), CATFAC(F416A), LABRT(N103A).

F417B A* B.L. BUZBEE C-4 73
 F417B B*SOLUTION OF COMPLEX LINEAR SYSTEM BY ITERATIVE REFINEMENT
 F417B C*F4 SR7600 CROS
 F417B D* SW 1 LS 2 TYPE 1.1
 F417B E*F4 SOURCE CARDS 46 BCD OBJECT CARDS 23 BIN
 F417B F**COMPLEX*LINEAR SYSTEMS*ITERATIVE*REFINEMENT
 F417B G*ON DISK F4 COMPAT WU 03/02/73 DECK 03/02/73
 F417B 1*FORM: CALL CLSIT(N,M,A,B,IA,X,Y,R,IX,T,D)
 F417B 2*PURPOSE: ALL ARGUMENTS ARE IDENTICAL TO LSSIT(F410B)
 F417B 3* EXCEPT FLOATING POINT ARGUMENTS A,B,X,Y,R,T, AND D MUST
 F417B 4* BE COMPLEX.
 F417B 5*ROUTINE NAME: CLSIT
 F417B 6*ENTRY NAME: CLSIT
 F417B 7*7600 TIMING: .029 SEC. FOR N=20 AND M=1.
 F417B 8*STORAGE: 406 OCTAL WORDS.
 F417B 9*ROUTINES CALLED: DOTPRO(F124B), CDOTPRO, COTPRO(F136B),
 F417B 10* CATFAC(F416B), UNPAK, CABS, LABRT(ALL ON THE SYSTEM).

F418A A* B L BUZBEE C-4 B L BUZBEE 71
 F418A B*LU DECOMPOSITION OF DIAGONALLY DOMINANT TRIDIAGONAL MATRIX
 F418A C*COMPASS SR6600 SCP 3.1
 F418A D* SW 5 LS 3 TYPE 1
 F418A E*SOURCE CARDS 115 BCD OBJECT CARDS 5 BIN
 F418A F**LU DECOMPOSITION*DIAGONALLY DOMINANT TRIDIAGONAL MATRIX
 F418A G*CARDS F4 COMPAT WU 08/29/72REV 1 DECK 08/29/72REV 1
 F418A 1*FORM: CALL FACTTD(N,B,LB,EP,NE)
 F418A 2*PURPOSE: DECOMPOSE A DIAGONALLY DOMINANT TRIDIAGONAL
 F418A 3* MATRIX A INTO A PRODUCT LU.
 F418A 4*ROUTINE NAME: FACTTD
 F418A 5*ENTRY NAMES: FACTTD
 F418A 6*STORAGE: 34 OCTAL WORDS
 F418A 7*ROUTINES CALLED: SELF CONTAINED


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F419B A*          B L BUZBEE          C-4          B L BUZBEE          72
F419B B*SOLVE DIAGONALLY DOMINANT TRIDIAGONAL LINEAR SYSTEM
F419B C*COMPASS          SR7600  CROS
F419B D*          SW 3          LS 4          TYPE 1
F419B E*SOURCE CARDS          193 BCD          OBJECT CARDS          7          BIN
F419B F**DIAGONALLY DOMINANT*TRIDIAGONAL LINEAR SYSTEM
F419B G*ON DISK          F4 COMPAT          WU 08/29/72          DECK 08/29/72
F419B 1*FORM: CALL SOLTD1(N,B,LB,Y,LY,SN)
F419B 2*          CALL SOLTDM(N,B,LB,Y,LY,KY,M,SN)
F419B 3*PURPOSE: SOLVE A TRIDIAGONAL LINEAR SYSTEM WITH DIAGONALLY
F419B 4*          DOMINANT MATRIX, USING THE DECOMPOSITION FROM
F419B 5*          FACTTD(F418).
F419B 6*ROUTINE NAME: SOLTDM
F419B 7*ENTRY NAMES: SOLTDM, SOLTD1
F419B 8*STORAGE: 64 OCTAL WORDS
F419B 9*TIMING: .1 MS FOR N=100 AND M=1
F419B 10*ROUTINES CALLED: FACTTD(F418B)

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F420A A*          B.L.BUZBEE          C-4          B.L.BUZBEE          73
F420A B*LU DECOMPOSITION OF PERIODIC-TRIDIAGONAL MATRIX
F420A C*F-4          SR6600  SCP 3.1
F420A D*          SW 5          LS 2          TYPE 1.1
F420A E*          SOURCE          56 CARD          OBJECT          12 CARD
F420A F**LU DECOMPOSITION*PERIODIC TRIDIAGONAL MATRIX*MATRIX
F420A G*CARDS          F4 COMPAT          WU 04/30/73          DECK 04/30/73
F420A 1*FORM: CALL DECPTD (N,A,B,C,EP,NE)
F420A 2*PURPOSE: COMPUTE LU DECOMPOSITION OF A DIAGONALLY
F420A 3*          DOMINANT PERIODIC-TRIDIAGONAL MATRIX
F420A 4*ROUTINE NAME: DECPTD
F420A 5*ENTRY NAMES: DECPTD
F420A 6*STORAGE: 204 OCTAL WORDS
F420A 7*ROUTINES CALLED: SELF CONTAINED

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F420B A*          B.L.BUZBEE      C-4          B.L.BUZBEE      73
F420B B*LU DECOMPOSITION OF PERIODIC-TRIDIAGONAL MATRIX
F420B C*F-4          SR7600      CROS
F420B D*              SW 5          LS 2          TYPE 1.1
F420B E*              SOURCE 56 CARD      OBJECT 12 CARD
F420B F**LU DECOMPOSITION*PERIODIC TRIDIAGONAL MATRIX*MATRIX
F420B G*DISK          F4 COMPAT WU 04/30/73      DECK 04/30/73
F420B 1*FORM: CALL DECPTD (N,A,B,C,EP,NE)
F420B 2*PURPOSE: COMPUTE LU DECOMPOSITION OF A DIAGONALLY
F420B 3*              DOMINANT PERIODIC-TRIDIAGONAL MATRIX
F420B 4*TIMING: N = 25, .11 MILLISEC.
F420B 5*              N = 50, .21 MILLISEC.
F420B 6*ROUTINE NAME: DECPTD
F420B 7*ENTRY NAMES: DECPTD
F420B 8*STORAGE: 207 OCTAL WORDS
F420B 9*ROUTINES CALLED: SELF CONTAINED

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F421A A*          B.L.BUZBEE      C-4          B.L.BUZBEE      73
F421A B*SOLUTION OF PERIODIC-TRIDIAGONAL SYSTEM OF EQUATIONS
F421A C*F-4          SR6600      SCP 3.1
F421A D*              SW 2          LS 2          TYPE 1.1
F421A E*              SOURCE 62 CARDS      OBJECT 13 CARDS
F421A F**PERIODIC-TRIDIAGONAL SYSTEM OF EQUATIONS
F421A G*CARDS          F4 COMPAT WU 04/30/73      DECK 04/30/73
F421A 1*FORM: CALL SOLPTD(N,M,Y,LR,LC,XN)
F421A 2*PURPOSE: SOLVE A PERIODIC-TRIDIAGONAL SYSTEM OF
F421A 3*              EQUATIONS.
F421A 4*ROUTINE NAME: SOLPTD
F421A 5*ENTRY NAMES: SOLPTD
F421A 6*STORAGE: 232 OCTAL WORDS
F421A 7*ROUTINES CALLED: SELF CONTAINED

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F421B A*          B.L.BUZBEE      C-4          B.L.B
F421B B*SOLUTION OF PERIODIC-TRIDIAGONAL SYSTEM OF EQUATIONS
F421B C*F-4          SR7600      CROS
F421B D*              SW 2          LS 2          TYPE 1.1
F421B E*              SOURCE 62 CARDS      OBJECT 13 CARDS
F421B F**PERIODIC-TRIDIAGONAL SYSTEM OF EQUATIONS
F421B G*DISK          F4 COMPAT WU 04/30/73      DECK 04/30/73
F421B 1*FORM: CALL SOLPTD(N,M,Y,LR,LC,XN)
F421B 2*PURPOSE: SOLVE A PERIODIC-TRIDIAGONAL SYSTEM OF
F421B 3*              EQUATIONS.
F421B 4*TIMING:          N = 25, M = 2, 29 MILLISEC
F421B 5*              N = 50, M = 2, 58 MILLISEC
F421B 6*ROUTINE NAME: SOLPTD
F421B 7*ENTRY NAMES: SOLPTD
F421B 8*STORAGE: 236 OCTAL WORDS
F421B 9*ROUTINES CALLED: SELF CONTAINED

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F5 FAST TRANSFORMS

E.G., FOURIER.

REVIEWER: R. HUNT, C-5

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F501A A*          B.R.HUNT          C-5          72
F501A B*RFFT - FAST FOURIER TRANSFORM OF REAL DATA
F501A C*CMP          SR6600      SCP 3.1
F501A D*          SW 2          LS 4          TYPE 1
F501A E*CMP SOURCE CARDS 126 BCD      OBJECT CARDS 8 BIN
F501A F**FAST*FOURIER*TRANSFORM*REAL
F501A G*CARDS      F4 COMPAT      WU 08/29/72      DECK 08/29/72
F501A 1*FORM: CALL RFFT(A,N)
F501A 2*PURPOSE: PERFORM THE FAST FOURIER TRANSFORM OF
F501A 3* REAL-VALUED DATA.
F501A 4*ROUTINE NAME: RFFT
F501A 5*ENTRY NAME: RFFT
F501A 6*STORAGE: 64 (OCTAL) WORDS
F501A 7*TIMING: ABOUT 3.1E-6*N*LOG2(N) SECONDS FOR CDC 6600,
F501A 8* WHERE N IS AN EXACT POWER OF 2 AND IS THE SAME
F501A 9* N IN THE CALL STATEMENT.
F501A 10*ROUTINES CALLED: FFT2(F502A), SIN(BI06A), COS(BI06A).

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F501B A*          B.R.HUNT          C-5          72
F501B B*RFFT - FAST FOURIER TRANSFORM OF REAL DATA
F501B C*CMP          SR7600      CROS
F501B D*          SW 2          LS 4          TYPE 1
F501B E*CMP SOURCE CARDS 126 BCD      OBJECT CARDS 8 BIN
F501B F**FAST*FOURIER*TRANSFORM*REAL
F501B G*ON DISK      F4 COMPAT      WU 08/29/72      DECK 08/29/72
F501B 1*FORM: CALL RFFT(A,N)
F501B 2*PURPOSE: PERFORM THE FAST FOURIER TRANSFORM OF
F501B 3* REAL-VALUED DATA.
F501B 4*ROUTINE NAME: RFFT
F501B 5*ENTRY NAME: RFFT
F501B 6*STORAGE: 64 OCTAL WORDS
F501B 7*TIMING: ABOUT 5.4E-7*N*LOG2(N) SECONDS FOR CDC 7600,
F501B 8* WHERE N IS AN EXACT POWER OF 2 AND IS THE SAME
F501B 9* N IN THE CALL STATEMENT.
F501B 10*ROUTINES CALLED: FFT2(F502B), SIN(BI06B), COS(BI06B).

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F502A A* B.R.HUNT C=5 72
 F502A B*FFT2 - FAST FOURIER TRANSFORM OF COMPLEX DATA
 F502A C*CMP SR6600 SCP 3.1
 F502A D* SW 3 LS 5 TYPE 1
 F502A E*CMP SOURCE CARDS 160 BCD OBJECT CARDS 8 BIN
 F502A F**FAST*FOURIER*TRANSFORM*COMPLEX
 F502A G*CARDS F4 COMPAT WU 09/13/72 DECK 09/13/72
 F502A 1*FORM: CALL FFT2(A,B,N,INC)
 F502A 2*PURPOSE: PERFORM THE FAST FOURIER TRANSFORM OF
 F502A 3* COMPLEX-VALUED DATA WITH A RADIX*2 ALGORITHM.
 F502A 4*ROUTINE NAME: FFT2
 F502A 5*ENTRY NAME: FFT2
 F502A 6*TIMING: ABOUT $4.7E-6 * N * \log_2(N)$ SECONDS FOR CDC 6600.
 F502A 7* WHERE N IS AN EXACT POWER OF 2 AND IS THE SAME N IN THE
 F502A 8* CALL STATEMENT.
 F502A 9*STORAGE: 73 OCTAL WORDS.
 F502A 10*SELF CONTAINED.

F502B A* B.R.HUNT C=5 72
 F502B B*FFT2 - FAST FOURIER TRANSFORM OF COMPLEX DATA
 F502B C*CMP SR7600 CROS
 F502B D* SW 3 LS 5 TYPE 1
 F502B E*CMP SOURCE CARDS 160 BCD OBJECT CARDS 8 BIN
 F502B F**FAST*FOURIER*TRANSFORM*COMPLEX
 F502B G*ON DISK F4 COMPAT WU 09/13/72 DECK 09/13/72
 F502B 1*FORM: CALL FFT2(A,B,N,INC)
 F502B 2*PURPOSE: PERFORM THE FAST FOURIER TRANSFORM OF
 F502B 3* COMPLEX-VALUED DATA WITH A RADIX-2 ALGORITHM.
 F502B 4*ROUTINE NAME: FFT2
 F502B 5*ENTRY NAME: FFT2
 F502B 6*TIMING: ABOUT $8.1E-7 * N * \log_2(N)$ SECONDS FOR CDC 7600.
 F502B 7* WHERE N IS AN EXACT POWER OF 2 AND IS THE SAME N IN THE
 F502B 8* CALL STATEMENT.
 F502B 9*STORAGE: 73 OCTAL WORDS.
 F502B 10*SELF CONTAINED.

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F503A A*           B.R.HUNT           C-5           72
F503A B*RFTI - INVERSE FAST FOURIER TRANSFORM OF REAL DATA
F503A C*CMP           SR6600   SCP 3.1
F503A D*           SW 2   LS 4   TYPE 1
F503A E*CMP SOURCE CARDS 147 BCD OBJECT CARDS 8 BIN
F503A F**INVERSE*FAST*FOURIER*TRANSFORM*REAL
F503A G*CARDS F4 COMPAT WU 09/13/72 DECK 09/13/72
F503A 1*FORM: CALL RFTI(A,N)
F503A 2*PURPOSE: PERFORM THE INVERSE FAST FOURIER TRANSFORM
F503A 3* FOR REAL-VALUED DATA.
F503A 4*ROUTINE NAME: RFTI
F503A 5*ENTRY NAME: RFTI
F503A 6*TIMING: ABOUT 2.9E-6*N*LOG2(N) SECONDS FOR CDC 6600, WHERE
F503A 7* N IS AN EXACT POWER OF 2 AND IS THE SAME N IN THE CALL
F503A 8* STATEMENT.
F503A 9*STORAGE: 74 OCTAL WORDS
F503A 10*EXTERNALS: FFT2(F502A), SIN(B106B), COS(B106B).

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F503B A*           B.R.HUNT           C-5           72
F503B B*RFTI - INVERSE FAST FOURIER TRANSFORM OF REAL DATA
F503B C*CMP           SR7600   CROS
F503B D*           SW 2   LS 5   TYPE 1
F503B E*CMP SOURCE CARDS 147 BCD OBJECT CARDS 8 BIN
F503B F**INVERSE*FAST*FOURIER*TRANSFORM*REAL
F503B G*ON DISK F4 COMPAT WU 09/13/72 DECK 09/13/72
F503B 1*FORM: CALL RFTI(A,N)
F503B 2*PURPOSE: PERFORM THE INVERSE FAST FOURIER TRANSFORM
F503B 3* FOR REAL-VALUED DATA.
F503B 4*ROUTINE NAME: RFTI
F503B 5*ENTRY NAME: RFTI
F503B 6*TIMING: ABOUT 5.4E-7*N*LOG2(N) SECONDS FOR CDC 7600, WHERE
F503B 7* N IS AN EXACT POWER OF 2 AND IS THE SAME N IN THE CALL
F503B 8* STATEMENT.
F503B 9*STORAGE: 74 OCTAL WORDS
F503B 10*EXTERNALS: FFT2(F502B), SIN(B106B), COS(B106B).

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F5AA  A*           B. HUNT           C=5                               72
F5AA  B*FFT FAST FOURIER TRANSFORM FOR COMPLEX 3 DIMENSIONAL DATA.
F5AA  C*F4           SR6600   SCP 3.1
F5AA  D*           SW 4           LS 7           TYPE 2
F5AA  E*F4 SOURCE CARDS           319 BCD   OBJECT CARDS           60   BIN
F5AA  F**FAST*FOURIER*TRANSFORM*COMPLEX*3 DIMENSIONAL
F5AA  G*CARDS           F4 COMPAT   WU 08/29/72           DECK 08/29/72
F5AA  1*FORM: CALL FFT(A,M,INV,S,IFSET,IFERR)
F5AA  2*PURPOSE: COMPUTE THE FOURIER TRANSFORM OF COMPLEX
F5AA  3*           THREE-DIMENSIONAL DATA.
F5AA  4*NOTE: C DIVISION RECOMMENDS THE USE OF FFT2(F502A)
F5AA  5*           IN PLACE OF THIS ROUTINE.
F5AA  6*ROUTINE NAME: FFT
F5AA  7*ENTRY NAME: FFT
F5AA  8*TIMING: APPROXIMATELY  $2.3 \cdot 10^{-5} \cdot N \cdot \log_2(N)$  SECONDS, WHERE
F5AA  9*           N REPRESENTS THE TOTAL NUMBER OF COMPLEX ELEMENTS IN A.
F5AA  10*STORAGE: 1541 OCTAL WORDS
F5AA  11*ROUTINES USED: SQR(B408A), SIN(B106A), COS(B106A).

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F5AB  A*           B.R.HUNT           C=5                               72
F5AB  B*RFSN FAST INVERSE FOURIER TRANSFORM
F5AB  C*F4           SR6600   SCP 3.1
F5AB  D*           SW 3           LS 2           TYPE 2
F5AB  E*F4 SOURCE CARDS           65 BCD   OBJECT CARDS           18   BIN
F5AB  F**FAST*INVERSE*FOURIER*TRANSFORM
F5AB  G*CARDS           F4 COMPAT   WU 08/29/72           DECK 08/29/72
F5AB  1*FORM: CALL RFSN(A,M,INV,S,IFERR)
F5AB  2*PURPOSE: COMPUTE THE REAL INVERSE FOURIER TRANSFORM
F5AB  3*NOTE: C DIVISION RECOMMENDS USE OF RFTI(F503A)
F5AB  4*           IN PLACE OF THIS ROUTINE.
F5AB  5*ROUTINE NAME: RFSN
F5AB  6*ENTRY NAME: RFSN
F5AB  7*STORAGE: 347 OCTAL WORDS
F5AB  8*TIMING:  $1.2 \cdot 10^{-5} \cdot N \cdot \log_2(N)$  SECONDS.
F5AB  9*ROUTINES CALLED: FFT(F5AA), SIN(B106A), COS(B106A).

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G

STATISTICAL ANALYSIS AND PROBABILITY

G4 DISTRIBUTION FUNCTIONS AND THEIR INVERSE

REVIEWER: R. LOHRDING, C-5

G403A A* LARA BAKER ENG-DO KEN LYONS 69
 G403A B*FISHE EVALUATION OF FISHER'S F VALUE.
 G403A C*FORTRAN IV SR6600 SCP 3.1
 G403A D* SW 2 LS 1 TYPE 1
 G403A E*SOURCE CARDS 51 BCD OBJECT CARDS 13 BIN
 G403A F**STATISTICS*FISHER*FTEST
 G403A G*CARDS F* COMPAT WU 08/01/69 DECK 08/01/69
 G403A 1*USAGE: P=FISHE (NUMDEG, IDENDG, FVAL)
 G403A 2*PURPOSE: TO CALCULATE THE PROBABILITY LEVEL OF A FISHER'S
 G403A 3*F VALUE GIVEN THE NUMERATOR AND DENOMINATOR DEGREES OF
 G403A 4*FREEDOM.
 G403A 5*STORAGE: 230 (OCTAL) WORDS
 G403A 6*SELF CONTAINED.

G6 TIME SERIES ANALYSIS AND PROCESSING

REVIEWER: R. HUNT, C-5

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G601A A*          B.R.HUNT          C-5          B.R.HUNT          72
G601A B*SPECTRAL ANALYSIS OF TIME SERIES
G601A C*F4          SR6600    SCP 3.1
G601A D*          SW 4          LS 2          TYPE 1
G601A E*SOURCE CARDS          44    BCD    OBJECT CARDS    27    BIN
G601A F**SPECTRAL ANALYSIS*TIME SERIES
G601A G*CARDS          F4    COMPAT    WU 10/04/72          DECK 10/04/72
G601A 1*FORM: CALL SPCTRL(X,ACX,PSX,T,NX,NM,NF,DELTA,TITLE,
G601A 2*          IA,IWIN,IDF,IP)
G601A 3*PURPOSE: COMPUTE THE AUTOCOVARANCE FUNCTION AND POWER
G601A 4*          SPECTRUM OF A TIME SERIES.
G601A 5*ROUTINE NAME: SPCTRL
G601A 6*ENTRY NAME: SPCTRL
G601A 7*STORAGE: 471 (OCTAL) WORDS PLUS NX+NM+NF+MAX(NM,NF) WORDS
G601A 8*          RESERVED IN THE CALLING PROGRAM FOR ARRAYS
G601A 9*          X,ACX,PSX,AND T.
G601A 10*ROUTINES CALLED: ACFCN(G602A), WINDOW(G603A),
G601A 11*          PWRSPCT(G604A), PLOJB(J562A).

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G601B A*          B.R.HUNT          C-5          B.R.HUNT          72
G601B B*SPECTRAL ANALYSIS OF TIME SERIES
G601B C*F4          SR7600    CROS
G601B D*          SW 4          LS 2          TYPE 1
G601B E*SOURCE CARDS          44    BCD    OBJECT CARDS    27    BIN
G601B F**SPECTRAL ANALYSIS*TIME SERIES
G601B G*ON DISK          F4    COMPAT    WU 10/04/72          DECK 10/04/72
G601B 1*FORM: CALL SPCTRL(X,ACX,PSX,T,NX,NM,NF,DELTA,TITLE,
G601B 2*          IA,IWIN,IDF,IP)
G601B 3*PURPOSE: COMPUTE THE AUTOCOVARANCE FUNCTION AND POWER
G601B 4*          SPECTRUM OF A TIME SERIES.
G601B 5*ROUTINE NAME: SPCTRL
G601B 6*ENTRY NAME: SPCTRL
G601B 7*STORAGE: 501 (OCTAL) WORDS PLUS NX+NM+NF+MAX(NM,NF) WORDS
G601B 8*          RESERVED IN THE CALLING PROGRAM FOR ARRAYS
G601B 9*          X,ACX,PSX,AND T.
G601B 10*ROUTINES CALLED: ACFCN(G602B), WINDOW(G603B),
G601B 11*          PWRSPCT(G604B), PLOJB(J562B).

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G602A  A*           B,R,HUNT           C-5           B,R,HUNT           72
G602A  B**AUTOCOVARIANCE/AUTOCORRELATION FUNCTION
G602A  C*F4           SR6600           SCP 3.1
G602A  D*           SW 3           LS 1           TYPE 1
G602A  E*SOURCE CARDS           32           BCD           OBJECT CARDS           12           BIN
G602A  F**AUTOCOVARIANCE/AUTOCORRELATION FUNCTION
G602A  G*CARDS           F4           COMPAT           WU 10/04/72           DECK 10/04/72
G602A  1*FORM: CALL ACFCN(X,ACX,N,M,IOPT,XM,XVAR)
G602A  2*PURPOSE: COMPUTE THE AUTOCOVARIANCE FUNCTION OF A
G602A  3*           TIME SERIES.
G602A  4*ROUTINE NAME: ACFCN
G602A  5*ENTRY NAME: ACFCN
G602A  6*STORAGE: 202 (OCTAL) WORDS PLUS N+M WORDS RESERVED
G602A  7*           IN THE CALLING PROGRAM FOR ARRAYS X AND ACX.
G602A  8*ROUTINES CALLED: SELF CONTAINED.

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G602B  A*           B,R,HUNT           C-5           B,R,HUNT           72
G602B  B**AUTOCOVARIANCE/AUTOCORRELATION FUNCTION
G602B  C*F4           SR7600           CROS
G602B  D*           SW 3           LS 1           TYPE 1
G602B  E*SOURCE CARDS           32           BCD           OBJECT CARDS           12           BIN
G602B  F**AUTOCOVARIANCE/AUTOCORRELATION FUNCTION
G602B  G*ON DISK           F4           COMPAT           WU 10/04/72           DECK 10/04/72
G602B  1*FORM: CALL ACFCN(X,ACX,N,M,IOPT,XM,XVAR)
G602B  2*PURPOSE: COMPUTE THE AUTOCOVARIANCE FUNCTION OF A
G602B  3*           TIME SERIES.
G602B  4*ROUTINE NAME: ACFCN
G602B  5*ENTRY NAME: ACFCN
G602B  6*STORAGE: 206 (OCTAL) WORDS PLUS N+M WORDS RESERVED
G602B  7*           IN THE CALLING PROGRAM FOR ARRAYS X AND ACX.
G602B  8*ROUTINES CALLED: SELF CONTAINED.

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G603A  A*           B,R,HUNT           C-5           B,R,HUNT           72
G603A  B*LAG-WINDOW GENERATOR
G603A  C*F4           SR6600           SCP 3.1
G603A  D*F4           SW 2           LS 2           TYPE 1
G603A  E*SOURCE CARDS           39           BCD           OBJECT CARDS           18           BIN
G603A  F**LAG-WINDOW GENERATOR
G603A  G*CARDS           F4           COMPAT           WU 10/04/72           DECK 10/04/72
G603A  1*FORM: CALL WINDOW(ACX,N,IOPT,M,IDF)
G603A  2*PURPOSE: MODIFY A RAW AUTOCOVARIANCE/AUTOCORRELATION
G603A  3*           FUNCTION BY MULTIPLYING IT BY A SPECIFIED
G603A  4*           LAG-WINDOW.
G603A  5*ROUTINE NAME: WINDOW
G603A  6*ENTRY NAME: WINDOW
G603A  7*STORAGE: 317 (OCTAL) WORDS PLUS M WORDS RESERVED IN THE
G603A  8*           CALLING PROGRAM FOR ARRAY ACX.
G603A  9*ROUTINES CALLED: COS(B106A)

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G603B A*          B.R.HUNT          C-5          B.R.HUNT          72
G603B B*LAG-WINDOW GENERATOR
G603B C*F4          SR7600          CROS
G603B D*F4          SW 2          LS 2          TYPE 1
G603B E*SOURCE CARDS          39          BCD          OBJECT CARDS          18          BIN
G603B F**LAG-WINDOW GENERATOR
G603B G*ON DISK          F4          COMPAT          WU 10/04/72          DECK 10/04/72
G603B 1*FORM: CALL WINDOW(ACX,N,IOP,M,IUF)
G603B 2*PURPOSE: MODIFY A RAW AUTOCOVARIANCE/AUTOCORRELATION
G603B 3*          FUNCTION BY MULTIPLYING IT BY A SPECIFIED
G603B 4*          LAG-WINDOW.
G603B 5*ROUTINE NAME: WINDOW
G603B 6*ENTRY NAME: WINDOW
G603B 7*STORAGE: 323 (OCTAL) WORDS PLUS M WORDS RESERVED IN THE
G603B 8*          CALLING PROGRAM FOR ARRAY ACX.
G603B 9*ROUTINES CALLED: COS(B106B)

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G604A A*          B.R.HUNT          C-5          B.R.HUNT          72
G604A B*POWER SPECTRUM COMPUTATION
G604A C*F4          SR6600          SCP 3.1
G604A D*          SW 2          LS 1          TYPE 1
G604A E*SOURCE CARDS          10          BCD          OBJECT CARDS          7          BIN
G604A F**POWER*POWER SPECTRUM COMPUTATION
G604A G*CARDS          F4          COMPAT          WU 10/04/72          DECK 10/04/72
G604A 1*FORM: CALL PWRSPCT(ACX,M,PSX,NF,DELTA)
G604A 2*PURPOSE: COMPUTE THE POWER SPECTRUM OF A TIME SERIES
G604A 3*          FROM AN AUTOCOVARIANCE/AUTOCORRELATION FUNCTION
G604A 4*          OF THE SERIES.
G604A 5*ROUTINE NAME: PWRSPCT
G604A 6*ENTRY NAME: PWRSPCT
G604A 7*STORAGE: 73 (OCTAL) WORDS PLUS M*NF WORDS RESERVED
G604A 8*          IN THE CALLING PROGRAM FOR ARRAYS ACX AND PSX.
G604A 9*ROUTINES CALLED: COS(B106A)

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G604B A*           B.R.HUNT           C-5           B.R.HUNT           72
G604B B*POWER SPECTRUM COMPUTATION
G604B C*F4           SR7600          CROS
G604B D*           SW 2           LS 1           TYPE 1
G604B E*SOURCE CARDS           10          BCD          OBJECT CARDS           7          BIN
G604B F**POWER*POWER SPECTRUM COMPUTATION
G604B G*ON DISK           F4          COMPAT          WU 10/04/72           DECK 10/04/72
G604B 1*FORM! CALL PWRSPCT(ACX,M,PSX,NF,DELTA)
G604B 2*PURPOSE! COMPUTE THE POWER SPECTRUM OF A TIME SERIES
G604B 3*           FROM AN AUTOCOVARIANCE/AUTOCORRELATION FUNCTION
G604B 4*           OF THE SERIES.
G604B 5*ROUTINE NAME! PWRSPCT
G604B 6*ENTRY NAME! PWRSPCT
G604B 7*STORAGE! 76 (OCTAL) WORDS PLUS M*NF WORDS RESERVED
G604B 8*           IN THE CALLING PROGRAM FOR ARRAYS ACX AND PSX.
G604B 9*ROUTINES CALLED! COS(B106B)

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G6AA A*           E. K. HODSON           J-14           71
G6AA B*AIDS - AUTO NUMERICAL FILTERING WITH CONVERGENCE TESTS
G6AA C*F4           SR6600          SCP 3.1
G6AA D*           SW 51           LS 9           TYPE 2
G6AA E*F4 SOURCE CARDS           448          BCD          OBJECT CARDS           99          BIN
G6AA F**AIDS*AUTO-NUMERICAL*FILTERING
G6AA G*CARDS           F4          COMPAT          WU 10/04/71           DECK 10/04/71
G6AA 1*FORM! CALL AIDS(Y,YS,N,FRE,FRAT,NPAS,IHSF,R1,R2,DT,IPRI)
G6AA 2*PURPOSE! SMOOTH RANDOM NOISE OUT OF SET OF POINTS.
G6AA 3*ROUTINE NAME! AIDS
G6AA 4*ENTRY NAME! AIDS
G6AA 5*STORAGE! 2631 OCTAL WORDS
G6AA 6*ROUTINES CALLED! SQRT(B408A),ALOG(B305A),EXP(B306A)

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G8 RANDOM VARIABLE GENERATORS

REVIEWER: R. LOHRDING, C-5

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G801A  A*           R.M.FRANK           C-4           R.LOHRDING           72
G801A  B*RANDOM NUMBER GENERATOR
G801A  C*CMP           SR6600           SCP 3.1
G801A  D*           SW 2           LS 1           TYPE 1
G801A  E*CMP SOURCE CARDS 41           BCD           OBJECT CARDS 5           BIN
G801A  F**RANDOM*NUMBER*GENERATOR
G801A  G*ON DISK      F4 COMPAT      WU 08/29/72           DECK 08/29/72
G801A  1*FORM: Y = RANDOM(DUMMY)
G801A  2*           CALL RANDST(R)
G801A  3*           CALL RANHSV(R)
G801A  4*           CALL RANVECT(X,N)
G801A  5*PURPOSE: GENERATES A RANDOM SEQUENCE OF FLOATING POINT
G801A  6* NUMBERS ON THE OPEN INTERVAL (0,1). RANDOM PRODUCES
G801A  7* A SINGLE RANDOM NUMBER. RANVECT RETURNS N RANDOM
G801A  8* NUMBERS INTO X ARRAY. PROVISION IS MADE FOR SAVING THE
G801A  9* GENERATING NUMBER AND FOR RESTARTING.
G801A  10*ROUTINE NAME: RANDOM
G801A  11*ENTRY NAMES: RANDOM,RANDST,RANHSV,RANVECT
G801A  12*STORAGE: 23 OCTAL WORDS
G801A  13*SELF CONTAINED.

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G801B  A*           R.M.FRANK           C-4           R.LOHRDING           73
G801B  B*RANDOM NUMBER GENERATOR
G801B  C*CMP           SR7600           CROS
G801B  D*           SW 2           LS 3           TYPE 1.1
G801B  E*CMP SOURCE CARDS 77           BCD           OBJECT CARDS 6           BIN
G801B  F**RANDOM*NUMBER*GENERATOR
G801B  G*ON DISK      F4 COMPAT      WU 04/12/73           DECK 04/12/73
G801B  1*FORM: Y = RANDOM(DUMMY)
G801B  2*           CALL RANDST(R)
G801B  3*           CALL RANHSV(R)
G801B  4*           CALL RANVECT(X,N)
G801B  5*PURPOSE: GENERATES A RANDOM SEQUENCE OF FLOATING POINT
G801B  6* NUMBERS ON THE OPEN INTERVAL (0,1). RANDOM PRODUCES
G801B  7* A SINGLE RANDOM NUMBER. RANVECT RETURNS N RANDOM
G801B  8* NUMBERS INTO X ARRAY. PROVISION IS MADE FOR SAVING THE
G801B  9* GENERATING NUMBER AND FOR RESTARTING.
G801B  10*ROUTINE NAME: RANDOM
G801B  11*ENTRY NAMES: RANDOM,RANDST,RANHSV,RANVECT
G801B  12*STORAGE: 44 OCTAL WORDS
G801B  13*ROUTINES CALLED: LIBMSG(SYSTEM).

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G802A  A*           B.L.BUZBEE           C-4           R.LOHRDING           72
G802A  B*RANDOM NUMBER GENERATOR
G802A  C*CMP           SR6600           SCP 3.1
G802A  D*           SW 1           LS 3           TYPE 1
G802A  E*CMP SOURCE CARDS 65           BCD           OBJECT CARDS 4           BIN
G802A  F**RANDOM*NUMBER
G802A  G*ON DISK      F4 COMPAT      WU 08/29/72           DECK 08/29/72
G802A  1*FORM: Y = RANF(X)
G802A  2*PURPOSE: GENERATES A SEQUENCE OF RANDOM NUMBERS,
G802A  3* IF X.EQ.0, THE NEXT NUMBER IN THE SEQUENCE IS RETURNED.
G802A  4* IF X.LT.0, THE LAST PREVIOUSLY GENERATED RANDOM
G802A  5* NUMBER (OR THE SEED IF NO RANDOM NUMBER HAS BEEN
G802A  6* GENERATED) IS RETURNED.
G802A  7* IF X.GT.0, X IS STORED (WITH EXPONENT 1717 (OCTAL))
G802A  8* TO BE USED AS THE SEED OF A NEW SEQUENCE. NOTE X.GT.0
G802A  9* OPTION DIFFERS FROM THAT IN APPENDIX C OF FORTRAN REF.
G802A  10* MANUAL.
G802A  11*ROUTINE NAME: RANF
G802A  12*ENTRY NAME: RANF
G802A  13*STORAGE: 14 OCTAL WORDS.
G802A  14*SELF CONTAINED.

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G803A  A*           B.L.BUZBEE           C-4           R.LOHRDING           72
G803A  B*GENERATE M-ELEMENT SUBSETS OF N POSITIVE INTEGERS
G803A  C*F4           SR6600           SCP 3.1
G803A  D*           SW 2           LS 2           TYPE 1
G803A  E*F4 SOURCE CARDS 32           BCD           OBJECT CARDS 13           BIN
G803A  F**SUBSETS
G803A  G*CARDS      F4 COMPAT      WU 08/29/72           DECK 08/29/72
G803A  1*FORM: CALL MESSNI(N,M,NOM,LX,LD)
G803A  2*PURPOSE: GENERATE M-ELEMENT SUBSETS OF N POSITIVE
G803A  3* INTEGERS.
G803A  4*ROUTINE NAME: MESSNI
G803A  5*ENTRY NAME: MESSNI
G803A  6*STORAGE: 220 OCTAL WORDS
G803A  7*SELF CONTAINED.

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H

OPERATIONS RESEARCH TECHNIQUES,
SIMULATION AND MANAGEMENT SCIENCE

H3

CRITICAL PATH PROGRAMS

REVIEWER: J. NEERGAARD, C-7

(THIS CATEGORY WILL NOT BE USED FOR FUTURE PROGRAMS)

H3AA A* R. A. WILEY C-4 SYSTONETICS, INC.72
 H3AA B*EZPERT - PERT NETWORK PLOTTING PACKAGE
 H3AA C*F4 CMP MP6600 SCP 3.1
 H3AA D* SW 15 LS 0 TYPE 2
 H3AA E*SOURCE CARDS 0 OBJECT CARDS 0
 H3AA F**EZPERT*PERT*NETWORK*PLOTTING PACKAGE
 H3AA G*ON TAPE WU 04/04/72
 H3AA 1*FORM: MAIN PROGRAM
 H3AA 2*PURPOSE: PLOT PERT NETWORKS
 H3AA 3*STORAGE 112000 (OCTAL) WORDS
 H3AA 4*TIMING: NORMALLY UNDER 2 MINUTES, DEPENDS ON NETWORK SIZE
 H3AA 5* AND NUMBER OF PLOTS REQUESTED.
 H3AA 6*ROUTINE NAME: EZPERT
 H3AA 7*ROUTINES CALLED: SELF CONTAINED

I INPUT/OUTPUT WITH CONVERSION OR INTERPRETATION

I4 FREE FORM AND NAMELIST I/O

REVIEWER: J. MOORE, C-2

I401A A* J.D. KERSHNER T-6 WALKER 67
 I401A B*LOAD FORTRAN IV FORMAT FREE INPUT
 I401A C*FIV SR6600 SCP 3.1
 I401A D* SW 5 LS 3 TYPE 1
 I401A E*F4 SOURCE CARDS 172 BCD OBJECT CARDS 61 BIN
 I401A F**LOAD*INPUT
 I401A G*CARDS F4 COMPAT WU 04/08/70REV 1 DECK 04/08/70REV j
 I401A 1*CALL LOAD(LIST,N,ERROR) WHERE LIST IS ORIGIN OF TABLE OF
 I401A 2*ABSOLUTE LOCATIONS,N IS THE NUMBER OF LOCATIONS,ERROR
 I401A 3*IS A LOGICAL VARIABLE .TRUE. INDICATES AN ERROR DURING
 I401A 4*INPUT .FALSE. INDICATES A VALID LOAD.
 I401A 5*PROVIDES 6600 FORTRAN IV WITH DATA INPUT UNRESTRICTED
 I401A 6*BY FORMAT CONTROL. LOADS REAL,INTEGER,HOLLRITH AND
 I401A 7*LOGICAL CONSTANTS PROVIDES INPUT ARITHMETIC,ARRAY LOADING,
 I401A 8*AND ERROR COMMENTS.
 I401A 9*STORAGE-834 WORDS.
 I401A 10*USES SHIFT(M401A),LOCF,MINO,AND MOD.

J

INPUT/OUTPUT WITH CONVERSION OR INTERPRETATION

J1

REVIEWER: R.M. FRANK, C-4

J1AA A* P. SEEGER P-11 71
 J1AA B*BASIC ZETA PLOTTER PACKAGE
 J1AA C*F4 SR6600 SCP 3.1 ZETA PLOTTER
 J1AA D* SW 5 LS 4 TYPE 2
 J1AA E*SOURCE CARDS 133 BCD PERMFILE W8ZETA 117 BIN
 J1AA F**CONVERSION OF*4020 PACKAGE TO*ZETA*PLOTTER
 J1AA G*CARDS F4 COMPAT WU 02/10/73REV 1 DECK 02/10/73REV 1
 J1AA 1*FORM1 CALL ADV,COLOR,CONVRT,DGA,DLCH,DLCV,DLGLG,DLGLN,DLNLG,
 J1AA 2* DLNLN,DRV,EMPTY,EXH,EXL,EXPI,FRAME,GXA,GYA,LINCNT,NORIM,
 J1AA 3* PLOT,PLT,SBLIN,SBLOG,SETPLT,SLLIN,SYLOG,SRLIN,SRLOG,STB,
 J1AA 4* STLIN,STLOG,SWEEP,TCP,TCR,TSP,TSPV,WLCH,WLCV,ZETABAS,
 J1AA 5*PURPOSE: A VERSION OF BASIC, GENERAL, AND LARGE-CHARACTER
 J1AA 6* PLOT ROUTINES (SEE J506A) WHICH CALLS ZETA PLOTTER ROUTINES
 J1AA 7* INSTEAD OF GENERATING 4020 COMMANDS. INCLUSION WITH ANY
 J1AA 8* FILM-PLOT PRODUCING PROGRAM CAUSES ZETA PLOTTER OUTPUT WITH
 J1AA 9* NO CHANGES IN PROGRAM. SEE WRITEUP FOR RESTRICTIONS.
 J1AA 10*STORAGE: 2563 (OCTAL) WORDS. (10611 WITH W8ZETA.)
 J1AA 11*EXTERNALS: CALLOG,CJE07,ZETAF(COMMON),ENDFIL,JOBNAME,OUTPTC
 J1AA 12* (SYSTEM),AXIS,LINE,BLKDATA,BPLOT,OUTBUF,PLTZ,SYMBOL,ZPLOTS,
 J1AA 13* ZWHERE(PERMPFILE W8ZETA, OR PERMPFILE ZETABIN)

J4 FORMATTED I/O

J4 REVIEWER: J. MOORE, C-2

J401A A* BARBARA BACON C-2 J MOORE 72
 J401A B*CHANGE FORTRAN P SCALE FACTORS ON OUTPUT FORMATS
 J401A C*CMP SR6600 SCP 3.1
 J401A D* SW 2 LS 0 TYPE 1
 J401A E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 J401A F**CHANGE FORTRAN*P SCALE FACTORS ON*OUTPUT FORMATS
 J401A G*ON DISK F4 COMPAT WU 07/03/72 DECK NONE
 J401A 1*FORM: CALL PSCALE(I)
 J401A 2*PURPOSE: IF I.NE.0, INCREASE P SCALE FACTOR ON E AND D
 J401A 3* FORMATS BY ONE. IF I.EQ.0, PRINT E AND D FORMATS AS IS.
 J401A 4*ROUTINE NAME: PSCALE
 J401A 5*ENTRY NAMES: PSCALE, PFACTOR
 J401A 6*STORAGE: 5 OCTAL WORDS
 J401A 7*SELF CONTAINED.

J401B A* BARBARA BACON C-2 J MOORE 72
 J401B B*CHANGE FORTRAN P SCALE FACTORS ON OUTPUT FORMATS
 J401B C*CMP SR7600 CROS
 J401B D* SW 1 LS 0 TYPE 1
 J401B E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 J401B F**CHANGE FORTRAN*P SCALE FACTORS ON*OUTPUT FORMATS
 J401B G*ON DISK F4 COMPAT WU 07/03/72 DECK NONE
 J401B 1*FORM: CALL PSCALE(I)
 J401B 2*PURPOSE: IF I.NE.0, INCREASE P SCALE FACTOR ON E AND D
 J401B 3* FORMATS BY ONE. IF I.EQ.0, PRINT E AND D FORMATS AS IS.
 J401B 4*ROUTINE NAME: PSCALE
 J401B 5*ENTRY NAMES: PSCALE, PFACTOR
 J401B 6*STORAGE: 5 OCTAL WORDS
 J401B 7*SELF CONTAINED.

J5

GRAPHICS

REVIEWER: R. FRANK, C-4

J506A A* GENE WILLBANKS C-2 R. M. FRANK 67
 J506A B*ADVANCE FILM
 J506A C*COMPASS SR6600 SCp 3.1
 J506A D* SW 19 LS 1 TYPE 1
 J506A E*SOURCE CARDS 40 BCD OBJECT CARDS 5 BIN
 J506A F**FILM*ADV*LINCNT*EMPTY*SETPLT*SC4020*PLOT*CDC 284
 J506A G*ON DISK F4 COMPAT WU 02/16/70 REV 6 DECK 06/26/69 REV 3
 J506A 1*CALL NAME: ADV,EMPTY,LINCNT,SETPLT
 J506A 2*PURPOSE: TO MANIPULATE FILM ON THE CDC 284 AND THE SC 4020
 J506A 3*STORAGE: 26 OCTAL
 J506A 4*ROUTINES CALLED: BS4020

J506B A* JERRY MELENDEZ C-4 E WILLBANKS 71
 J506B B*ADVANCE FRAME, SET LINECOUNT, SET PLOT, EMPTY FILM BUFFER
 J506B C*CMP SR7600 CROS
 J506B D* SW 5 LS 0 TYPE 1
 J506B E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 J506B F**ADVANCE*FRAME*SET*PLOT*SET*LINECOUNT*EMPTY*FILM*BUFFER
 J506B G*ON DISK F4 COMPAT WU 08/04/71 DECK NONE
 J506B 1*FORM: CALL ADV(N)
 J506B 2* CALL LINCNT(N)
 J506B 3* CALL GLINCNT(N,NAME)
 J506B 4* CALL SLINCNT(N,NAME)
 J506B 5* CALL SETPLT(NAME)
 J506B 6* CALL EMPTY
 J506B 7*PURPOSE: UTILITY FILM SUBROUTINES, USED TO SET UP THE FILM
 J506B 8* ENVIRONMENT, ADVANCE FRAMES, AND TO EMPTY THE SMALL CORE
 J506B 9* FILM BUFFER
 J506B 10*ROUTINE NAME: ADV
 J506B 11*ENTRY NAMES: ADV, LINCNT, GLINCNT, SLINCNT, SETPLT, EMPTY
 J506B 12*STORAGE: 66 OCTAL WORDS OF SCM
 J506B 13*SCM EXTERNALS: RQTA, (ON THE SYSTEM)
 J506B 14*ROUTINES CALLED: BS4020, GETBA, SYSTEM,
 J506B 15* ABNORML (ALL ON THE SYSTEM).

J507A A* R. M. FRANK C-4 GENE WILLBANKS 67
 J507A B*SET EXPOSURE LIGHT OR HEAVY
 J507A C*COMPASS SR6600 SCP. 3.1
 J507A D* SW 1 LS 1
 J507A E*SOURCE CARDS 9 BCD OBJECT CARDS 4 BIN
 J507A F**SET*EXPOSURE*LIGHT OR*HEAVY
 J507A G*ON DISK F4 COMPAT WU 01/17/69REV2 DECK 01/17/69REV2
 J507A 1*CALL EXH. RETURN 4020 TO NORMAL EXPOSURE CONDITION.
 J507A 2*CALL EXL. REDUCES EXPOSURE ON 4020 TO PROVIDE LIGHTER THAN
 J507A 3*NORMAL IMAGE. SEE J506A WRITEUP FOR FULL DETAILS.
 J507A 4*STORAGE - 12 WORDS
 J507A 5*SELF CONTAINED.

J508A A* V. GARDINER C-4 G. WILLBANKS 67
 J508A B*STANDARDIZED PLOT
 J508A C*F4 SR6600 SCP 3.1
 J508A D* SW 1 LS 2 TYPE 1
 J508A E*SOURCE CARDS 43 BCD OBJECT CARDS 17 BIN
 J508A F**STANDARDIZED*PLOT*ROUTINE
 J508A G*ON DISK F4 COMPAT WU 04/26/72REV.3 DECK 04/26/72REV 2
 J508A 1*FORM: CALL SPLOT(IOP,N,X,Y,ICHAR,ICON)
 J508A 2*PURPOSE: CREATE A BOX WITH A GRID AND PROVIDE A
 J508A 3* STANDARDIZED PLOT
 J508A 4* IOP DEFINES TYPE OF GRID.
 J508A 5* N POINTS ARE PLOTTED USING DATA FROM TABLES OF X AND Y
 J508A 6* ICHAR DEFINES THE PLOTTING CHARACTER TO BE USED.
 J508A 7* IF ICON NOT ZERO CONSECUTIVE POINTS WILL BE CONNECTED
 J508A 8* BY VECTORS, SEE ADV(J506A) FOR COMPREHENSIVE DESCRIPTION.
 J508A 9*STORAGE: 256 OCTAL WORDS
 J508A 10*ROUTINE NAME: SPLOT
 J508A 11*ENTRY NAME: SPLOT
 J508A 12*ROUTINES CALLED: MAXV(F115A),MINV(F115A),ASCL((J510A),
 J508A 13* ADV(J506A),DLNLN(J529A)DLNLG(J530A),DLGLG(J530A),
 J508A 14* DLGLN(J530A),SLLIN(J533A),SLLOG(J540A),SBLIN(J535A),
 J508A 15* SBLOG(J540A),PLOT(J541A),DGA(J528A).

J508B A* V. GARDINER C-4 G. WILLBANKS 72
 J508B B*STANDARDIZED PLOT
 J508B C*F4 SR7600 CROS
 J508B D* SW 1 LS 2 TYPE 1
 J508B E*SOURCE CARDS 43 BCD OBJECT CARDS 17 BIN
 J508B F**STANDARDIZED*PLOT*ROUTINE
 J508B G*ON DISK F4 COMPAT WU 04/26/72 DECK 04/26/72
 J508B 1*FORM: CALL SPLOT(IOP,N,X,Y,ICHR,ICON)
 J508B 2*PURPOSE: CREATE A BOX WITH A GRID AND PROVIDE A
 J508B 3* STANDARDIZED PLOT
 J508B 4* IOP DEFINES TYPE OF GRID.
 J508B 5* N POINTS ARE PLOTTED USING DATA FROM TABLES OF X AND Y
 J508B 6* ICHAR DEFINES THE PLOTTING CHARACTER TO BE USED.
 J508B 7* IF ICON NOT ZERO CONSECUTIVE POINTS WILL BE CONNECTED
 J508B 8* BY VECTORS, SEE ADV(J506A) FOR COMPREHENSIVE DESCRIPTION.
 J508B 9*STORAGE: 266 OCTAL WORDS
 J508B 10*ROUTINE NAME: SPLOT
 J508B 11*ENTRY NAME: SPLOT
 J508B 12*ROUTINES CALLED: MAXV(F115B),MINV(F115B),ASCL((J510B),
 J508B 13* ADV(J506B),DLNLN(J529B),DLNLG(J530B),DLGLG(J530B),
 J508B 14* DLGLN(J530B),SLLIN(J533B),SLL0G(J540B),SBLIN(J535B),
 J508B 15* SBL0G(J540B),PLOT(J541B),DGA(J528B).

J510A A* VERNA GARDINER C-4 67
 J510A B*AUTOMATIC GRAPH SCALING
 J510A C*F4 SR6600 SCP 3.1
 J510A D* SW 4 LS 3 TYPE 1
 J510A E*F4 SOURCE CARDS 102 BCD OBJECT CARDS 18 BIN
 J510A F**AUTOMATIC*GRAPH*SCALING
 J510A G*ON DISK F4 COMPAT WU 03/24/72REV 2 DECK 03/24/72REV 2
 J510A 1*FORM: CALL ASCL(M,ZMIN,ZMAX,MAJOR,MINOR,K)
 J510A 2*PURPOSE: DETERMINES VALUES TO ASSIGN TO GRAPH BOUNDARIES,
 J510A 3* THE NUMBER OF MAJOR AND MINOR INTERVALS TO DRAW, AND THE
 J510A 4* FORMAT TO USE IN PLACING A NUMERICAL SCALE ALONG A
 J510A 5* BOUNDARY USING SC4020 SCALING ROUTINES.
 J510A 6*ROUTINE NAME: ASCL
 J510A 7*ENTRY NAME: ASCL
 J510A 8*STORAGE: 326 (OCTAL) WORDS.
 J510A 9*SELF CONTAINED.

J510B A* Verna GARDINER C-4 72
 J510B B*AUTOMATIC GRAPH SCALING
 J510B C*F4 SR7600 CROS
 J510B D* SW 1 LS 3 TYPE 1
 J510B E*F4 SOURCE CARDS 102 BCD OBJECT CARDS 18 BIN
 J510B F**AUTOMATIC*GRAPH*SCALING
 J510B G*ON DISK F4 COMPAT WU 03/24/72 DECK 03/24/72
 J510B 1*FORM: CALL ASCL(M,ZMIN,ZMAX,MAJOR,MINOR,K)
 J510B 2*PURPOSE: DETERMINES VALUES TO ASSIGN TO GRAPH BOUNDARIES,
 J510B 3* THE NUMBER OF MAJOR AND MINOR INTERVALS TO DRAW, AND THE
 J510B 4* FORMAT TO USE IN PLACING A NUMERICAL SCALE ALONG A
 J510B 5* BOUNDARY USING SC4020 SCALING ROUTINES. SEE ASCL(J510A)
 J510B 6* FOR FURTHER DETAILS.
 J510B 7*ROUTINE NAME: ASCL
 J510B 8*ENTRY NAME: ASCL
 J510B 9*STORAGE: 332 (OCTAL) WORDS.
 J510B 10*SELF CONTAINED.

J511A A* GENE WILLBANKS C-4 67
 J511A B*AUTOMATIC GRAPHING OF A SET OF POINTS
 J511A C*FIV SR6600 SCP 3.1
 J511A D* SW 5 LS 2 TYPE 1
 J511A E*SOURCE CARDS 106 BCD OBJECT CARDS 34 BIN
 J511A F**AUTOMATIC*GRAPHING OF A SET OF*POINTS
 J511A G*ON DISK F4 COMPAT WU 02/24/69 REV1 DECK 05/26/67
 J511A 1*CALL GRAPH(IOP,N,X,MX,Y,MY,ICHAR,ICON,IXY,XY). DRAWS A GRAPH
 J511A 2*USING THE SC4020.
 J511A 3*STORAGE - 355 WORDS
 J511A 4*USES-ASCL(J510A),DGA(J528A),DLNLN(J529A),SLLIN(J533A),
 J511A 5*SBLIN(J535A),PLOT(J541A),DLNLG(J530A),SLLOG(J540A),
 J511A 6*SBLOG(J540A),DLGLN(J530A),DLGLG(J530A).

J512A A* V. GARDINER C-4 R. FRANK 67
 J512A B*POLAR COORDINATE GRAPH USING THE 4020
 J512A C*F-4 SR6600 SCP 3.1 4020
 J512A D* SW 4 LS 4 TYPE 1.1
 J512A E*SOURCE CARDS 147 BCD OBJECT CARDS 40 BIN
 J512A F**POLAR*COORDINATE*GRAPH*4020
 J512A G*ON DISK F4 COMPAT WU 03/29/73REV.1 DECK 03/29/73REV.1
 J512A 1*FORM: CALL POLAR(N,R,THETA,ICHAR,ICON,IGRID,IXC,IYC,IR)
 J512A 2*PURPOSE: DRAW A POLAR COORDINATE GRAPH OF A SET OF POINTS
 J512A 3* USING THE 4020. MORE THAN ONE SET OF POINTS
 J512A 4* CAN BE PLOTTED ON THE SAME POLAR GRID.
 J512A 5*ROUTINE NAME: POLAR
 J512A 6*ENTRY NAME: POLAR
 J512A 7*STORAGE: 1000 OCTAL WORDS
 J512A 8*ROUTINES CALLED: THIS PROGRAM USES BASIC SET OF 4020
 J512A 9* SUBROUTINES. SEE J506A WRITEUP.

J512B A* V. GARDINER C-4 R. FRANK 73
 J512B B*POLAR COORDINATE GRAPH USING THE 4020
 J512B C*F-4 SR7600 CROS 4020
 J512B D* SW 4 LS 4 TYPE 1.1
 J512B E*SOURCE CARDS 147 BCD OBJECT CARDS 41 BIN
 J512B F**POLAR*COORDINATE*GRAPH*4020
 J512B G*ON DISK F4 COMPAT WU 03/29/73 DECK 03/29/73
 J512B 1*FORM: CALL POLAR(N,R,THETA,ICHAR,ICON,IGRID,IXC,IYC,IR)
 J512B 2*PURPOSE: DRAW A POLAR COORDINATE GRAPH OF A SET OF POINTS
 J512B 3* USING THE 4020. MORE THAN ONE SET OF POINTS
 J512B 4* CAN BE PLOTTED ON THE SAME POLAR GRID.
 J512B 5*ROUTINE NAME: POLAR
 J512B 6*ENTRY NAME: POLAR
 J512B 7*STORAGE: 1005 OCTAL WORDS
 J512B 8*ROUTINES CALLED: THIS PROGRAM USES BASIC SET OF 4020
 J512B 9* SUBROUTINES. SEE J506B WRITEUP .

J513A A* R.M.FRANK C-4 V.GARDINER 67
 J513A B*STEREOSCOPIC PROJECTION WITH THE SC4020 FILM PLOTTER.
 J513A C*F4 SR6600 SCP 3.1
 J513A D* SW 10 LS 4 TYPE 1
 J513A E*F4 SOURCE CARDS 193BCD OBJECT CARDS 40BIN
 J513A F**STEREOSCOPIC*PROJECTION*SC4020
 J513A G*ON DISK F4 COMPAT WU 04/05/72REV.1 DECK 05/26/67
 J513A 1*FORM: CALL STEREO(IEYE,IXY,DV,A,SF,FWF,N,X,MX,
 J513A 2* Y,MY,Z,MZ,ICHAR,ICON)
 J513A 3*PURPOSE: PRODUCE STEREOSCOPIC PROJECTIONS OF A SET OF
 J513A 4* POINTS IN SPACE OR CAN BE USED ALSO FOR SINGLE
 J513A 5* (MONOCULAR) PROJECTIONS.
 J513A 6* OUTPUT IS ON SC4020 FILM.
 J513A 7*ROUTINE NAME: STEREO
 J513A 8*ENTRY NAME: STEREO
 J513A 9*STORAGE: 562 OCTAL WORDS
 J513A 10*ROUTINES CALLED: BASIC 4020 ROUTINES. SEE ADV(J506A) WRITEUP.

J514A A* R. M. FRANK C-4 GENE WILLBANKS 67
 J514A B*EXPAND OR RETURN IMAGE SIZE TO NORMAL
 J514A C*COMPASS SR6600 SCP. 3.1
 J514A D* SW 1 LS 1 TYPE 1
 J514A E*SOURCE CARDS 22 BCD OBJECT CARDS 4 BIN
 J514A F**EXPAND OR*RETURN*IMAGE*SIZE TO*NORMAL
 J514A G*ON DISK F4 COMPAT WU 08/19/70REV 3 DECK 01/17/69REV2
 J514A 1*USE: CALL EXPIM PROVIDES FOR LARGER IMAGE AND THUS BUTTED
 J514A 2*FRAMES, ON THE SC 4020. NO EFFECT ON CDC 284.
 J514A 3*USE: CALL NORIM RETURNS IMAGE SIZE TO NORMAL, ALLOWING A GAP
 J514A 4*BETWEEN FRAMES.
 J514A 5*STORAGE: 15 (OCTAL) WORDS.
 J514A 6*SELF CONTAINED.

J5-8

J516A A* GENE WILLBANKS C-4 67
 J516A 0*PLOT A POINT
 J516A B*PLOTTING J5 COMPASS SR6600 SCOPE
 J516A C* SW 1 LS 1
 J516A D*COMPASS SOURCE DECK 15BCD3.1 OBJECT DECK 4BIN
 J516A S**PLOT*A*POINT
 J516A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 J516A 11*CALL PLT(IX,IY,ICHAR). THE CHARACTER SPECIFIED BY ICHAR IS
 J516A 12*PLOTTED AT POINT (IX,IY). SEE J506A WRITEUP FOR DETAILS.
 J516A 13*STORAGE - 6 WORDS
 J516A 14*SELF CONTAINED.

J517A A* GENE WILLRANKS C-4 67
 J517A 0*DRAW VECTOR
 J517A B*PLOTTING J5 COMPASS SR6600 SCP 3.1
 J517A C* SW 1 LS 2
 J517A D*COMPASS SOURCE DECK 84BCD3.1 OBJECT DECK 5BIN
 J517A S**DRAW*VECTOR
 J517A 10*ON DISK F4 COMPAT WU 11/14/68REV 2 DECK 11/14/68REV 2
 J517A 11*CALL DRV(IX1,IY1,IX2,IY2). A STRAIGHT LINE VECTOR WILL BE
 J517A 12*DRAWN FROM POSITION (IX1,IY1) TO (IX2,IY2). FOR FULL
 J517A 13*DESCRIPTION SEE J506A WRITEUP.
 J517A 14*STORAGE - 36 WORDS
 J517A 15*SELF CONTAINED.

J518A A* R. M. FRANK C-4 GENE WILLBANKS 67
 J518A B*GENERATE X OR Y AXIS
 J518A C*COMPASS SR6600 SCP, 3.1
 J518A D* SW 1 LS 1
 J518A E*SOURCE CARDS 42 BCD OBJECT CARDS 5 BIN
 J518A F**GENERATE*X OR*Y*AXIS
 J518A G*ON DISK F4 COMPAT WU 01/17/69REV2 DECK 01/17/69REV2
 J518A 1*CALL GX(X1,X2,IY). DRAWS X AXIS FROM (X1,IY) TO (X2,IY).
 J518A 2*CALL GYA(IY1,IY2,IX). DRAWS Y AXIS FROM (IY1,IX) TO (IY2,IX).
 J518A 3*FOR ADDITIONAL INFORMATION SEE J506A WRITEUP.
 J518A 4*STORAGE - 21 WORDS
 J518A 5*SELF CONTAINED.

J520A A* GENE WILLBANKS T-1 67
 J520A O*TYPE SPECIFIC POINT
 J520A B*PLOTting J5 COMPASS SR6600 SCOPE
 J520A C* SW 1 LS 2
 J520A D*COMPASS SOURCE DECK 38BCD3.1 OBJECT DECK 5BIN
 J520A S**TYPE*SPECIFIED*POINT
 J520A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 J520A 11*CALL TSP(IX,IY,NC,BCD). THE NC CHARACTERS LOCATED STARTING
 J520A 12*AT BCD ARE TYPED ON FILM STARTING AT LOC (IX,IY). FOR
 J520A 13*ADDITIONAL DETAILS SEE J506A WRITEUP.
 J520A 14*STORAGE - 20 WORDS
 J520A 15*USES TCP(J521A).

J521A A* GENE WILLBANKS C-4 67
 J521A O*TYPE CURRENT POINT
 J521A B*PLOTting J5 COMPASS SR6600 SCOPE
 J521A C* SW 1 LS 7
 J521A D*COMPASS SOURCE DECK 387BCD3.1 OBJECT DECK 20BIN
 J521A S**TYPE*CURRENT*POINT
 J521A 10*ON DISK F4 COMPAT WU 07/12/68 REV DECK 07/12/68 REV
 J521A 11*CALL TCP(NC,BCD). THE NC CHARACTERS LOCATED STARTING AT
 J521A 12*LOCATION BCD ARE TYPED ON FILM STARTING AT THE LAST USED
 J521A 13*POSITION. SEE J506A WRITEUP FOR COMPLETE DETAILS.
 J521A 14*STORAGE - 23A WORDS
 J521A 15*SELF CONTAINED.

J522A A* GENE WILLBANKS T-1 67
 J522A O*TYPE SPECIFIED POINT VERTICALLY
 J522A B*PLOTting J5 COMPASS SR6600 SCOPE
 J522A C* SW 1 LS 2
 J522A D*COMPASS SOURCE DECK 73BCD3.1 OBJECT DECK 5BIN
 J522A S**TYPE SPECIFIED POINT*VERTICALLY
 J522A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 J522A 11*CALL TSPV(IX,IY,NC,BCD). THE NC CHARACTERS FROM STORAGE BCD
 J522A 12*ARE TYPED VERTICALLY FROM TOP TO BOTTOM STARTING AT (IX,IY).
 J522A 13*SEE J506A WRITEUP FOR MORE DETAILS.
 J522A 14*STORAGE - 37 WORDS
 J522A 15*USES TSP(J520A).

J523A A* R.M.FRANK C-4 GENE WILLBANKS 67
 J523A B*DRAW FRAME
 J523A C*COMPASS SR6600 SCP.3.1
 J523A D* SW 1 LS 1
 J523A E*SOURCE CARDS 36 BCD OBJECT DECK 4 BIN
 J523A F**DRAW FRAME
 J523A G*ON DISK F4 COMPAT WU 01/17/69 REV.2 DECK 04/15/68 REV.1
 J523A 1*CALL FRAME(IXL,IXR,IYT,IYB). A BORDER IS DRAWN CONNECTING
 J523A 2*THE BOUNDARIES SPECIFIED. SEE J506A WRITEUP FOR MORE DETAIL.
 J523A 3*STORAGE - 18 WORDS.
 J523A 4*USES GXA,GYA(J518A).

J524A A* GENE WILLBANKS T-1 67
 J524A 0*STORE WORD IN BUFFER
 J524A B*PLOTTING J5 COMPASS SR6600 SCOPE
 J524A C* SW 1 LS 1
 J524A D*COMPASS SOURCE DECK 9BCD3.1 OBJECT DECK 3BIN
 J524A S**STORE WORD*IN*BUFFER
 J524A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 J524A 11*CALL STB(WORD). THE WORD AT LOCATION #WORD# IS STORED
 J524A 12*IN THE BUFFER. SEE J506A WRITEUP FOR DETAILS.
 J524A 13*STORAGE - 4 WORDS
 J524A 14*SELF CONTAINED.

J526A A* G. WILLBANKS T-1 67
 J526A 0*CONVERT TO 4020 COORDINATE
 J526A B*PLOTTING J5 F4 SR6600 SCOPE
 J526A C* SW 1 LS 1
 J526A D*F4 SOURCE CARDS 11BCDF4 OBJECT DECK 7BIN
 J526A S**CONVERT TO*4020*COORDINATE
 J526A 10*ON DISK F4 COMPAT WU 11/29/67 REV DECK 11/29/67 REV
 J526A 11*CALL CONVRT(Z,IZ,Z1,Z2,IZ1,IZ2) WHERE Z = A FLOATING POINT
 J526A 12*NUMBER, Z1 AND Z2 ARE FLOATING POINT VALUES ASSIGNED TO THE
 J526A 13*BOUNDARIES IZ1 AND IZ2 RESPECTIVELY AND THE RESULT IS IN IZ.
 J526A 14*FOR ADDITIONAL DETAILS SEE J506A WRITEUP.
 J526A 15* STORAZE - 63 WORDS
 J526A 16*USES LABRT(N103A).

J527A A* GENE WILLBANKS T-1 67
 J527A 0*TEST COORDINATE FOR RANGE
 J527A B*PLOTting J5 F4 SR6600 SCOPE
 J527A C* SW 1 LS 1
 J527A D*F4 SOURCE CARDS 5BCDF4 OBJECT CARDS 4BIN
 J527A S*TEST*COORDINATE FOR*RANGE
 J527A 10*ON DISK F4 COMPAT WU 05/12/67 DECK 04/20/67
 J527A 11*CALL TCR(IZ). COORDINATE IZ IS TESTED TO INSURE IT LIES
 J527A 12*INSIDE 4020 LIMITS. SEE J506A FOR ADDITIONAL DETAILS.
 J527A 13*STORAGE - 18 WORDS.
 J527A 14*SELF CONTAINED.

J528A A* GENE WILLBANKS T-1 67
 J528A 0*DEFINE GRAPH AREA
 J528A B*PLOTting J5 COMPASS SR6600 SCOPE
 J528A C* SW 1 LS 2
 J528A D*COMPASS SOURCE DECK 51BCD3.1 OBJECT CARDS 6BIN
 J528A S**DEFINE*GRAPH*AREA
 J528A 10*ON DISK F4 COMPAT WU 04/15/68 REV DECK 04/15/68 REV
 J528A 11*CALL DGA(IXL,IXR,IYT,IYB,XL,XR,YT,YB). IXL,IXR,IYT,IYB ARE
 J528A 12*THE 4020 COORDINATES FOR LEFT, RIGHT, TOP, AND BOTTOM
 J528A 13*BOUNDARIES RESPECTIVELY. XL, XR, YT, AND YB ARE FLOATING PT
 J528A 14*VALUES ASSIGNED TO RESPECTIVE BOUNDARIES. SEE J506A WRITEUP
 J528A 15*FOR ADDITIONAL DETAILS.
 J528A 16*STORAGE-22 WORDS
 J528A 17*USES TCR(J527A), NAME COMMON CJE07(8 WORDS).

J529A A* R.M.FRANK C-4 GENE WILLBANKS 67
 J529A B*DRAW LINEAR-LINEAR GRID
 J529A C*F4 SR6600 SCP.3.1
 J529A D* SW 1 LS 1
 J529A E*SOURCE CARDS 18 BCD OBJECT CARDS 9 BIN
 J529A F**DRAW*LINEAR-LINEAR*GRID
 J529A G*ON DISK F4 COMPAT WU 01/17/69REV1 DECK 04/20/67
 J529A 1*CALL DLNLN(NX,NY). A LINEAR GRID IS DRAWN IN BOTH X AND Y
 J529A 2*USING INTERVALS SPECIFIED BY NX AND NY. FOR MORE DETAIL SEE
 J529A 3*J506A WRITEUP.
 J529A 4*STORAGE - 7? WORDS
 J529A 5*USES GXA(J518A), GYA(J518A), NAME COMMON CJE07(8 WORDS).

J530A A* R. M. FRANK C-4 VERNA GARDINER 67
 J530A B*DRAW COMBINATION OF LINEAR AND LOG GRIDS
 J530A C*F4 SR6600 SCP. 3.1
 J530A D* SW 1 LS 2 TYPE 1
 J530A E*SOURCE CARDS 79 BCD OBJECT CARDS 25 BIN
 J530A F**DRAW*COMBINATION OF*LINEAR AND*LOG*GRIDS
 J530A G*ON DISK F4 COMPAT WU 06/04/71REV 6 DECK 06/04/71REV 6
 J530A 1* CALL DLNLG(NX) DRAWS A GRID LINEAR IN X AT NX INTERVALS
 J530A 2* AND LOG IN Y. Y MUST BE THE RESULT OF ALOG10. OVER 25
 J530A 3* DECADES CAUSES ERROR MESSAGE AND EXIT.
 J530A 4* CALL DLGLG. A GRID OF UP TO 25 DECADES EACH IS DRAWN
 J530A 5* IN X AND Y.
 J530A 6* CALL DLGLN(NY). A GRID IS DRAWN, LOG IN X AND LINEAR
 J530A 7* IN Y AT NY INTERVALS. X IS LIMITED TO 25 DECADES.
 J530A 8*SEE J506A WRITEUP FOR FURTHER INFORMATION.
 J530A 9*STORAGE - 441 (OCTAL) WORDS.
 J530A 10*USES GX(A(J518A), GYA(J518A), DLNLN(J529A),
 J530A 11*NAME COMMON CJE07(8 WORDS).

J530B A* R.M.FRANK C-4 VERNA GARDINER 72
 J530B B*DRAW COMBINATION OF LINEAR AND LOG GRIDS
 J530B C*F4 SR7600 CROS
 J530B D* SW 1 LS 3 TYPE 1
 J530B E*F4 SOURCE CARDS 79 BCD OBJECT CARDS 25 BIN
 J530B F**DRAW*COMBINATION OF*LINEAR AND*LOG*GRIDS
 J530B G*ON DISK F4 COMPAT WU 08/09/72 DECK 08/09/72
 J530B 1*FORM: CALL DLNLG(NX) DRAWS A GRID LINEAR IN X AT NX
 J530B 2* INTERVALS AND LOG IN Y. Y MUST BE THE RESULT OF
 J530B 3* ALOG10. OVER 25 DECADES CAUSES ERROR MESSAGE AND
 J530B 4* EXIT.
 J530B 5* CALL DLGLG. A GRID OF UP TO 25 DECADES EACH IS
 J530B 6* DRAWN IN X AND Y.
 J530B 7* CALL DLGLN(NY). A GRID IS DRAWN, LOG IN X AND
 J530B 8* LINEAR IN Y AT NY INTERVALS. X IS LIMITED TO
 J530B 9* 25 DECADES. SEE J506B WRITEUP FOR FURTHER
 J530B 10* INFORMATION.
 J530B 11*ROUTINE NAME: DLNLG
 J530B 12*ENTRY NAMES: DLNLG, DLGLG, DLGLN
 J530B 13*STORAGE: 447 OCTAL WORDS.
 J530B 14*ROUTINES USED: GX(A(J518B), GYA(J518B), DLNLN(J529B),
 J530B 15* NAME COMMON CJE07(8 WORDS).

J533A A* VERNA GARDINER C-4 67
 J533A B*SCALE LEFT SIDE LINEARLY
 J533A C*F4 SR6600 SCP 3.1
 J533A D* SW 1 LS 1 TYPE 1
 J533A E*F4 SOURCE CARDS 30 BCD OBJECT CARDS 15 BIN
 J533A F**SCALE*LEFT SIDE*LINEARLY
 J533A G*ON DISK F4 COMPAT WU 08/02/71REV 1 DECK 08/02/71REV
 J533A 1*FORM: CALL SLLIN(NY,K)
 J533A 2*THE LEFT SIDE OF A GRID IS SCALED AT NY INTERVALS ACCORD-
 J533A 3* ING TO A FORMAT SPECIFIED BY K. SEE J506A WRITEUP FOR
 J533A 4* MORE DETAILS.
 J533A 5*ROUTINE NAME: SLLIN
 J533A 6*ENTRY NAME: SLLIN
 J533A 7*STORAGE: 205 (OCTAL) WORDS.
 J533A 8*ROUTINES USED: TSP(J520A), NAME COMMON CJE07(8 WORDS).
 J533A 9* (ON THE SYSTEM).

J533B A* VERNA GARDINER C-4 72
 J533B B*SCALE LEFT SIDE LINEARLY
 J533B C*F4 SR7600 CROS
 J533B D* SW 1 LS 2 TYPE 1
 J533B E*F4 SOURCE CARDS 30 BCD OBJECT CARDS 14 BIN
 J533B F**SCALE*LEFT SIDE*LINEARLY
 J533B G*ON DISK F4 COMPAT WU 07/27/72 DECK 07/27/72
 J533B 1*FORM: CALL SLLIN(NY,K)
 J533B 2*PURPOSE: THE LEFT SIDE OF A GRID IS SCALED AT NY
 J533B 3* INTERVALS ACCORDING TO A FORMAT SPECIFIED BY K.
 J533B 4*ROUTINE NAME: SLLIN
 J533B 5*ENTRY NAME: SLLIN
 J533B 6*STORAGE: 205 (OCTAL) WORDS.
 J533B 7*ROUTINES USED: TSP(J520B), NAME COMMON CJE07(8 WORDS).
 J533B 8* (ON THE SYSTEM).

J534A A* GENE WILLBANKS T-1 68
 J534A 0*SCALE RIGHT SIDE OF GRAPH LINEARLY
 J534A B*PLOTting J5 F4 SR6600 SCOPE
 J534A C* SW 1 LS 1
 J534A D*F4 SOURCE DECK 33BCDF4 OBJECT CARDS 16BIN
 J534A S**SCALE*RIGHT*LINEARLY
 J534A 10*ON DISK F4 COMPAT WU 02/27/68 REV DECK 02/27/68 REV
 J534A 11*CALL SRLIN(NY,K). THE RIGHT SIDE OF A GRID IS SCALED AT NY
 J534A 12*INTERVALS ACCORDING TO A FORMAT SPECIFIED BY K. FOR MORE
 J534A 13*DETAILS SEE J506A WRITEUP.
 J534A 14*STORAGE - 170 WORDS
 J534A 15*USES TSP(J520A),TCP(J521A),NAME COMMON CJE07(8 WORDS).

J535A A* R. M. FRANK C-4 GENE WILLBANKS 67
 J535A B*SCALE TOP OR BOTTOM OF GRAPH LINEARLY
 J535A C*F4 SR6600 SCP. 3.1
 J535A D* SW 1 LS 1
 J535A E*SOURCE CARDS 42 BCD OBJECT CARDS 18 BIN
 J535A F**SCALE*TOP OR*BOTTOM OF*GRAPH*LINEARLY
 J535A G#ON DISK F4 COMPAT WU 02/12/69REV 3 DECK 02/12/69REV 3
 J535A 1*CALL SBLIN(NX,K). A GRID IS SCALED ALONG THE BOTTOM AT NX
 J535A 2*INTERVALS ACCORDING TO A FORMAT K.
 J535A 3*CALL STLIN(NX,K). A NUMERIC SCALE IS TYPED ALONG THE TOP OF
 J535A 4*THE GRID AT NX INTERVALS ACCORDING TO FORMAT K. FOR MORE
 J535A 5*DETAILED EXPLANATION SEE J506A WRITEUP.
 J535A 6*STORAGE - 314 (OCTAL) WORDS.
 J535A 7*USES TSP(J520A), NAME COMMON CJE07(8 WORDS).

J540A A* V. GARDINER C-4 R.M.FRANK 67
 J540A B*SCALE ANY BOUNDARY OF GRAPH LOGARITHMICALLY
 J540A C*F4 SR6600 SCP. 3.1
 J540A D* SW 1 LS 2 TYPE 1
 J540A E*SOURCE CARDS 72 BCD OBJECT CARDS 20 BIN
 J540A F**LOGARITHMIC SCALE*GRAPH BOUNDARY
 J540A G#ON DISK F4 COMPAT WU 02/21/73REV.3 DECK 02/21/73REV.3
 J540A 1*CALL SBLOG. A LOG SCALE IS TYPED ALONG THE BOTTOM BOUNDARY.
 J540A 2*CALL SLLOG. A LOG SCALE IS TYPED ON THE LEFT BOUNDARY.
 J540A 3*CALL SRLOG. A LOG SCALE IS TYPED IN ALONG THE RIGHT BOUNDARY.
 J540A 4*CALL STLOG. A LOG SCALE IS TYPED ALONG THE TOP BOUNDARY.
 J540A 5*FOR MORE DETAIL SEE J506A WRITEUP.
 J540A 6*STORAGE - 375 OCTAL WORDS
 J540A 7*ROUTINE NAME: SBLOG
 J540A 8*ENTRY NAMES: SBLOG, SLLOG, SRLOG, STLOG
 J540A 9*ROUTINES CALLED: TSP(J520A),
 J540A 10* NAME COMMON CJE07(10 OCTAL WORDS)

J540B A* V. GARDINER C-4 R.M.FRANK 73
 J540B B*SCALE ANY BOUNDARY OF GRAPH LOGARITHMICALLY
 J540B C*F4 SR7600 CROS
 J540B D* SW 1 LS 2 TYPE 1
 J540B E*SOURCE CARDS 72 BCD OBJECT CARDS 19 BIN
 J540B F**LOGARITHMIC SCALE*GRAPH BOUNDARY
 J540B G*ON DISK F4 COMPAT WU 02/21/73 DECK 02/21/73
 J540B 1*CALL SBLOG. A LOG SCALE IS TYPED ALONG THE BOTTOM BOUNDARY.
 J540B 2*CALL SLLOG. A LOG SCALE IS TYPED ON THE LEFT BOUNDARY.
 J540B 3*CALL SRLOG. A LOG SCALE IS TYPED IN ALONG THE RIGHT BOUNDARY.
 J540B 4*CALL STLOG. A LOG SCALE IS TYPED ALONG THE TOP BOUNDARY.
 J540B 5*FOR MORE DETAIL SEE J506B WRITEUP.
 J540B 6*STORAGE - 374 OCTAL WORDS
 J540B 7*ROUTINE NAME: SBLOG
 J540B 8*ENTRY NAMES: SBLOG, SLLOG, SRLOG, STLOG
 J540B 9*ROUTINES CALLED: TSP(J520B).
 J540B 10* NAME COMMON CJE07(10 OCTAL WORDS)

J541A A* GENE WILLRANKS C-4 67
 J541A B*PLOT N POINTS
 J541A C*FORTRAN IV SR6600 SCP3.1
 J541A D* SW 1 LS 1 TYPE 1
 J541A E*F4 SOURCE CARDS 26 BCD OBJECT CARDS 13 BIN
 J541A F**PLOT*N*POINTS
 J541A G*ON DISK F4 COMPAT WU 06/24/69REV 1 DECK 06/24/69REV 1
 J541A 1*CALL PLOT(N,X,MX,Y,MY,ICHAR,ICON). THE CHARACTER DESIGNATED
 J541A 2*BY ICHAR IS PLOTTED N TIMES AT POINTS DERIVED FROM TABLES OF
 J541A 3*X AND Y STORED AT INTERVALS OF MX AND MY. IF ICON IS NOT ZERO
 J541A 4*SUCCESSIVE POINTS ARE CONNECTED BY VECTORS. SEE J506A FOR
 J541A 5*MORE DETAILED WRITEUP.
 J541A 6*STORAGE - 119 WORDS
 J541A 7*USES CONVRT(J526A), TCP(J527A), PLT(J516A), DRV(J517A), NAME
 J541A 8*COMMON CJE07(8 WORDS).

J542A A* K. J. MELENDEZ C-4 R. M. FRANK 67
 J542A B*WRITE LARGE CHARACTERS HORIZONTALLY OR VERTICALLY
 J542A C*COMPASS SR6600 SCP. 3.1
 J542A D* SW 1 LS 9 TYPE 1
 J542A E*SOURCE CARDS 312 BCD OBJECT CARDS 20 BIN
 J542A F**WRITE*LARGE*CHARACTERS*HORIZONTALLY OR*VERTICALLY
 J542A G*ON DISK F4 COMPAT WU 01/28/71REV 3 DECK 01/28/71REV 3
 J542A 1*CALL WLCH(IX,IY,NC,BCD,ISIZE). THE NC CHARACTERS LOCATED AT
 J542A 2*BCD ARE PRINTED STARTING AT (IX,IY). THE SIZE OF THE
 J542A 3*CHARACTERS IS CONTROLLED BY ISIZE FROM 1 TO 6.
 J542A 4*CALL WLCV(IX,IY,NC,BCD,ISIZE). THE NC CHARACTERS LOCATED AT
 J542A 5*BCD ARE PRINTED OVERSIZE STARTING AT (IX,IY). THE SIZE IS
 J542A 6*CONTROLLED BY ISIZE. SEE J506A WRITEUP FOR FULL DETAILS.
 J542A 7*STORAGE - 222 WORDS
 J542A 8*SELF CONTAINED.

J542B A* K.J.MELENDEZ C-4 R.M.FRANK 72
 J542B B*WRITE LARGE CHARACTERS HORIZONTALLY OR VERTICALLY
 J542B C*CMP SR7600 CROS
 J542B D* SW 1 LS 10 TYPE 1
 J542B E*CMP SOURCE CARDS 312 BCD OBJECT CARDS 20 BIN
 J542B F**WRITE*LARGE*CHARACTERS*HORIZONATLLY OR*VERTICALLY
 J542B G*ON DISK F4 COMPAT WU 08/09/72 DECK 08/09/72
 J542B 1*FORM: CALL WLCH(IX,IY,NC,BCD,ISIZE).
 J542B 2*PURPOSE: THE NC CHARACTERS LOCATED AT BCD ARE PRINTED
 J542B 3* STARTING AT (IX,IY). THE SIZE OF THE CHARACTERS
 J542B 4* IS CONTROLLED BY ISIZE FROM 1 TO 6.
 J542B 5* CALL WLCV(IX,IY,NC,BCD,ISIZE).
 J542B 6*PURPOSE: THE NC CHARACTERS LOCATED AT BCD ARE PRINTED
 J542B 7* OVERSIZE STARTING AT (IX,IY). THE SIZE IS CONTROLLED
 J542B 8* BY ISIZE.
 J542B 9*ROUTINE NAME: WLCH
 J542B 10*ENTRY NAMES: WLCH, WLCV
 J542B 11*STORAGE: 336 OCTAL WORDS.
 J542B 12*SELF CONTAINED.

J544A A* V.GARDINER C-4 R FRANK C-4 68
 J544A B*CALCOMP STANDARDIZED PLOT
 J544A C*F4 SR6600 SCP 3.1
 J544A D* SW 27 LS 2 TYPE 1
 J544A E*SOURCE CARDS 70 BCD OBJECT CARDS 20 BIN
 J544A F**CALCOMP*PLOT
 J544A G*CARDS F4 COMPAT WU 01/03/73REV.2 DECK 01/06/69 REV1
 J544A 1*FORM: CALL PLOTZ(X,Y,N,I,LIN,ISYM,B,XA,YA,ITITLE,
 J544A 2* NTITLE,LABELX,NLBLX,LARELY,NLBLY)
 J544A 3*PURPOSE: CREATE A BOX WITH TIC MARKS ON ALL SIDES.
 J544A 4* LEFT AND BOTTOM AXES ARE LABELLED. TITLE IS
 J544A 5* WRITTEN AT TOP OF GRAPH. VALUES OF X AND Y ARE
 J544A 6* PLOTTED.
 J544A 7*NOTE: THE J544 WRITEUP ALSO DESCRIBES MANY OF THE
 J544A 8* CALCOMP ROUTINES.
 J544A 9*ROUTINE NAME: PLOTZ
 J544A 10*ENTRY NAME: PLOTZ
 J544A 11*STORAGE: 321 OCTAL WORDS
 J544A 12*ROUTINES CALLED: SCALE(J546A),AXIS(J547A),LINE(J548A),
 J544A 13* PLTZ(J549A),SYMBOL(J559A).

J545A A* R. M. FRANK C-4 68
 J545A 0*CALCOMP NUMBER LABELING
 J545A B*PLOTING J5 F4 SR6600 SCOPE
 J545A C* SW 1 LS 1
 J545A D*F4 SOURCE CARDS 43BCDF4 OBJECT CARDS 14BIN
 J545A S**CALCOMP*LABEL
 J545A 10*CARDS F4 COMPAT WU 09/12/68 DECK 09/12/68
 J545A 11*CALL NUMBER (X, Y, HT, BCD, TH, NS)
 J545A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J545A 13*USES SYMBOL(J559A) AND ALOG10(B305A)
 J545A 14*STORAGE 250(8) WORDS

J546A A* ROBERT M FRANK C-4 68
 J546A 0*GENERATE SCALE FOR AXIS
 J546A B*PLOTING J5 F4 SR6600 SCOPE
 J546A C* SW 1 LS 2
 J546A D*F4 SOURCE CARDS 96BCDF4 OBJECT CARDS 22BIN
 J546A S*CALCOMP*SCALE
 J546A 10*CARDS F4 COMPAT WU 08/19/68 08/19/68
 J546A 11*CALL SCALE (X, F, D, A, N, I)
 J546A 12*SEE WRITE UP FOR J544A FOR FULL DETAILS.
 J546A 13*USES-ALOG10(B305A)
 J546A 14*STORAGE 371(8) WORDS.

J547A A* V.GARDINER C-4 R.M.FRANK 68
 J547A B*GENERATE AND LABEL AXIS ON CALCOMP
 J547A C*F4 SR6600 SCP 3.1
 J547A D* SW 1 LS 4 TYPE 1
 J547A E*F4 SOURCE CARDS 144 BCD OBJECT CARDS 42 BIN
 J547A F**CALCOMP*AXIS
 J547A G*CARDS F4 COMPAT WU 01/03/73REV 2 DECK 01/03/73REV 1
 J547A 1*FORM: CALL AXIS (X,Y,ITITLE,N,A,DEG,F,D,LOG)
 J547A 2*PURPOSE: GENERATE AND LABEL AXIS ON CALCOMP
 J547A 3*SEE PLOTZ(J544A) WRITEUP FOR FULL DETAILS.
 J547A 4*ROUTINE NAME: AXIS
 J547A 5*ENTRY NAME: AXIS
 J547A 6*STORAGE: 1040 OCTAL WORDS
 J547A 7*ROUTINES CALLED: NUMBER(J544A),PLTZ(J545A),SINCOS(B106A),
 J547A 8* AND SYMBOL(J559A).

J547B A* V.GARDINER C-4 R.M.FRANK 73
 J547B B*GENERATE AND LABEL AXIS ON CALCOMP
 J547B C*F4 SR7600 CROS
 J547B D* SW 1 LS 4 TYPE 1
 J547B E*F4 SOURCE CARDS 144 BCD OBJECT CARDS 42 BIN
 J547B F**CALCOMP*AXIS
 J547B G*ON DISK F4 COMPAT WU 01/03/73 DECK 01/03/73
 J547B 1*FORM: CALL AXIS (X,Y,ITITLE,N,A,DEG,F,D,LOG)
 J547B 2*PURPOSE: GENERATE AND LABEL AXIS ON CALCOMP
 J547B 3*SEE PLOTZ(J544) WRITEUP FOR FULL DETAILS.
 J547B 4*ROUTINE NAME: AXIS
 J547B 5*ENTRY NAME: AXIS
 J547B 6*STORAGE: 1045 OCTAL WORDS.
 J547B 7*ROUTINES CALLED: NUMBER(J544), PLTZ(J545), SINCOS(B106),
 J547B 8* AND SYMBOL(J559).

J548A A* ROBERT M FRANK C-4 68
 J548A 0*PLOT SYMBOL AND DRAW LINE THROUGH SUCCESSIVE DATA POINTS
 J548A B*PLOTTING JS F4 SR6600 SCOPE
 J548A C* SW 1 LS 1
 J548A D*F4 SOURCE CARDS 52BCDF4 OBJECT CARDS 15BIN
 J548A S**CALCOMP*GRAPH
 J548A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J548A 11*CALL LINE (X,FX,DX,Y,FY,DY,N,I,LIN,ISYM,R)
 J548A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J548A 13*USES PLTZ(J549A), WHERE(J554A), SYMBOL(J559A), ALOG10(B305A),
 J548A 14*SQRT(B408A).
 J548A 15*STORAGE 1340(8) WORDS.

J549A A* ROBERT M FRANK C-4 68
 J549A 0*GENERATE TAPE TO CONTROL PEN MOTION
 J549A B*PLOTting J5 F4 SR6600 SCOPE
 J549A C* SW 1 LS 3
 J549A D*F4 SOURCE CARDS 124BCDF4 OBJECT CARDS 17BIN
 J549A S**CALCOMP*TAPE*PEN
 J549A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J549A 11*CALL PLTZ(X, Y, IC)
 J549A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J549A 13*USES BLOCK(J551A), TAPWRI(J552A), STORE(J553A)
 J549A 14*STORAGE 306(8) WORDS.

J550A A* ROBERT M FRANK C-4 68
 J550A 0*INITIALIZE CALCOMP ROUTINES AND ASSIGN TAPE
 J550A B*PLOTting J5 F4 COMPAT SR6600 SCOPE
 J550A C* SW 1 LS 1
 J550A D*F4 SOURCE CARDS 21BCDF4 OBJECT CARDS 10BIN
 J550A S**CALCOMP*TAPE
 J550A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J550A 11*CALL PLOTS (LT)
 J550A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J550A 13*USES BLOCK (J551A)
 J550A 14*STORAGE 22(8) WORDS.

J551A A* R. M. FRANK C-4 68
 J551A 0*WRITE BLOCK NUMBER ON TAPE
 J551A B*PLOTting J5 F4 SR6600 SCOPE
 J551A C* SW 1 LS 1
 J551A D*F4 SOURCE CARDS 39BCDF4 OBJECT CARDS 14BIN
 J551A S**CALCOMP*BLOCK
 J551A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J551A 11*CALCOMP EXCLUSIVE INTERNAL SUBROUTINE
 J551A 12*USES TAPWRI(J552A) AND STORE(J553A).
 J551A 13*STORAGE 173(8) WORDS.

J552A A* R. M. FRANK C-4 68
 J552A 0*WRITE ON TAPE
 J552A B*PLOTting J5 F4 SR6600 SCOPE
 J552A C* SW 1 LS 1
 J552A D*F4 SOURCE CARDS 21BCDF4 OBJECT CARDS 11BIN
 J552A S**CALCOMP*TAPE*WRITE
 J552A 10*CARDS F4 COMPAT WU 09/12/68 DECK 09/12/68
 J552A 11*CALCOMP EXCLUSIVE INTERNAL SUBROUTINE
 J552A 12*STORAGE 114(8) WORDS
 J552A 13*CALLS UNLODE, GETEQN

J552B A* R.M.FRANK C-4 R M FRANK 72
 J552B B*WRITE ON TAPE
 J552B C*F4 SR7600 CROS
 J552B D* SW 1 LS 1 TYPE 1
 J552B E*SOURCE CARDS 9 RCD OBJECT CARDS 5 BIN
 J552B F**CALCOMP*TAPE*WRITE*PLOTING
 J552B G*ON DISK F4 COMPAT WU 11/15/72 DECK 11/15/72
 J552B 1*CALCOMP EXCLUSIVE INTERNAL SUBROUTINE
 J552B 2*ROUTINE NAME: TAPWRI
 J552B 3*STORAGE 32 OCTAL WORDS
 J552B 4*ROUTINES CALLED: SELF CONTAINED

J553A A* R. M. FRANK C-4 68
 J553A 0*PACK COMMANDS FOR TAPE
 J553A B*PLOTING J5 F4 SR6600 SCOPE
 J553A C* SW 1 LS 1
 J553A D*F4 SOURCE CARDS 20BCDF4 OBJECT CARDS 6BIN
 J553A S**CALCOMP*TAPE
 J553A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J553A 11*CALCOMP EXCLUSIVE INTERNAL SUBROUTINE
 J553A 12*USES TAPWRI(J552A) AND ENCODE(J558A).
 J553A 13*STORAGE 41 (8) WORDS

J554A A* R. M. FRANK C-4 68
 J554A 0*CURRENT PLOTTER POSITION
 J554A B*PLOTING J5 F4 SR6600 SCOPE
 J554A C* SW 1 LS 1
 J554A D*F4 SOURCE CARDS 8BCDF4 OBJECT CARDS 4BIN
 J554A S**CALCOMP*PEN*POSITION
 J554A 10*CARDS F4 COMPAT WU 08/19/68 08/19/68
 J554A 11*CALL WHERE (XWHERE , YWHERE, FACT)
 J554A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J554A 13*STORAGE 23(8) WORDS.

J555A A* R. M. FRANK C-4 68
 J555A 0*SCALING FACTOR FOR SUBSEQUENT PLOTING
 J555A B*PLOTING J5 F4 SR6600 SCOPE
 J555A C* SW 1 LS 1
 J555A D*F4 SOURCE CARDS 7BCDF4 OBJECT CARDS 3BIN
 J555A S**CALCOMP*MOVEMENT*SCALE
 J555A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J555A 11*CALL FACTOR (FACT)
 J555A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J555A 13*STORAGE 13(8) WORDS.

J556A A* R. M. FRANK C-4 68
 J556A 0*CHANGE OF ORIGIN
 J556A B*PLOTTING J5 F4 SR6600 SCOPE
 J556A C* SW 1 LS 1
 J556A D*F4 SOURCE CARDS 9BCDF4 OBJECT CARDS 4BIN
 J556A S**CALCOMP*ORIGIN*CHANGE
 J556A 10*CARDS F4 COMPAT WU 08/19/68 DECK 08/19/68
 J556A 11*CALL OFFSET (XMIN, DX, YMIN, DY)
 J556A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS.
 J556A 13*STORAGE 17(8) WORDS.

J558A A* R. M. FRANK C-4 68
 J558A 0*TAPE PACKING ROUTINE
 J558A B*PLOTTING J5 COMPASS SR6600 SCOPE
 J558A C* SW 1 LS 1
 J558A D*COMPASS SOURCE CARDS 22BCD OBJECT CARDS 3BIN
 J558A S**CALCOMP*TAPE*PACKING
 J558A 10*CARDS F4 COMPAT WU 09/12/68 DECK 09/12/68
 J558A 11*CALCOMP EXCLUSIVE INTERNAL SUBROUTINE
 J558A 12*STORAGE 13(8) WORDS.

J559A A* R. M. FRANK C-4 68
 J559A 0*CALCOMP SYMBOL LABELING
 J559A B*PLOTTING J5 COMPASS SR6600 SCOPE
 J559A C* SW 1 LS 8
 J559A D*COMPASS SOURCE CARDS 389BCD OBJECT CARDS 23BIN
 J559A S**CALCOMP*LABEL
 J559A 10*CARDS F4 COMPAT WU 09/12/68 DECK 09/12/68
 J559A 11*CALL SYMBOL (X, Y, HT, IBCD, TH, NS)
 J559A 12*SEE WRITEUP FOR J544A FOR FULL DETAILS
 J559A 13*USES PLTZ(J549A),COS(B106A),SIN(B106A)
 J559A 14*STORAGE 415(8) WORDS.

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J560A A*          R. M. FRANK          C-4          68
J560A B*CONTOUR PLOTTING FOR CALCOMP PLOTTER
J560A C*F4          SR6600          SCP 3.1
J560A D*          SW 3          LS 3          TYPE 1
J560A E*F4 SOURCE CARDS          123 BCD OBJECT CARDS          46 BIN
J560A F**CONTOUR*PLOTTING*CALCOMP
J560A G*CARDS          F4 COMPAT          WU 03/13/69REV 1 DECK 03/13/69REV 1
J560A 1*CALL CONTOUR(X,NNX,Y,NNY,Z,NZX,NZY,NC,ZMN,ZMX,DLZ,ZC,DMPX,
J560A 2*DMPY,IGRD,ITITLE,NTITLE,XLABEL,NXLBL,YLABEL,NYLBL)
J560A 3*MAKES TAPE FOR PLOTTING CONTOURS ON CALCOMP PLOTTER. SEE
J560A 4*WRITE-UP FOR DETAILS.
J560A 5*USES TRICON(J561A) AND PLOTZ(J544A).
J560A 6*STORAGE 1114 WORDS.

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J561A A*          R. M. FRANK          C-4          68
J561A 0*PRIVATE SUBROUTINE FOR CONTOUR
J561A B*PLOTTING          J5          F4          SR6600          SCOPE
J561A C*          PLOTZ          SW 1          LS 2
J561A D*F4 SOURCE          61BCDBINARY          24BIN
J561A S**CONTOUR*PLOTTING*CALCOMP
J561A 10*CARDS          F4 COMPAT          WU 09/12/68          DECK 09/12/68
J561A 11*CALL TRICON(X,Y,DX,DY,NOC,ZPLAN,ZX,ZV,ZY)
J561A 12*PRIVATE SUBROUTINE FOR CONTOUR
J561A 13*CALLS PLOTZ(J544A).
J561A 14*STORAGE 496 WORDS.

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J562A A*          V. GARDINER          C-4          R FRANK          68
J562A B*STANDARDIZED PLOT ON FILM
J562A C*F4          SR6600          SCP.3.1
J562A D*          SW 10          LS 3          TYPE 1
J562A E*SOURCE CARDS          118 BCD          OBJECT CARDS          43 BIN
J562A F**FILM*PLOT
J562A G*ON DISK          F4 COMPAT          WU 02/14/73REV.9 DECK 04/24/72REV.7
J562A 1*FORM: CALL PLOJB(X,Y,NPTS,INC,LIN,NSYM,C,XAA,YAA,
J562A 2*          LABELZ,NZL,LABELX,NXL,LABELY,NYL)
J562A 3*PURPOSE: PLOTS VALUES OF X,Y TABLE ON FILM WITH LABELLING
J562A 4* OF AXES AND TITLE.
J562A 5*ROUTINE NAME; PLOJB
J562A 6*ENTRY NAME; PLOJB
J562A 7*STORAGE 1021 (OCTAL) WORDS
J562A 8*ROUTINES CALLED: MAXV(F115A), MINV(F115A), ADV(J506A),
J562A 9* ASCL(J510A), PLT(J516A), DRV(J517A), TSP(J520A),
J562A 10* TSPV(J522A), FRAME(J523A), CONVRT(J526A), DLNLN(J529A),
J562A 11* DLGLG(J530A), DLGLN(J530A), DLNLG(J530A), SLLIN(J533A),
J562A 12* SBLIN(J535A), SBLOG(J540A), SLLOG(J540A), DLCH(J567A),
J562A 13* DGA(J528A). ALL ON DISK.

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J562B A* V. GARDINER C-4 R FRANK 72
 J562B B*STANDARDIZED PLOT ON FILM
 J562B C*F4 SR7600 CROS
 J562B D* SW 10 LS 3 TYPE 1
 J562B E*SOURCE CARDS 118 BCD OBJECT CARDS 44 BIN
 J562B F**FILM*PLOT
 J562B G*ON DISK F4 COMPAT WU 02/14/73REV.1 DECK 04/24/72
 J562B 1*FORM: CALL PLOJB(X,Y,NPTS,INC,LIN,NSYM,C,XAA,YAA,
 J562B 2* LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J562B 3*PURPOSE: PLOTS VALUES OF X,Y TABLE ON FILM WITH LABELLING
 J562B 4* OF AXES AND TITLE.
 J562B 5*ROUTINE NAME: PLOJB
 J562B 6*ENTRY NAME: PLOJB
 J562B 7*STORAGE 1030 (OCTAL) WORDS
 J562B 8*ROUTINES CALLED: MAXV(F115B), MINV(F115B), ADV(J506B),
 J562B 9* ASCL(J510B), PLT(J516B), DRV(J517B), TSP(J520B),
 J562B 10* TSPV(J522B), FRAME(J523B), CONVRT(J526B), DLNLN(J529B),
 J562B 11* DLGLG(J530B), DLGLN(J530B), DLNLG(J530B), SLLIN(J533B),
 J562B 12* SRLIN(J535B), SBLOG(J540B), SLLG(J540B), DLCH(J567B),
 J562B 13* DGA(J528B), ALL ON DISK.

J563A A* R. M. FRANK C-4 J. BORING 68
 J563A B*CONTOUR PLOTTING WITH FILM OUTPUT
 J563A C*F4 SR6600 SCP.3.1
 J563A D* SW 6 LS 3 TYPE 1
 J563A E*SOURCE CARDS 91 BCD OBJECT CARDS 39 BIN
 J563A F**CONTOUR*PLOTTING*FILM
 J563A G*ON DISK F4 COMPAT WU 07/22/70REV 4 DECK 07/22/70REV 3
 J563A 1*USE: CALL CONTRJB(X,NNX,Y,NNY,Z,NZX,NZY,NC,ZMN,ZMX,DLZ,ZC,
 J563A 2*DMPX,DMPY,IGRD,ITITLE,NTITLE,XLABEL,NXLBL,YLABEL,NYLBL)
 J563A 3*PURPOSE: PRODUCES A CONTOUR PLOT WITH LABELS ON FILM.
 J563A 4*STORAGE 754 (OCTAL) WORDS.
 J563A 5*USES TRICJB(J564A),PLOJB(J562A),ADV(J506A),DLCH(J567A),
 J563A 6*DRV(J517A),PLT(J516A),TCP(J521A)

J563B A* R. M. FRANK C-4 R.M.FRANK 72
 J563B B*CONTOUR PLOTTING WITH FILM OUTPUT
 J563B C*F4 SR7600 CROS
 J563B D* SW 6 LS 3 TYPE 1
 J563B E*SOURCE CARDS 91 BCD OBJECT CARDS 40 BIN
 J563B F**CONTOUR*PLOTTING*FILM
 J563B G*ON DISK F4 COMPAT WU 08/09/72 DECK 08/09/72
 J563B 1*FORM: CALL CONTRJB(X,NNX,Y,NNY,Z,NZX,NZY,NC,ZMN,ZMX,DLZ,ZC,
 J563B 2* DMPX,DMPY,IGRD,ITITLE,NTITLE,XLABEL,NXLBL,YLABEL,NYLBL)
 J563B 3*PURPOSE: PRODUCE A CONTOUR PLOT WITH LABELS ON FILM.
 J563B 4*ROUTINE NAME: CONTRJB
 J563B 5*ENTRY NAME: CONTRJB
 J563B 6*STORAGE 764 (OCTAL) WORDS.
 J563B 7*ROUTINES CALLED: TRICJB(J564B),PLOJB(J562B)ADV(J506B),
 J563B 8* DLCH(J567B),DRV(J517),PLT(J516B),TCP(J521B)

J564A A* R. M. FRANK C-4 J. BORING 68
 J564A B*PRIVATE SUBROUTINE FOR CONTRJB(J563A)
 J564A C*F4 SR6600 SCP.3.1
 J564A D* SW 1 LS 1 TYPE 1
 J564A E*SOURCE CARDS 57 BCD OBJECT CARDS 21 BIN
 J564A F**CONTOUR*PLOTTING*FILM
 J564A G*ON DISK F4 COMPAT WU 09/19/69REV 2 DECK 09/19/69REV 1
 J564A 1*CALL TRICJB(X,Y,DX,DY,NOC,ZPLAN,ZX,ZV,ZY)
 J564A 2*PRIVATE SUBROUTINE FOR CONTRJB
 J564A 3*STORAGE 454 WORDS
 J564A 4*CALLS PLOJB(J562A),TCP(J521A)

J565A A* K J MELENDEZ C-4 69
 J565A B*DOUBLE BUFFER FILM OUTPUT
 J565A C*COMPASS SR6600 SCP 3.1
 J565A D* WU 2 LS 5 TYPE 1
 J565A E*SOURCE CARDS 269 BCD OBJECT CARDS 14 BIN
 J565A F**DOUBLE BUFFER*BS4020*4020*SC4020*FILM*PLOT
 J565A G*CARDS CMP WU 10/06/69REV 2 DECK 10/06/69REV 2
 J565A 1*J565A IS A VERSION OF BS4020 WHICH USES A DOUBLE BUFFER
 J565A 2*SCHEME TO DECREASE RUNNING TIME WHEN HAVING LARGE AMOUNTS OF
 J565A 3*FILM OUTPUT. ALTHOUGH BS4020 IS NOT CALLED DIRECTLY BY THE
 J565A 4*USER, HE MUST SUBMIT THE DECK FOR J565A AS PART OF HIS JOB
 J565A 5*IF HE DESIRES TO USE THIS FASTER VERSION. WHEN THIS ROUTINE
 J565A 6*IS USED, ONE MUST CALL EMTY BEFORE TERMINATING EXECUTION.
 J565A 7*J565A USES 143 (DECIMAL) WORDS OF STORAGE.

J566A A* GENE WILLBANKS C-4 KAY LATHROP 69
 J566A B*PLOT 3-DIMENSIONS ON 4020
 J566A C*FORTRAN IV SR6600 SCP 3.1
 J566A D* SW 4 LS 2 TYPE 1
 J566A E*SOURCE CARDS 92 BCD 35 BIN
 J566A F**PLOT*3-DIMENSIONS ON*4020
 J566A G*CARDS F4 COMPAT WU 03/07/69 DECK 03/06/69
 J566A 1*CALL PLT3D(F,X,Y,IM,JM,FL,WR)
 J566A 2*STORAGE 1241 WORDS
 J566A 3*USES-J523A(FRAME), J520A(TSP), J528A(DGA), J541A(PLOT),
 J566A 4*AND J506A(ADV).

J567A A* R. M. FRANK C-4 69
 J567A B*DRAW LARGE CHARACTERS
 J567A C*F4 SR6600 SCP 3.1
 J567A D* SW 5 LS 3 TYPE 1
 J567A E*SOURCE CARDS 151 BCD OBJECT CARDS 71 BIN
 J567A F**WRITE*LARGE*CHARACTERS HORIZONTALLY OR VERTICALLY
 J567A G*ON DISK F4 COMPAT WU 04/28/70 REV. 2 DECK 06/13/69
 J567A 1*CALL NAME: DLCH(IX,IY,NC,BCD,ISIZE) DLCV(IX,IY,NC,BCD,ISIZE)
 J567A 2*PURPOSE: TO DRAW LARGE CHARACTERS HORIZONTALLY OR VERTICALLY
 J567A 3*STORAGE: 272 OCTAL
 J567A 4*ROUTINES CALLED: EMPTY(J506A), STB(J524A) ,
 J567A 5*BS4020(ON THE SYSTEM).

J568A *(FLASH) DELETED FROM THE LIBRARY-SEE CCF:PIM-2:003

J569A A* JERRY MELENDEZ C-4 R FRANK 69
 J569A B*COLOR
 J569A C*F4 SR6600 SCP 3.1
 J569A D* SW 6 LS 2 TYPE 1
 J569A E*SOURCE CARDS 47 BCD OBJECT CARDS 9 BIN
 J569A F**COLOR*FILM*MICROFILM*COLOR MICROFILM
 J569A G*ON DISK F4 COMPAT WU 09/26/72REV 1 DECK 09/26/72REV 1
 J569A 1*FORM: CALL COLOR(C)
 J569A 2* CALL COLOR(IC)
 J569A 3*PURPOSE: SELECT COLOR FILTERS TO GENERATE COLOR MICROFILM
 J569A 4*ROUTINE NAME: COLOR
 J569A 5*ENTRY NAME: COLOR
 J569A 6*STORAGE: 102 OCTAL WORDS
 J569A 7*ROUTINES CALLED: STB(J524A)

J569B A* JERRY MELENDEZ C-4 R FRANK 72
 J569B B*COLOR
 J569B C*F4 SR7600 CROS
 J569B D* SW 6 LS 2 TYPE 1
 J569B E*SOURCE CARDS 47 BCD OBJECT CARDS 8 BIN
 J569B F**COLOR*FILM*MICROFILM*COLOR MICROFILM
 J569B G*ON DISK F4 COMPAT WU 09/26/72 DECK 09/26/72
 J569B 1*FORM: CALL COLOR(C)
 J569B 2* CALL COLOR(IC)
 J569B 3*PURPOSE: SELECT COLOR FILTERS TO GENERATE COLOR MICROFILM
 J569B 4*ROUTINE NAME: COLOR
 J569B 5*ENTRY NAME: COLOR
 J569B 6*STORAGE: 101 OCTAL WORDS
 J569B 7*ROUTINES CALLED: STB(J524R)

J570A A* DON DICKMAN C-4 R FRANK 69
 J570A B*SWEEP - BACKGROUND COLOR ON MICROFILM
 J570A C*F4 SR6600 SCP3.1 FILM
 J570A D* SW 3 LS 1 TYPE 1
 J570A E*SOURCE CARDS 21 BCD OBJECT CARDS 7 BIN
 J570A F**SWEEPS*RECTANGULAR *BACKGROUND ON *COLOR *FILM
 J570A G*CARDS F4 COMPAT WU 09/07/72REV 1 DECK 09/07/72REV 1
 J570A 1*FORM: CALL SWEEP(IX1,IY1,IX2,IY2)
 J570A 2*PURPOSE: EXPOSE RECTANGULAR AREA AS A BACKGROUND
 J570A 3* ON A FRAME OF COLOR FILM.
 J570A 4*ROUTINE NAME: SWEEP
 J570A 5*ENTRY NAME: SWEEP
 J570A 6*STORAGE: 65 OCTAL WORDS
 J570A 7*ROUTINES CALLED: GXA,GYA(J518A)

J570B A* DON DICKMAN C-4 R FRANK 72
 J570B B*SWEEP - BACKGROUND COLOR ON MICROFILM
 J570B C*F4 SR7600 CROS FILM
 J570B D* SW 3 LS 1 TYPE 1
 J570B E*SOURCE CARDS 21 BCD OBJECT CARDS 7 BIN
 J570B F**SWEEPS*RECTANGULAR *BACKGROUND ON *COLOR *FILM
 J570B G*CARDS F4 COMPAT WU 09/07/72 DECK 09/07/72
 J570B 1*FORM: CALL SWEEP(IX1,IY1,IX2,IY2)
 J570B 2*PURPOSE: EXPOSE RECTANGULAR AREA AS A BACKGROUND
 J570B 3* ON A FRAME OF COLOR FILM.
 J570B 4*ROUTINE NAME: SWEEP
 J570B 5*ENTRY NAME: SWEEP
 J570B 6*STORAGE: 67 OCTAL WORDS
 J570B 7*ROUTINES CALLED: GXA,GYA(J518B)

J571A A* V. GARDINER C-4 R.M. FRANK 69
 J571A B*PLOT ROUTINE FOR LINE PRINTER
 J571A C*F4 SR6600 SCP 3.1
 J571A D* SW 13 LS 8 TYPE 1
 J571A E*F4 SOURCE CARDS 339 BCD OBJECT CARDS 104 BIN
 J571A F**PLOS B*PLOT*GRAPH
 J571A G*CARDS F4 COMPAT WU 09/01/72REV.3 DECK 09/01/72REV.3
 J571A 1*FORM: CALL PLOS B(X,Y,NPTS,INC,LNN,NSYM,C,XAA,YAA,
 J571A 2* LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J571A 3*PURPOSE: PLOT VALUES OF AN X,Y TABLE ON THE LINE
 J571A 4* PRINTER WITH LABELLING OF AXES AND TITLE
 J571A 5*ROUTINE NAME: PLOS B
 J571A 6*ENTRY NAME: PLOS B
 J571A 7*STORAGE: 12217 OCTAL WORDS.
 J571A 8*ROUTINES CALLED: MAXV(F115A), MINV(F115A), ASCL(J510A),
 J571A 9* PUT(M403A), FETCH(M403A).

J571B A* V. GARDINER C-4 R.M. FRANK 72
 J571B B*PLOT ROUTINE FOR LINE PRINTER
 J571B C*F4 SR7600 CROS
 J571B D* SW 13 LS 8 TYPE 1
 J571B E*F4 SOURCE CARDS 344 BCD OBJECT CARDS 105 BIN
 J571B F**PLOS B*PLOT*GRAPH
 J571B G*ON DISK F4 COMPAT WU 09/01/72REV.1 DECK 09/01/72REV.1
 J571B 1*FORM: CALL PLOS B(X,Y,NPTS,INC,LNN,NSYM,C,XAA,YAA,
 J571B 2* LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J571B 3*PURPOSE: PLOT VALUES OF AN X,Y TABLE ON THE LINE
 J571B 4* PRINTER WITH LABELLING OF AXES AND TITLE
 J571B 5*ROUTINE NAME: PLOS B
 J571B 6*ENTRY NAME: PLOS B
 J571B 7*STORAGE: 12236 OCTAL WORDS.
 J571B 8*ROUTINES CALLED: MAXV(F115B), MINV(F115B), ASCL(J510B),
 J571B 9* PUT(M403B), FETCH(M403B), LIBMSG(SYSTEM).

J572A A* R. M. FRANK C-4 69
 J572A B*POLAR3D (CALCOMP)
 J572A C*F4 SR6600 SCP 3.1
 J572A D* SW 4 LS 2 TYPE 1
 J572A E*SOURCE CARDS 112 BCD OBJECT CARDS 48 BIN
 J572A F**PLOT TING*3-DIMENSIONAL*POLAR-COORDINATES*CALCOMP
 J572A G*CARDS F4 COMPAT WU 10/10/69REV 1 DECK 10/10/69REV 1
 J572A 1*CALL POLAR3D(THETA,R,NTH,NR,F,NTHF,THX,THY,X,Y,TITLE,NTITLE)
 J572A 2*PURPOSE: PLOTS THE MATRIX F IN 3-DIMENSIONS VS. R AND THETA.
 J572A 3*STORAGE: 1113 (OCTAL) WORDS.
 J572A 4*ROUTINES CALLED: SIN(B106A),MAXV(F115A),MAXM(F116A),
 J572A 5*ADV(J506A),EXH(J507A),TSP(J520A),CONVRT(J526A),PLOJB(J562A),
 J572A 6*DLCH(J567A).

J573A A* WILLARD DRAISIN C-4 TOM GODFREY 69
 J573A B*PRNSRD-PRINT *SECRET IN LARGE LETTERS ON MICROFILM
 J573A C*F4 CMP SR6600 SCP 3.1 SC-4020
 J573A D* SW 1 LS 1 TYPE 1
 J573A E*SOURCE CARDS 20 BCD OBJECT CARDS 13 BIN
 J573A F**PRNSRD*FILM
 J573A G*CARDS F4 COMPAT WU 08/25/69 DECK 08/25/69
 J573A 1*CALL=PRNSRD (THERE ARE NO ARGUMENTS)
 J573A 2*PURPOSE: TO WRITE *SECRET PD* IN LARGE LETTERS ON MICRO-
 J573A 3*FILM (SC-4020).
 J573A 4*PRNSRD IS NORMALLY USED TO IDENTIFY THE BEGINNING AND END
 J573A 5*OF SECRET INFORMATION OUTPUT ON THE SC-4020. THE SUBROUTINE
 J573A 6*ADVANCES THE FILM BEFORE PRINTING. IT DOES NOT ADVANCE THE
 J573A 7*FILM AFTER PRINTING. TAPE12 = FILM IS REQUIRED AS AN
 J573A 8*ARGUMENT ON THE PROGRAM CARD.
 J573A 9*TIMING IS UNDER TWO SECONDS OF CP TIME.
 J573A 10*STORAGE: 163 OCTAL WORDS.
 J573A 11*USES: LSHIFT(M407A).

J574A A* V. GARDINER C-4 R. FRANK 69
 J574A B*FILM ERROR BAR PLOTTER
 J574A C*F4 SR6600 SCP 3.1 SC-4020
 J574A D* SW 8 LS 4 TYPE 1
 J574A E*SOURCE CARDS 131 BCD OBJECT CARDS 49 BIN
 J574A F**FILM*ERROR*BAR*PLOTTER
 J574A G*CARDS F4 COMPAT WU 08/11/72REV 3 DECK 08/11/72REV 3
 J574A 1*USE: CALL ERRBAR(X,Y,NPTS,INC,YPOS,YMIN,INCERR,LIN,NSYM,C,
 J574A 2*XAA,YAA,LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J574A 3*PURPOSE: TO PLOT VALUES WITH OR WITHOUT ERROR BARS IN AN
 J574A 4*X,Y TABLE, INCLUDING LABELING OF AXES AND TITLE, ON THE FILM
 J574A 5*PLOTTER.
 J574A 6*STORAGE: 1131 OCTAL WORDS
 J574A 7*ROUTINES CALLED:
 J574A 8* MAXV(F115A), MINV(F115A), ADV(J506A), EXH(J507A),
 J574A 9* EXL(J507A), ASCL(J510A), PLT(J516A), DRV(J517A),
 J574A 10* TSP(J520A), TSPV(J522A), FRAME(J523A), CONVRT(J526A),
 J574A 11* DGA(J528A), DLNLN(J529A), DLGLG(J530A), DLGLN(J530A),
 J574A 12*DLNLG(J530A), SLLIN(J533A), SBLIN(J535A), SBLOG(J540A),
 J574A 13*SLLOG(J540A), DLCH(J567A).

J574B A* V. GARDINER C-4 R. FRANK 72
 J574B B*ERRBAR - FILM ERROR BAR PLOTTER
 J574B C*F4 SR7600 CROS SC-4020
 J574B D* SW 8 LS 4 TYPE 1
 J574B E*F4 SOURCE CARDS 131 BCD OBJECT CARDS 49 BIN
 J574B F**FILM*ERROR*BAR*PLOTTER
 J574B G*ON DISK F4 COMPAT WU 08/11/72REV 1 08/11/72REV 1
 J574B 1*FORM: CALL ERRBAR(X,Y,NPTS,INC,YPOS,YMIN,INCERR,LIN,NSYM,C,
 J574B 2* XAA,YAA,LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J574B 3*PURPOSE: PLOT VALUES WITH OR WITHOUT ERROR BARS IN AN
 J574B 4* X,Y TABLE, INCLUDING LABELING OF AXES AND TITLE, ON THE
 J574B 5* FILM PLOTTER.
 J574B 6*ROUTINE NAME: ERRBAR
 J574B 7*ENTRY NAME: ERRBAR
 J574B 8*STORAGE: 1140 OCTAL WORDS
 J574B 9*ROUTINES CALLED: MAXV(F115B), MINV(F115B), ADV(J506B),
 J574B 10* EXH(J507B), EXL(J507B), ASCL(J510B), PLT(J516B),
 J574B 11* DRV(J517B), TSP(J520B), TSPV(J522B), FRAME(J523B),
 J574B 12* CONVRT(J526B), DGA(J528B), DLNLN(J529B), DLGLG(J530B),
 J574B 13* DLGLN(J530B), DLNLG(J530B), SLLIN(J533B), SBLIN(J535B),
 J574B 14* SBLOG(J540B), SLLOG(J540B), DLCH(J567B).

J575A A* R.M. FRANK C-4 J.BORING/S.BLIVICE 69
 J575A B*CALCOMP ERROR BAR PLOTTER
 J575A C*F4 SR6600 SCP 3.1 CALCOMP
 J575A D* SW 8 LS 3 TYPE 1
 J575A E*SOURCE CARDS 132 BCD OBJECT CARDS 35 BIN
 J575A F**CALCOMP*ERROR*BAR*PLOTTER
 J575A G*CARDS F4 COMPAT WU 03/23/71REV 1 DECK 03/23/71REV 1
 J575A 1*CALL NAME: EROBAR
 J575A 2*PURPOSE: TO PLOT VALUES WITH OR WITHOUT ERROR BARS IN AN
 J575A 3*X,Y TABLE, INCLUDING LABELING OF AXES AND TITLE, ON THE
 J575A 4*CALCOMP PLOTTER.
 J575A 5*STORAGE: 706 (OCTAL) WORDS.
 J575A 6*ROUTINES CALLED: SCALE(J546A), AXIS(J547A), LINE(J548A),
 J575A 7*PLTZ(J549A), SYMBOL(J559A).

J575B A* R. M. FRANK C-4 72
 J575B B*CALCOMP ERROR BAR PLOTTER
 J575B C*F4 SR7600 CROS CALCOMP
 J575B D* SW 1 LS 4 TYPE 1
 J575B E*SOURCE CARDS 132 BCD OBJECT CARDS 36 BIN
 J575B F**CALCOMP*ERROR*BAR*PLOTTER
 J575B G*ON DISK F4 COMPAT WU 06/28/72 DECK 06/28/72
 J575B 1*FORM; CALL EROBAR(X,Y,NPTS,INC,YPOS,YMIN,INCERR,J,NSYM,B,
 J575B 2* XXA,YYA,LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J575B 3*PURPOSE: PLOT VALUES WITH OR WITHOUT ERROR BARS IN AN X,Y
 J575B 4* TABLE, INCLUDING LABELING OF AXES AND TITLE ON THE
 J575B 5* CALCOMP PLOTTER. SEE EROBAR(J575A) FOR FURTHER DETAILS.
 J575B 6*ROUTINE NAME; EROBAR
 J575B 7*ENTRY NAME; EROBAR
 J575B 8*STORAGE: 716 OCTAL WORDS
 J575B 9*ROUTINES CALLED; SCALE(J546R), AXIS(J547B), LINE(J548B),
 J575B 10*PLTZ(J549B), SYMBOL(J559B).

J576A A* R. M. FRANK C-4 69
 J576A B*PLOTS MATRIX IN 3-DIMENSION VS R AND THETA FOR CALCOMP
 J576A C*F4 SR6600 SCP 3.1 CALCOMP
 J576A D* SW 3 LS 2 TYPE 1
 J576A E*SOURCE CARDS 110 BCD OBJECT CARDS 48 BIN
 J576A F**PLOT*CALCOMP*3-D
 J576A G*CARDS F4 COMPAT WU 09/30/69 DECK 09/30/69
 J576A 1*CALL NAME: POL3DCC(THETA,R,NTH,NR,F,NTHF,THX,THY,X,Y,TITLE,
 J576A 2*NTITLE).
 J576A 3*PURPOSE: PLOTS THE MATRIX F IN 3-DIMENSION VS. R AND THETA,
 J576A 4*FOR THE CALCOMP.
 J576A 5*STORAGE: 1,164 (OCTAL) WORDS.
 J576A 6*ROUTINES CALLED; ATAN(B104A),SIN(B106A),MAXV(F115A),
 J576A 7*MAXM(F116A),LINE(J548A),PLTZ(J549A),SYMBOL(J559A),
 J576A 8*SCALED(J577A).

J577A A* R. M. FRANK C-4 69
 J577A B*THIS IS A PRIVATE SUBROUTINE TO BE USED WITH POL3DCC
 J577A C*F4 SR6600 SCP 3.1 CALCOMP
 J577A D* SW 2 LS 1 TYPE 1
 J577A E*SOURCE CARDS 49 BCD OBJECT CARDS 13 BIN
 J577A F**CALCOMP
 J577A G*CARDS F4 COMPAT WU 09/30/69 DECK 09/30/69
 J577A 1*CALL NAME: CALL SCALED(ARRAY,FIRSTV,DELTAV,AXLE,NPTS,INC,
 J577A 2*AMN,AMX)
 J577A 3*PURPOSE: TO ESTABLISH FIRST VALUE AND INCREMENT FOR LINE
 J577A 4*ROUTINE WHEN USING POL3DCC.
 J577A 5*STORAGE: 207 (OCTAL) WORDS.
 J577A 6*ROUTINES CALLED; ATAN2(B104A),ALOG(B305A),ALOG10(B305A).

J578A A* R. M. FRANK C-4 69
 J578A B*CONTOUR PLOTTING IN POLAR COORDINATES WITH FILM OUTPUT
 J578A C*F4 SR6600 SCP 3.1
 J578A D* SW 4 LS 2 TYPE 1
 J578A E*SOURCE CARDS 111 BCD OBJECT CARDS 50 BIN
 J578A F**CONTOUR*PLOTTING*POLAR*COORDINATES*FILM
 J578A G*CARDS F4 COMPAT WU 10/14/69REV 1 DECK 10/14/69REV 1
 J578A 1*CALL NAME: POLCON(X,NNX,Y,NNY,Z,NZX,NC,ZMN,ZMX,DLZ,ZC,IGRD,
 J578A 2*ITITLE,NTITLE).
 J578A 3*PURPOSE: TO PRODUCE A CONTOUR PLOT OF A VARIABLE Z(X,Y).
 J578A 4*STORAGE: 1165 (OCTAL) WORDS.
 J578A 5*ROUTINES CALLED: CDG(B106A),COS(B106A),SDG(B106A),
 J578A 6*SIN(B106A),MAXAV(F115A),MINAV(F115A),MAXV(F115A),MINM(F116A),
 J578A 7*MAXM(F116A),ADV(J506A),EXH(J507A),EXL(J507A),DRV(J517A),
 J578A 8*PLOJB(J562A),DLCH(J567A),TRIPOL(J579A),CIRCA(J580A).

J579A A* R. M. FRANK C-4 69
 J579A B*PRIVATE SUBROUTINE FOR POLCON(J578A)
 J579A C*F4 SR6600 SCP 3.1
 J579A D* SW 1 LS 1 TYPE 1
 J579A E*SOURCE CARDS 61 BCD OBJECT CARDS 23 BIN
 J579A F**CONTOUR*PLOTTING*FILM
 J579A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J579A 1*CALL TRIPOL(X,Y,DX,DY,NOC,ZPLAN,ZX,ZV,ZY)
 J579A 2*PRIVATE SUBROUTINE FOR POLCON
 J579A 3*STORAGE 744(OCTAL) WORDS.
 J579A 4*USES CDG(B106A),SDG(B106A),PLOJB(J562A).

J580A A* R. M. FRANK C-4 69
 J580A B*ROUTINE TO DRAW CIRCLES ON SC4020
 J580A C*F4 SR6600 SCP 3.1
 J580A D* SW 1 LS 1 TYPE 1
 J580A E*SOURCE CARDS 41 BCD OBJECT CARDS 12 BIN
 J580A F**DRAW*CIRCLES ON *SC4020
 J580A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J580A 1*CALL CIRCA(IXC,IYC,IR)
 J580A 2*DRAWS A CIRCLE CENTERED AT IXC,IYC WITH RADIUS IR.
 J580A 3*IXC,IYC,IR ARE IN PLOTTER COORDINATES WHERE (0,0) IS THE
 J580A 4*LEFT EDGE OF THE FRAME AND (1023,1023) IS THE LOWER RIGHT
 J580A 5*EDGE.
 J580A 6*STORAGE-251(OCTAL) WORDS
 J580A 7*USES-COS(B106A), SIN(B106A), DRV(J517A).

J581A A* R. M. FRANK C-4 69
 J581A B* DRAWS A CIRCLE, ARC, OR SPIRAL ON THE CALCOMP
 J581A C*F4 SR6600 SCP 3.1 CALCOMP
 J581A D* SW 2 LS 1 TYPE 1
 J581A E*SOURCE CARDS 52 BCD OBJECT CARDS 14 BIN
 J581A F**PLOT*CALCOMP
 J581A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J581A 1*CALL NAME: CALL CIRCL(XPAGE,YPAGE,THO,THF,RO,RF,DI)
 J581A 2*PURPOSE: TO DRAW, STARTING AT A GIVEN POINT, AN ARCH WHICH
 J581A 3*MAY BE EXTENDED TO FORM A CIRCLE OR SPIRAL.
 J581A 4*STORAGE: 232 (OCTAL) WORDS.
 J581A 5*ROUTINES CALLED: COS(B106A), SIN(B106A), PLTZ(J549A),
 J581A 6*WHERE(J554A).

J582A A* R. M. FRANK C-4 69
 J582A B* DRAWS DASHED LINES CONNECTING DATA POINTS ON THE CALCOMP
 J582A C*F4 SR6600 SCP 3.1 CALCOMP
 J582A D* SW 2 LS 2 TYPE 1
 J582A E*SOURCE CARDS 76 BCD OBJECT CARDS 15 BIN
 J582A F**PLOT*CALCOMP
 J582A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J582A 1*CALL NAME: DASHL(XARRAY,YARRAY,NPTS,INC)
 J582A 2*PURPOSE: TO DRAW DASHED LINES CONNECTING A SERIES OF DATA
 J582A 3*POINTS.
 J582A 4*STORAGE: 310 (OCTAL) WORDS.
 J582A 5*ROUTINES CALLED: SQRT(B408A),PLTZ(J549A),WHERE(J554A).

J583A A* R. M. FRANK C-4 69
 J583A B* DRAWS A DASHED LINE TO A SPECIFIED POINT ON THE CALCOMP
 J583A C*F4 SR6600 SCP 3.1 CALCOMP
 J583A D* SW 2 LS 1 TYPE 1
 J583A E*SOURCE CARDS 53 BCD OBJECT CARDS 9 BIN
 J583A F**PLOT*CALCOMP
 J583A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J583A 1*CALL NAME: DASHP(XPAGE,YPAGE,DASH)
 J583A 2*PURPOSE: TO DRAW A DASHED LINE FROM THE PEN#S PRESENT
 J583A 3*POSITION TO A SPECIFIED POINT
 J583A 4*STORAGE: 124 (OCTAL) WORDS
 J583A 5*ROUTINES CALLED: SQRT(B408A),PLTZ(J549A),WHERE(J554A).

J584A A* F. M. FRANK C-4 69
 J584A B*DRAWS AN ELLIPSE OR ELLIPTICAL ARC ON THE CALCOMP
 J584A C*F4 SR6600 SCP 3.1 CALCOMP
 J584A D* SW 2 LS 1 TYPE 1
 J584A E*SOURCE CARDS 39 BCD OBJECT CARDS 16 BIN
 J584A F**PLOT*CALCOMP
 J584A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J584A 1*CALL NAME: ELIPS(XPAGE,YPAGE,RMAJ,RMIN,ANGLE,THO,THF,IPEN)
 J584A 2*PURPOSE: TO DRAW AN ELLIPSE OR ELLIPTICAL ARC.
 J584A 3*STORAGE: 303 (OCTAL) WORDS.
 J584A 4*ROUTINES CALLED: COS(B106A),SIN(B106A),SQRT(B408A),
 J584A 5*PLTZ(J549A),WHERE(J554A).

J585A A* R. M. FRANK C-4 69
 J585A B*DRAWS A CURVE THROUGH THREE POINTS ON THE CALCOMP
 J585A C*F4 SR6600 SCP 3.1 CALCOMP
 J585A D* SW 2 LS 2 TYPE 1
 J585A E*SOURCE CARDS 61 BCD OBJECT CARDS 17 BIN
 J585A F**PLOT*CALCOMP
 J585A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J585A 1*CALL NAME: CALL FIT(XPAGE1,YPAGE1,XPAGE2,YPAGE2,XPAGE3,
 J585A 2*YPAGE3).
 J585A 3*PURPOSE: TO DRAW A SEMI-HYPERBOLIC CURVE THROUGH THREE
 J585A 4*POINTS.
 J585A 5*STORAGE: 421 (OCTAL) WORDS
 J585A 6*ROUTINES CALLED: ATAN(B104A), COS(B106A), SQRT(B408A),
 J585A 7*PLTZ(J549A), WHERE(J554A), SOLUT(J589A).

J586A A* R. M. FRANK C-4 69
 J586A B*DRAWS A LINEAR GRID ON THE CALCOMP
 J586A C*F4 SR6600 SCP 3.1 CALCOMP
 J586A D* SW 2 LS 1 TYPE 1
 J586A E*SOURCE CARDS 36 BCD OBJECT CARDS 9 BIN
 J586A F**PLOT*CALCOMP
 J586A G*CARDS F4 COMPAT WU 09/26/69 DECK 09/26/69
 J586A 1*CALL NAME: CALL GRID(XPAGE,YPAGE,DELTA X,DELTA Y,NXSP,NYSP)
 J586A 2*PURPOSE: TO DRAW A LINEAR GRID.
 J586A 3*STORAGE: 114 (OCTAL) WORDS.
 J586A 4*ROUTINES CALLED: PLTZ(J549A).

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J587A A*          R. M. FRANK          C-4          69
J587A B*DRAWS AN EQUILATERAL POLYGON ON THE CALCOMP
J587A C#F4          SR6600      SCP 3.1      CALCOMP
J587A D*          SW 2      LS 1      TYPE 1
J587A E*SOURCE CARDS          31      BCD      OBJECT CARDS          11      BIN
J587A F**PLOT*CALCOMP
J587A G*CARDS          F4      COMPAT      WU 09/26/69      DECK 09/26/69
J587A 1*CALL NAME: POLY(XPAGE,YPAGE,SLEN,SN,ANGLE)
J587A 2*PURPOSE: TO DRAW EQUILATERAL POLYGONS.
J587A 3*STORAGE: 171 (OCTAL) WORDS.
J587A 4*ROUTINES CALLED: COS(B106A), SIN(B106A), PLTZ(J549A).

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J588A A*          R. M. FRANK          C-4          69
J588A B*DRAWS RECTANGLES ON THE CALCOMP
J588A C#F4          SR6600      SCP 3.1      CALCOMP
J588A D*          SW 2      LS 1      TYPE 1
J588A E*SOURCE CARDS          20      BCD      OBJECT CARDS          9      BIN
J588A F**PLOT*CALCOMP
J588A G*CARDS          F4      COMPAT      WU 09/26/69      DECK 09/26/69
J588A 1*CALL NAME: CALL RECT(XPAGE,YPAGE,HEIGHT,WIDTH,ANGLE,IPEN)
J588A 2*PURPOSE: TO DRAW RECTANGLES.
J588A 3*STORAGE: 113 (OCTAL) WORDS.
J588A 4*ROUTINES CALLED: COS(B106A), SIN(B106A), PLTZ(J549A).

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J589A A*          R. M. FRANK          C-4          69
J589A B*THIS IS A PRIVATE SUBROUTINE FOR FIT(J585A).
J589A C#F4          SR6600      SCP 3.1      CALCOMP
J589A D*          SW 1      LS 1      TYPE 1
J589A E*SOURCE CARDS          38      BCD      OBJECT CARDS          12      BIN
J589A F**CALCOMP*PLOT
J589A G*CARDS          F4      COMPAT      WU 09/26/69      DECK 09/26/69

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J590A A* R M FRANK C-4 70
 J590A B*THREE-D PLOT PROGRAM FOR 4020
 J590A C*F4 SR6600 SCP 3.1
 J590A D* SW 3 LS 3 TYPE 1
 J590A E*SOURCE CARDS 128 BCD OBJECT CARDS 65 BIN
 J590A F**THREE-D*PLOT*4020
 J590A G*CARDS F4 COMPAT WU 01/20/70 DECK 01/20/70
 J590A 1*CALL NAME: CART3D(X,Y,NX,NY,F,NF,FO,THX,THY,SO,U,V,TITLE,
 J590A 2*NTITLE)
 J590A 3*PURPOSE: MAKE AN ISOMETRIC 3-DIMENSIONAL PLOT OF F VS X,Y
 J590A 4*ON THE 4020
 J590A 5*STORAGE: 1,514 (OCTAL) WORDS.
 J590A 6*ROUTINES CALLED: ATAN2(B104A), CDG(B106A), SDG(B106A),
 J590A 7*MAXV(F115A),MINV(F115A),MAXM(F116A),MINM(F116A),ADV(J506A),
 J590A 8*EXH(J507A),EXL(J507A),CONVRT(J526A),PLOJB(J562A),DLCH(J567A),
 J590A 9*DLCV(J567A).

J591A A* K. J. MELENDEZ C-4 70
 J591A B*FILM EDIT
 J591A C*F4 SR6600 SCP 3.1
 J591A D* SW 3 LS 3 TYPE 1
 J591A E*SOURCE CARDS 112 BCD OBJECT CARDS 33 BIN
 J591A F**FILM*EDIT
 J591A G*CARDS F4 COMPAT WU 06/23/70 DECK 06/23/70
 J591A 1*USE: CALL EDITFF(IFLG,JMAX,IN,OUT,NFRM).
 J591A 2*PURPOSE: TO EDIT A FILM FILE IN TERMS OF FRAMES.
 J591A 3*STORAGE: 3323 (OCTAL) WORDS.
 J591A 4*ROUTINES CALLED: SHIFN(M401A).

J592A A* MELVIN L. PRUEITT TD-4 R. FRANK 71
 J592A B*PICTURE-PERSPECTIVE PLOTS, HIDDEN LINES REMOVED, COLOR
 J592A C*F4 CMP SR6600 SCP 3.1 FILM
 J592A D* SW 8 LS 19 TYPE 1
 J592A E*F4 SOURCE CARDS 912 BCD OBJECT CARDS 212 BIN
 J592A F**PICTURE*PERSPECTIVE*PLOTS*3D PLOTS*HIDDEN*LINE*REMOVAL*COLOR
 J592A G*CARDS F4 COMPAT WU 02/16/73REV.1 DECK 02/16/73REV.1
 J592A 1*FORM: CALL PICTURE (F,X,Y,NX,NY,NXD,XW,YW,XVIEW,YVIEW,
 J592A 2* ZVIEW,BA,RF,SC,LHIDE,LBOX,LINE,CLR)
 J592A 3*PURPOSE: PRODUCE 3-D PLOTS IN PERSPECTIVE WITH HIDDEN
 J592A 4* LINES OPTIONALLY REMOVED AND WITH THE OPTION TO
 J592A 5* PRODUCE COLOR PLOTS.
 J592A 6*ROUTINE NAME: PICTURE
 J592A 7*ENTRY NAMES: PICTURE
 J592A 8*STORAGE: 5516 OCTAL WORDS
 J592A 9*ROUTINES CALLED: ATAN2(B104A), COS(B106A), SIN(B106A),
 J592A 10* ADV(J506A), TSP(J520A), CONVRT(J526A), DGA(J528A),
 J592A 11* PLOT(J541A), WLCH(J542A), COLOR(J569A), ACGOER(SYSTEM),
 J592A 12* OUTPTS(SYSTEM).
 J592A 13*OTHER EXTERNALS: INSECT

J592B A* MELVIN L. PRUEITT TD-4 R. FRANK 73
 J592B B*PICTURE-PERSPECTIVE PLOTS, HIDDEN LINES REMOVED, COLOR
 J592B C*F4 CMP SR7600 CROS FILM
 J592B D* SW 8 LS 19 TYPE 1
 J592B E*F4 SOURCE CARDS 912 BCD OBJECT CARDS 213 BIN
 J592B F**PICTURE*PERSPECTIVE*PLOTS*3D PLOTS*HIDDEN*LINE*REMOVAL*COLOR
 J592B G*ON DISK F4 COMPAT WU 02/16/73 DECK 02/16/73
 J592B 1*FORM: CALL PICTURE (F,X,Y,NX,NY,NXD,XW,YW,XVIEW,YVIEW,
 J592B 2* ZVIEW,BA,RF,SC,LHIDE,LBOX,LINE,CLR)
 J592B 3*PURPOSE: PRODUCE 3-D PLOTS IN PERSPECTIVE WITH HIDDEN
 J592B 4* LINES OPTIONALLY REMOVED AND WITH THE OPTION TO
 J592B 5* PRODUCE COLOR PLOTS.
 J592B 6*ROUTINE NAME: PICTURE
 J592B 7*ENTRY NAMES: PICTURE
 J592B 8*STORAGE: 5551 OCTAL WORDS
 J592B 9*ROUTINES CALLED: ATAN2(B104B), COS(B106B), SIN(B106B),
 J592B 10* ADV(J506B), TSP(J520B), CONVRT(J526B), DGA(J528B),
 J592B 11* PLOT(J541B), WLCH(J542B), COLOR(J569B), ACGOER(SYSTEM),
 J592B 12* OUTPTS(SYSTEM).
 J592B 13*OTHER EXTERNALS: INSECT

J593A A* JERRY MELENDEZ C-4 71
 J593A B*WRITE FILM HEADER
 J593A C*CMP SR6600 SCP 3.1
 J593A D* SW 2 LS 6 TYPE 1
 J593A E*CMP SOURCE CARDS 272 BCD OBJECT CARDS 18 BIN
 J593A F**WRITE*FILM*HEADER
 J593A G*CARDS F4 COMPAT WU 06/17/71 DECK 06/17/71
 J593A 1*FORM: CALL WFH(N,STRING)
 J593A 2*ARGUMENTS: N = NUMBER OF WORDS IN THE ARRAY STRING
 J593A 3* STRING= ARRAY CONTAINING N WORDS OF DISPLAY CODE CHARS.
 J593A 4*PURPOSE: THE N WORDS OF DISPLAY CODE CHARACTERS IN STRING
 J593A 5* ARE WRITTEN AS N FRAMES ON FILM USING \$ SIGNS
 J593A 6*STORAGE: 300 OCTAL WORDS.
 J593A 7* TIMING: 21 MS PER WORD.
 J593A 8*EXTERNALS: BS4020(SYSTEM).

J594A A* JOHN SAVAGE ENG-6 71
 J594A B*XHATCH TO HATCH RECTANGULAR AREAS ON FILM.
 J594A C*F4 SR6600 SCP 3.1SC-4020
 J594A D* SW 2 LS 2 TYPE 1
 J594A E*F4 SOURCE CARDS 45 BCD OBJECT CARDS 15 BIN
 J594A F**XHATCH*VECTOR*GENERATOR FOR*HATCHING*FILM
 J594A G*CARDS F4 COMPAT WU 06/08/71 DECK 06/08/71
 J594A 1*FORM: CALL XHATCH(IX1,IY1,IX2,IY2,INC)
 J594A 2*PURPOSE: FILL A SPECIFIED RECTANGULAR AREA ON A FILM PLOT
 J594A 3* WITH SLOPING PARALLEL VECTORS. VECTOR SLOPE AND
 J594A 4* SPACING CAN BE SPECIFIED.
 J594A 5*TIMING: CP TIME USED BY DEMONSTRATION PROGRAM CALLING THIS
 J594A 6* SUBROUTINE TO CROSSHATCH 30 RECTANGLES WITH VARIOUS
 J594A 7* PATTERNS: 2.384 SECONDS ON 6600, 2.750 SECONDS ON
 J594A 8* 7600.
 J594A 9*ROUTINE NAME: XHATCH
 J594A 10*ENTRY NAME: XHATCH
 J594A 11*STORAGE: 236 (OCTAL) WORDS.
 J594A 12*ROUTINES CALLED: DRV(J517A).

J594B A* JOHN SAVAGE ENG-6 71
 J594B B*XHATCH TO HATCH RECTANGULAR AREAS ON FILM.
 J594B C*F4 SR7600 CROS SC-4020
 J594B D* SW 2 LS 2 TYPE 1
 J594B E*F4 SOURCE CARDS 45 RCD OBJECT CARDS 15 BIN
 J594B F**XHATCH*VECTOR*GENERATOR FOR*HATCHING*FILM
 J594B G*ON DISK F4 COMPAT WU 06/08/71 DECK 06/08/71
 J594B 1*FORM: CALL XHATCH(IX1,IY1,IX2,IY2,INC)
 J594B 2*PURPOSE: FILL A SPECIFIED RECTANGULAR AREA ON A FILM PLOT
 J594B 3* WITH SLOPING PARALLEL VECTORS. VECTOR SLOPE AND
 J594B 4* SPACING CAN BE SPECIFIED.
 J594B 5*TIMING: CP TIME USED BY DEMONSTRATION PROGRAM CALLING THIS
 J594B 6* SUBROUTINE TO CROSSHATCH 30 RECTANGLES WITH VARIOUS
 J594B 7* PATTERNS: 2.384 SECONDS ON 6600, 2.750 SECONDS ON
 J594B 8* 7600.
 J594B 9*ROUTINE NAME: XHATCH
 J594B 10*ENTRY NAME: XHATCH
 J594B 11*STORAGE: 241 OCTAL WORDS
 J594B 12*ROUTINES CALLED: DRV(J517A).

J595B A* JERRY MELENDEZ C-4 71
 J595B B*CHECK NUMBER OF WORDS IN THE PLOT FILESET
 J595B C*CMP SR7600 CROS
 J595B D* SW 2 LS 0 TYPE 1
 J595B E*CMP SOURCE CARDS 0 RCD OBJECT CARDS 0 BIN
 J595B F**CHECK*NUMBER OF WORDS IN*PLOT*FILESET
 J595B G*ON DISK F4 COMPAT WU 08/04/71 DECK NONE
 J595B 1*FORM: CALL FILMCK(N)
 J595B 2*PURPOSE: CHECK THE NUMBER OF WORDS WRITTEN ON THE PLOT
 J595B 3* FILESET AND RELEASE THE DATA IF THE PLOT FILESET
 J595B 4* CONTAINS MORE THAN N WORDS OF DATA.
 J595B 5*ROUTINE NAME: FILMCK
 J595B 6*ENTRY NAME: FILMCK
 J595B 7*STORAGE: 34 OCTAL WORDS OF SCM
 J595B 8*ROUTINES CALLED: DATAREL(W105B), RQTA (BS4020), BS4020
 J595B 9* (ALL ON THE SYSTEM).

J596A A* V. GARDINER C-4 72
 J596A B*FILM PLOT ON NORMAL PROBABILITY PAPER
 J596A C*F4 SR6600 SCP 3.1
 J596A D* SW 6 LS 5 TYPE 1
 J596A E*F4 SOURCE CARDS 178 RCD OBJECT CARDS 56 BIN
 J596A F**FILM*PLOT*NORMAL PROBABILITY PAPER
 J596A G*CARDS F4 COMPAT WU 06/01/72 DECK 06/01/72
 J596A 1*FORM: CALL PLOPR(X,Y,NPTS,INC,LIN,NSYM,C,XAA,YAA,
 J596A 2* LABELZ,NZL,LABELX,NXL,LABELY,NYL)
 J596A 3*PURPOSE: PLOTS VALUES OF X,Y TABLES ON FILM USING THE
 J596A 4* FORMAT OF NORMAL PROBABILITY PAPER WITH LABELLING OF
 J596A 5* AXES AND TITLE.
 J596A 6*ROUTINE NAME: PLOPR
 J596A 7*ENTRY NAME: PLOPR
 J596A 8*STORAGE: 1216 OCTAL WORDS.
 J596A 9*ROUTINES CALLED: ADV(J506A), ALOG10(B305A), ASCL(J510A),
 J596A 10* CONVRT(J526A), DGA(J528A), DLCH(J567A), DLCV(J567A),
 J596A 11* DLGLG(J530A), DLGLN(J530A), DLNLG(J530A), DLNLN(J529A),
 J596A 12* DRV(J517A), EXH(J507A), EXL(J507A), FRAME(J523A),
 J596A 13* GXA(J518A), GYA(J518A), MAXV(F115A), MINV(F115A),
 J596A 14* PLT(J516A), SBLIN(J535A), SBLOG(J540A), SLLIN(J533A),
 J596A 15* SLLOG(J540A), TSP(J520A), ALL ON DISK.

J596B A* V. GARDINER C-4 72
 J596B B*FILM PLOT ON NORMAL PROBABILITY PAPER
 J596B C*F4 SR7600 CROS
 J596B D* SW 1 LS 5 TYPE 1
 J596B E*F4 SOURCE CARDS 178 RCD OBJECT CARDS 56 BIN
 J596B F**FILM*PLOT*NORMAL PROBABILITY PAPER
 J596B G*ON DISK F4 COMPAT WU 06/01/72 DECK 06/01/72
 J596B 1*FORM: CALL PLOPR(X,Y,NPTS,INC,LIN,NSYM,C,XAA,YAA,LABELZ,
 J596B 2* NZL,LABELX,NXL,LABELY,NYL)
 J596B 3*PURPOSE: PLOTS VALUES OF X,Y TABLES ON FILM USING THE
 J596B 4* FORMAT OF NORMAL PROBABILITY PAPER WITH LABELLING OF
 J596B 5* AXES AND TITLE. FOR FURTHER DETAILS SEE WRITEUP FOR
 J596B 6* PLOPR(J596A).
 J596B 7*ROUTINE NAME: PLOPR
 J596B 8*ENTRY NAME: PLOPR
 J596B 9*STORAGE: 1227 OCTAL WORDS
 J596B 10*ROUTINES CALLED: ADV(J506B), ALOG10(B305B), ASCL(J510B),
 J596B 11* CONVRT(J526B), DGA(J528B), DLCH(J567B), DLCV(J567B),
 J596B 12* DLGLG(J530B), DLGLN(J530B), DLNLG(J530B), DLNLN(J529B),
 J596B 13* DRV(J517B), EXH(J507B), EXL(J507B), FRAME(J523B),
 J596B 14* GXA(J518B), GYA(J518B), MAXV(F115B), MINV(F115B),
 J596B 15* PLT(J516B), SBLIN(J535B), SBLOG(J540B), SLLIN(J533B),
 J596B 16* SLLOG(J540B), TSP(J520B), ALL ON DISK.

J597A A* ALAN MARSHALL C-4 72
 J597A B*CONTOUR PLOTTING OF ARBITRARILY SPACED DATA POINTS
 J597A C*F4 SR6600 SCP 3.1
 J597A D* SW 4 LS 12 TYPE 1
 J597A E*F4 SOURCE CARDS 376 BCD OBJECT CARDS 123 BIN
 J597A F**CONTOUR*PLOTTING OF ARBITRARILY SPACED*DATA*POINTS
 J597A G*CARDS F4 COMPAT WU 04/12/72 DECK 04/12/72
 J597A 1*FORM: CALL RXPLOT(X,Y,Z,N,NC,CONVAL,DMPX,DMPY,C,ITITLE,
 J597A 2* NTITLE,XLABEL,NXLABEL,YLABEL,NYLABEL,M)
 J597A 3*PURPOSE: PRODUCE CONTOUR PLOTS ON FILM OF THE FUNCTION
 J597A 4* $Z = F(X,Y)$, WHERE THE (X,Y) PAIRS ARE PERMITTED
 J597A 5* TO BE IRREGULARLY SPACED.
 J597A 6*RESTRICTION: IN THE PRESENT VERSION OF THE CODE THE USER
 J597A 7* IS REQUIRED TO SCALE THE X,Y VALUES TO THE SAME ORDER
 J597A 8* OF MAGNITUDE.
 J597A 9*ROUTINE NAME: RXPLOT
 J597A 10*ENTRY NAMES: RXPLOT,NGONS,IFNGH,PBISEQ,LSTUP
 J597A 11*LABELLED COMMON: PRLK01, TRBLK
 J597A 12*STORAGE: 3775 OCTAL WORDS (EXCLUSIVE OF STORAGE WHICH MUST
 J597A 13* BE ASSIGNED BY USER)
 J597A 14*ROUTINES CALLED: MINV(F115A), MAXV(F115A), PLOJB(J562A),
 J597A 15* ATAN(B104A), SQRT(B408A).

J597B A* ALAN MARSHALL C-4 72
 J597B B*CONTOUR PLOTTING OF ARBITRARILY SPACED DATA POINTS
 J597B C*F4 SR7600 CROS
 J597B D* SW 1 LS 12 TYPE 1
 J597B E*F4 SOURCE CARDS 376 BCD OBJECT CARDS 125 BIN
 J597B F**CONTOUR*PLOTTING OF ARBITRARILY SPACED*DATA*POINTS
 J597B G*ON DISK F4 COMPAT WU 04/12/72 DECK 04/12/72
 J597B 1*FORM: CALL RXPLOT(X,Y,Z,N,NC,CONVAL,DMPX,DMPY,C,ITITLE,
 J597B 2* NTITLE,XLABEL,NXLABEL,YLABEL,NYLABEL,M)
 J597B 3*PURPOSE: PRODUCE CONTOUR PLOTS ON FILM OF THE FUNCTION
 J597B 4* $Z = F(X,Y)$, WHERE THE (X,Y) PAIRS ARE PERMITTED
 J597B 5* TO BE IRREGULARLY SPACED.
 J597B 6*FOR FURTHER DETAILS SEE WRITEUP FOR RXPLOT(J597A).
 J597B 7*STORAGE: 3775 OCTAL WORDS (EXCLUSIVE OF STORAGE WHICH MUST
 J597B 8* BE ASSIGNED BY USER)
 J597B 9*ROUTINES CALLED: MINV(F115B), MAXV(F115B), PLOJB(J562B),
 J597B 10* ATAN(B104B), SQRT(B408B).

J598A A* V GARDINER C-4 R MITCHELL T-6 73
 J598A B*PHISTF, HISTOGRAM PLOT ROUTINE
 J598A C*F4 SR6600 SCp 3.1 MICROFILM
 J598A D* SW 7 LS 2 TYPE 1
 J598A E*SOURCE CARDS 69 RCD OBJECT CARDS 27 BIN
 J598A F**HISTOGRAM*PLOT ROUTINE
 J598A G*CARDS F4 COMPAT WU 02/08/73 DECK 02/08/73
 J598A 1*FORM: CALL PHISTF(X,Y,NPTS,INC,YB,YT,NYSM,XINC,XAA,YAA,
 J598A 2* LBLZ,NZ,LBLX,NX,LBLY,NY)
 J598A 3*PURPOSE: PLOT VERTICAL HISTOGRAMS ON FILM.
 J598A 4*ROUTINE NAME: PHISTF
 J598A 5*ENTRY NAME: PHISTF
 J598A 6*STORAGE: 514 OCTAL WORDS
 J598A 7*ROUTINES CALLED: PLOTM(J599A)

J598B A* V GARDINER C-4 R MITCHELL T-6 73
 J598B B*PHISTF, HISTOGRAM PLOT ROUTINE
 J598B C*F4 SR7600 CROS MICROFILM
 J598B D* SW 7 LS 2 TYPE 1
 J598B E*SOURCE CARDS 69 RCD OBJECT CARDS 28 BIN
 J598B F**HISTOGRAM*PLOT ROUTINE
 J598B G*ON DISK F4 COMPAT WU 02/08/73 DECK 02/08/73
 J598B 1*FORM: CALL PHISTF(X,Y,NPTS,INC,YB,YT,NYSM,XINC,XAA,YAA,
 J598B 2* LBLZ,NZ,LBLX,NX,LBLY,NY)
 J598B 3*PURPOSE: PLOT VERTICAL HISTOGRAMS ON FILM.
 J598B 4*ROUTINE NAME: PHISTF
 J598B 5*ENTRY NAME: PHISTF
 J598B 6*STORAGE: 524 OCTAL WORDS
 J598B 7*ROUTINES CALLED: PLOTM(J599B)

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J599A  A*          V.GARDINER          C-4          R FRANK          73
J599A  B*STANDARDIZED PLOT ON FILM WITH TIC MARKS
J599A  C*F4          SR6600          SCP 3.1
J599A  D*          SW 6          LS 3          TYPE 1
J599A  E*SOURCE CARDS          118 BCD          OBJECT CARDS          43          BIN
J599A  F**FILM*PLOT
J599A  G*CARDS          F4 COMPAT          WU 02/08/73          DECK 02/08/73
J599A  1*FORM: CALL PLOTM(X,Y,NPTS,INC,LIN,NSYM,C,XAA,YAA,
J599A  2*          LABELZ,NZL,LABELX,NXL,LABELY,NYL)
J599A  3*PURPOSE: PLOTS VALUES OF X,Y TABLE ON FILM WITH LABELLING
J599A  4* OF AXES AND TITLE AND WITH TIC MARKS.
J599A  5*ROUTINE NAME: PLOTM
J599A  6*ENTRY NAME: PLOTM
J599A  7*STORAGE: 1021 (OCTAL) WORDS
J599A  8*ROUTINES CALLED: MAXV(F115A), MINV(F115A), ADV(J506A),
J599A  9*  ASCL(J510A), PLT(J516A), DRV(J517A), TSP(J520A),
J599A  10* TSPV(J522A), FRAME(J523A), CONVRT(J526A),
J599A  11* SLLIN(J533A), SRLIN(J535A), SBLOG(J540A), SLLOG(J540A),
J599A  12* DLCH(J567A), DGA(J528A). ALL ON DISK.
J599A  13* DLGLGTM(J602A), DLGLNTM(J602A), DLNLGTM(J602A),
J599A  14* DLNLNTM(J601A). ALL ON CARDS

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J599B  A*          V.GARDINER          C-4          R FRANK          73
J599B  B*STANDARDIZED PLOT ON FILM WITH TIC MARKS
J599B  C*F4          SR7600          CROS
J599B  D*          SW 6          LS 3          TYPE 1
J599B  E*SOURCE CARDS          118 BCD          OBJECT CARDS          43          BIN
J599B  F**FILM*PLOT
J599B  G*ON DISK          F4 COMPAT          WU 02/08/73          DECK 02/08/73
J599B  1*FORM: CALL PLOTM(X,Y,NPTS,INC,LIN,NSYM,C,XAA,YAA,
J599B  2*          LABELZ,NZL,LABELX,NXL,LABELY,NYL)
J599B  3*PURPOSE: PLOTS VALUES OF X,Y TABLE ON FILM WITH LABELLING
J599B  4* OF AXES AND TITLE AND WITH TIC MARKS.
J599B  5*ROUTINE NAME: PLOTM
J599B  6*ENTRY NAME: PLOTM
J599B  7*STORAGE: 1030 (OCTAL) WORDS
J599B  8*ROUTINES CALLED: MAXV(F115B), MINV(F115B), ADV(J506B),
J599B  9*  ASCL(J510B), PLT(J516B), DRV(J517B), TSP(J520B),
J599B  10* TSPV(J522B), FRAME(J523B), CONVRT(J526B),
J599B  11* SLLIN(J533B), SRLIN(J535B), SBLOG(J540B), SLLOG(J540B),
J599B  12* DLCH(J567B), DGA(J528B). DLNLNTM(J601B).
J599B  13* DLGLGTM(J602B), DLGLNTM(J602B), DLNLGTM(J602B),
J599B  14* ALL ON DISK.

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J5AA A* R. L. ELLIOT TD-5 R.FRANK 72
 J5AA B*M2C - THE MAGEE MOVIE CODE
 J5AA C*F4 CMP MP7600 CROS REQUIRES MICROFILM
 J5AA D* SW 48 LS 0 TYPE 2
 J5AA E* NO CARDS
 J5AA F**M2C*MAGEE*MOVIE
 J5AA G* PERMFILE WU 02/12/73REV.2 DECK NONE
 J5AA 1*FORM: MAIN PROGRAM
 J5AA 2*PURPOSE: MAKE MOVIES FROM DATA GIVEN ON TAPE. SEE PAGE 4
 J5AA 3* OF WRITEUP FOR OTHER USES.

J5AB A* R. M. FRANK C-4 73
 J5AB B*CONVERT CALCOMP FILE TO MUX FREE FILE
 J5AB C*F4 MP6600 SCP 3.1
 J5AB D* SW 1 LS 4 TYPE 2
 J5AB E* SOURCE 114 CARDS OBJECT 34 CARDS
 J5AB F**CALCOMP*MUX
 J5AB G*CARDS F4 COMPAT WU 07/05/73 DECK 07/05/73
 J5AB 1*FORM: MAIN PROGRAM
 J5AB 2*PURPOSE: READ CALTAPE FILE WHICH CONTAINS CALCOMP
 J5AB 3* INSTRUCTIONS AND CREATE MUXTAPE FILE WHICH CONTAINS
 J5AB 4* ON-LINE CALCOMP INSTRUCTIONS.
 J5AB 5* CALTAPE MUST BE REWOUND BEFORE ENTERING THIS
 J5AB 6* PROGRAM. CALTAPE AND MUXTAPE FILENAMES MAY BE CHANGED
 J5AB 7* BY USING THE FILENAME REPLACEMENT FEATURE OF THE LOADER.
 J5AB 8* THE STORAGE AVAILABLE FOR CREATING BUFFER SPACE FOR
 J5AB 9* MUXTAPE IS CALCULATED BY THE PROGRAM. STORAGE MAY BE
 J5AB 10* INCREASED BY INCREASING THE FIELD LENGTH ON THE JOB CARD
 J5AB 11* AND USING SC=* TO PREVENT AUTOMATIC FIELD LENGTH
 J5AB 12* REDUCTION BY THE SYSTEM.
 J5AB 13*PROGRAM CARD: PROGRAM CALCVT (CALTAPE=100,MUXTAPE=100,
 J5AB 14* OUTPUT)
 J5AB 15*ROUTINE NAME: CALCVT
 J5AB 16*ENTRY NAME: CALCVT
 J5AB 17*STORAGE: AT LEAST 14300 OCTAL WORDS
 J5AB 18*ROUTINES CALLED: PUT/FETCH(M403),CPAREA(Q401),
 J5AB 19* LOCF(SYSTEM),LENGTH(SYSTEM)

J6 GRAPHICS (CONT#D)

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J601A A*          V. GARDINER      C-4          R FRANK          73
J601A B*DRAW LINEAR-LINEAR TIC MARKS ON FILM.
J601A C*F4          SR6600      SCP 3.1
J601A D*          SW 1          LS 1          TYPE 1.1
J601A E*SOURCE CARDS      29      BCD      OBJECT CARDS      12      BIN
J601A F**FILM*TIC MARKS
J601A G*CARDS      F4 COMPAT      WU 05/08/73 REV.1 DECK 05/08/73 REV.1
J601A 1*FORM: CALL DLNLNTM (NX,NY)
J601A 2*PURPOSE: DLNLNTM DRAWS A FRAME AROUND THE AREA SPECIFIED
J601A 3*          IN THE LAST CALL TO DGA(J528). IT DRAWS A
J601A 4*          LINEAR-LINEAR GRID OF TIC MARKS, DIVIDING THE
J601A 5*          FRAME INTO A SPECIFIED NUMBER OF INTERVALS.
J601A 6*          NX = NUMBER OF INTERVALS IN WHICH THE X AXIS
J601A 7*          IS DIVIDED, NX.GT.0.
J601A 8*          NY = NUMBER OF INTERVALS IN WHICH THE Y AXIS
J601A 9*          IS DIVIDED, NY.GT.0.
J601A 10*ROUTINE NAME: DLNLNTM
J601A 11*ENTRY NAME: DLNLNTM
J601A 12*STORAGE: 152 OCTAL WORDS
J601A 13*ROUTINES CALLED: GX(A(J518A), GYA(J518A), DRV(J517A),
J601A 14*          NAME COMMON CJE07(10 OCTAL WORDS).

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J601B A*          V. GARDINER      C-4          R FRANK          73
J601B B*DRAW LINEAR-LINEAR TIC MARKS ON FILM.
J601B C*F4          SR7600      CROS
J601B D*          SW 1          LS 1          TYPE 1.1
J601B E*SOURCE CARDS      29      BCD      OBJECT CARDS      11      BIN
J601B F**FILM*TIC MARKS
J601B G*DISK      F4 COMPAT      WU 05/08/73 REV.1 DECK 05/08/73 REV.1
J601B 1*FORM: CALL DLNLNTM (NX,NY)
J601B 2*PURPOSE: DLNLNTM DRAWS A FRAME AROUND THE AREA SPECIFIED
J601B 3*          IN THE LAST CALL TO DGA(J528). IT DRAWS A
J601B 4*          LINEAR-LINEAR GRID OF TIC MARKS, DIVIDING THE
J601B 5*          FRAME INTO A SPECIFIED NUMBER OF INTERVALS.
J601B 6*          NX = NUMBER OF INTERVALS IN WHICH THE X AXIS
J601B 7*          IS DIVIDED, NX.GT.0.
J601B 8*          NY = NUMBER OF INTERVALS IN WHICH THE Y AXIS
J601B 9*          IS DIVIDED, NY.GT.0.
J601B 10*ROUTINE NAME: DLNLNTM
J601B 11*ENTRY NAME: DLNLNTM
J601B 12*STORAGE: 152 OCTAL WORDS
J601B 13*ROUTINES CALLED: GX(A(J518B), GYA(J518B), DRV(J517B),
J601B 14*          NAME COMMON CJE07(10 OCTAL WORDS).

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J602A  A*           V. GARDINER           C-4           R FRANK           73
J602A  B*DRAW LINEAR AND LOG TIC MARKS ON FILM
J602A  C*F4           SR6600           SCP 3.1
J602A  D*           SW 2           LS 3           TYPE 1.1
J602A  E*SOURCE CARDS           99           OBJECT CARDS           30           BIN
J602A  F**FILM*TIC MARKS
J602A  G*CARDS           F4 COMPAT WU 05/08/73 REV.1 DECK 05/08/73 REV.1
J602A  1*FORM: CALL DLNLGTM(NX)           LINEAR X, LOG Y
J602A  2*           CALL DLGLNTM(NY)           LOG X, LINEAR Y
J602A  3*           CALL DLGLGTM           LOG X, LOG Y
J602A  4*PURPOSE: DRAW GRID OF TIC MARKS, AS DETERMINED BY
J602A  5*           DGA(J528). A LOG AXIS IS LIMITED TO 25 DECADES.
J602A  6*           A LINEAR GRID DIVIDES THE AXIS INTO NX OR NY INTERVALS.
J602A  7*ROUTINE NAME: DLNLGTM
J602A  8*ENTRY NAMES: DLNLGTM, DLGLNTM, DLGLGTM
J602A  9*STORAGE: 524 (OCTAL) WORDS
J602A  10*ROUTINES CALLED: GXA(J518A), GYA(J518A), DLNLNTM(J601A),
J602A  11*           DRV(J517A), NAME COMMON CJE07(10 OCTAL WORDS).

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J602B  A*           V. GARDINER           C-4           R FRANK           73
J602B  B*DRAW LINEAR AND LOG TIC MARKS ON FILM
J602B  C*F4           SR7600           CROS
J602B  D*           SW 2           LS 3           TYPE 1
J602B  E*SOURCE CARDS           99           OBJECT CARDS           30           BIN
J602B  F**FILM*TIC MARKS
J602B  G*DISK           F4 COMPAT WU 05/08/73 REV.1 DECK 05/08/73 REV.1
J602B  1*FORM: CALL DLNLGTM(NX)           LINEAR X, LOG Y
J602B  2*           CALL DLGLNTM(NY)           LOG X, LINEAR Y
J602B  3*           CALL DLGLGTM           LOG X, LOG Y
J602B  4*PURPOSE: DRAW GRID OF TIC MARKS, AS DETERMINED BY
J602B  5*           DGA(J528). A LOG AXIS IS LIMITED TO 25 DECADES.
J602B  6*           A LINEAR GRID DIVIDES THE AXIS INTO NX OR NY INTERVALS.
J602B  7*ROUTINE NAME: DLNLGTM
J602B  8*ENTRY NAMES: DLNLGTM, DLGLNTM, DLGLGTM
J602B  9*STORAGE: 531 (OCTAL) WORDS
J602B  10*ROUTINES CALLED: GXA(J518B), GYA(J518B), DLNLNTM(J601B),
J602B  11*           DRV(J517B), NAME COMMON CJE07(10 OCTAL WORDS).

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J603A A* V. GARDINER C-4 R. FRANK 73
 J603A B*POLAR COORDINATE GRAPH FOR CALCOMP
 J603A C*F-4 SR6600 SCP3.1 CALCOMP
 J603A D* SW 4 LS 4 TYPE 1
 J603A E*SOURCE CARDS 124 BCD OBJECT CARDS 42 BIN
 J603A F**POLAR COORDINATE*GRAPH*CALCOMP
 J603A G*CARDS F4 COMPAT WU 03/01/73 DECK 03/01/73
 J603A 1*FORM: CALL POLCC(N,R,THETA,ICHAR,ICON,
 J603A 2* IGRID,XC,YC,XR,TITLE,NC)
 J603A 3*PURPOSE: DRAW A POLAR COORDINATE GRAPH OF A SET OF
 J603A 4* POINTS ON THE CALCOMP WITH A TITLE.
 J603A 5*ROUTINE NAME: POLCC
 J603A 6*ENTRY NAME: POLCC
 J603A 7*STORAGE: 1032 OCTAL WORDS
 J603A 8*ROUTINES CALLED: PLTZ(J549A),NUMBER(J545A),CIRCL(J581A),
 J603A 9* SYMBOL(J559A),SCALE(J546A),LINE(J548A).

J603B A* V. GARDINER C-4 R. FRANK 73
 J603B B*POLAR COORDINATE GRAPH FOR CALCOMP
 J603B C*F-4 SR7600 CROS CALCOMP
 J603B D* SW 4 LS 3 TYPE 1
 J603B E*SOURCE CARDS 124 BCD OBJECT CARDS 42 BIN
 J603B F**POLAR COORDINATE*GRAPH*CALCOMP
 J603B G*ON DISK F4 COMPAT WU 03/01/73 DECK 03/01/73
 J603B 1*FORM: CALL POLCC(N,R,THETA,ICHAR,ICON,
 J603B 2* IGRID,XC,YC,XR,TITLE,NC)
 J603B 3*PURPOSE: DRAW A POLAR COORDINATE GRAPH OF A SET OF
 J603B 4* POINTS ON THE CALCOMP WITH A TITLE.
 J603B 5*ROUTINE NAME: POLCC
 J603B 6*ENTRY NAME: POLCC
 J603B 7*STORAGE: 1036 OCTAL WORDS
 J603B 8*ROUTINES CALLED: PLTZ(J549B),NUMBER(J545B),CIRCL(J581B),
 J603B 9* SYMBOL(J559B),SCALE(J546B),LINE(J548B).

J604A A* R.M.FRANK C-4 R.M.FRANK 73
 J604A B*DRAW AND SHADE RECTANGLE ON FILM
 J604A C*F4 SR6600 SCP 3.1 MICROFILM
 J604A D* SW 4 LS 3 TYPE 1.1
 J604A E* SOURCE 88 CARDS OBJECT 25 CARDS
 J604A F**MICROFILM*RECTANGLE
 J604A G*CARDS F4 COMPAT WU 06/11/73 DECK 06/11/73
 J604A 1*FORM: CALL BARPLOT (X1,X2,Y1,Y2,SPACING,ANGLE)
 J604A 2*PURPOSE: DRAW SCALED RECTANGLE AND SHADE IT, SCALING
 J604A 3* IS ESTABLISHED BY PRIOR CALL TO PLOJB(J562) OR
 J604A 4* PLOTM(J599).
 J604A 5*ROUTINE NAME: BARPLOT
 J604A 6*ENTRY NAMES: BARPLOT
 J604A 7*STORAGE: 467 OCTAL WORDS
 J604A 8*ROUTINES CALLED: PLOTM(J599)

J604B A* R.M.FRANK C-4 R.M.FRANK 73
 J604B B*DRAW AND SHADE RECTANGLE ON FILM
 J604B C*F4 SR7600 CROS MICROFILM
 J604B D* SW 4 LS 3 TYPE 1.1
 J604B E* SOURCE 88 CARDS OBJECT 25 CARDS
 J604B F**MICROFILM*RECTANGLE
 J604B G*DISK F4 COMPAT WU 06/11/73 DECK 06/11/73
 J604B 1*FORM: CALL BARPLOT (X1,X2,Y1,Y2,SPACING,ANGLE)
 J604B 2*PURPOSE: DRAW SCALED RECTANGLE AND SHADE IT, SCALING
 J604B 3* IS ESTABLISHED BY PRIOR CALL TO PLOJB(J562) OR
 J604B 4* PLOTM(J599).
 J604B 5*ROUTINE NAME: BARPLOT
 J604B 6*ENTRY NAMES: BARPLOT
 J604B 7*STORAGE: 475 OCTAL WORDS
 J604B 8*ROUTINES CALLED: PLOTM(J599)

K

INFORMATION TRANSFER WITH NO PARTICULAR CONVERSION OR
INTERPRETATION OTHER THAN DEVICE-DEPENDENT REQUIREMENTS

K1 DIRECT ACCESS CORE/DISK I/O

REVIEWER: J. MOORE, C-2

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K101B A*          EMILY WILLBANKS  C-2          J. MOORE          71
K101B B*RANR,RANW,RANRE,RANWE - DIRECT ACCESS I/O
K101B C*CMP          SR7600   CROS
K101B D*          SW 2      LS 4      TYPE 1
K101B E*CMP SOURCE CARDS 121 BCD   OBJECT CARDS 8   BIN
K101B F**RANR*RANW*RANRE*RANWE*DIRECT ACCESS*RANDOM*IO
K101B G*ON DISK   F4 COMPAT  WU 10/10/72REV 1 DECK 10/10/72REV 1
K101B 1*FORM:  CALL RANR(N,LCMV,NWORDS,NSECT,IWAIT)
K101B 2*          CALL RANW(N,LCMV,NWORDS,NSECT,IWAIT)
K101B 3*          CALL RANRE(N,NLCM,NWORDS,NSECT,IWAIT)
K101B 4*          CALL RANWE(N,NLCM,NWORDS,NSECT,IWAIT)
K101B 5*PURPOSE: RANR/RANRE READS NWORDS FROM SECTOR NSECT OF FILE-
K101B 6* SET N INTO LCM VARIABLE LCMV OR WORD NLCM. RANW/RANWE
K101B 7* WRITES NWORDS FROM LCMV OR WORD NLCM OF LCM INTO FILESET
K101B 8* N AT SECTOR NSECT. IWAIT IS A WAIT/NOWAIT OPTION. THIS
K101B 9* IS SLOWER THAN IRAN(K102B).
K101B 10*ROUTINE NAME: RANRW
K101B 11*ENTRY NAMES: RANR,RANW,RANRE,RANWE
K101B 12*STORAGE: 52 OCTAL WORDS.
K101B 13*ROUTINES CALLED: GETBA(ON THE SYSTEM).

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K102B A*          EMILY WILLBANKS  C-2          J. MOORE          71
K102B B*IRANR,IRANW,IRANRE,IRANWE - DIRECT ACCESS I/O
K102B C*CMP          SR7600   CROS
K102B D*          SW 2      LS 4      TYPE 1
K102B E*CMP SOURCE CARDS 99 BCD   OBJECT CARDS 7   BIN
K102B F**IRANR*IRANW*IRANRE*IRANWE*DIRECT ACCESS*RANDOM*IO
K102B G*ON DISK   F4 COMPAT  WU 10/10/72REV 1 DECK 10/10/72REV 1
K102B 1*FORM:  I = IRANR(RQT,LCMV,NWORDS,NSECT,FS)
K102B 2*          I = IRANW(RQT,LCMV,NWORDS,NSECT,FS)
K102B 3*          I = IRANRE(RQT,NLCM,NWORDS,NSECT,FS)
K102B 4*          I = IRANWE(RQT,NLCM,NWORDS,NSECT,FS)
K102B 5*PURPOSE: IRANR/IRANRE READS NWORDS FROM SECTOR NSECT OF
K102B 6* FILESET FS WITH RQT INTO LCM VARIABLE LCMV OR WORD NLCM.
K102B 7* IRANW/IRANWE WRITES NWORDS FROM LCMV OR WORD NLCM OF LCM
K102B 8* INTO FILESET FS AT SECTOR NSECT. THIS IS FASTER THAN
K102B 9* RANRW(K101B).
K102B 10*ROUTINE NAME: IRAN
K102B 11*ENTRY NAMES: IRANR,IRANW,IRANRE,IRANWE
K102B 12*STORAGE: 44 OCTAL WORDS
K102B 13*SELF CONTAINED.

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K1-2

K103B *(RANRWE) DELETED FROM LIBRARY-NOW COMBINED WITH K101B.

K104B *(IRANE) DELETED FROM LIBRARY-NOW COMBINED WITH K102B.

K2 ECS/CORE OR CORE/CORE

REVIEWER: J. MOORE, C-2

K201A A* LARA BAKER ENG-DO 69
 K201A B*MOVEMC MOVES AN ARRAY IN MAIN CORE THROUGH ECS
 K201A C*FORTRAN IV SR6600 SCP 3.1
 K201A D* SW 3 LS 1 TYPE 1
 K201A E*SOURCE DECK 25 BCD OBJECT CARDS 10 BIN
 K201A F**ECS*MOVEMC
 K201A G*CARDS F4 COMPAT WU 08/01/69 DECK 08/01/69
 K201A 1*CALL MOVEMC(IFROM, ITO, NWDS, IECS, NECS)
 K201A 2*PURPOSE TO MOVE IN ARRAY FROM ONE LOCATION IN MAIN MEMORY
 K201A 3*TO ANOTHER LOCATION IN MAIN MEMORY.
 K201A 4*TIMING: SEE ATTACHED GRAPH.
 K201A 5*STORAGE: 143 (OCTAL) WORDS.
 K201A 6*USES: ECRD, ECWR(ON THE SYSTEM)

K202A A* LARA BAKER ENG-DO 69
 K202A B*MOVEEC MOVES AN ARRAY IN ECS THROUGH MAIN CORE
 K202A C*FORTRAN IV SR6600 SCP 3.1
 K202A D* SW 2 LS 1 TYPE 1
 K202A E*SOURCE CARDS 20 BCD OBJECT CARDS 9 BIN
 K202A F**ECS*MOVEEC
 K202A G*CARDS F4 COMPAT WU 08/01/69 DECK 08/01/69
 K202A 1*USAGE: CALL MOVEEC (IFROM, ITO, NWDS, IMC, NMC)
 K202A 2*PURPOSE: TO MOVE AN ARRAY FROM ONE LOCATION IN EXTENDED
 K202A 3*CORE STORAGE TO ANOTHER LOCATION ECS.
 K202A 4*TIMING: ABOUT THE SAME AS THAT EXPLAINED FOR MOVEMC, K201A.
 K202A 5*STORAGE: 127(OCTAL) WORDS
 K202A 6*USES ECRD, ECWR(ON THE SYSTEM)

K203A A* LARA BAKER ENG-DO 69
 K203A B*ECR READS ONE WORD FROM ECS
 K203A C*COMPASS SR6600 SCP 3.1
 K203A D* SW 2 LS 1 TYPE 1
 K203A E*SOURCE CARDS 13 BCD OBJECT CARDS 4 BIN
 K203A F**ECS*ECR*READ
 K203A G*CARDS F4 COMPAT WU 08/01/69 DECK 08/01/69
 K203A 1*USAGE: ANS = ECR (LOCE)
 K203A 2*PURPOSE: TO READ ONE WORD FROM EXTENDED CORE STORAGE AND
 K203A 3*RETURN THE CONTENTS OF THAT WORD AS THE RESULT OF THE
 K203A 4*FUNCTION CALL.
 K203A 5*TIMING: 15.0 MICROSECONDS
 K203A 6*STORAGE: 7 WORDS
 K203A 7*SELF CONTAINED.

K203B A* LARA BAKER TD-7 J. MOORE 72
 K203B B*ECR READS ONE WORD FROM ECS
 K203B C*COMPASS SR7600 CROS
 K203B D* SW 2 LS 1 TYPE 1
 K203B E*CMP SOURCE CARDS 22 BCD OBJECT CARDS 4 BIN
 K203B F**ECS*ECR*READ
 K203B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 K203B 1*FORM: ANS = ECR (LOCE)
 K203B 2*PURPOSE: READ ONE WORD FROM EXTENDED CORE STORAGE AND
 K203B 3* RETURN THE CONTENTS OF THAT WORD AS THE RESULT OF THE
 K203B 4* FUNCTION CALL.
 K203B 5*ROUTINE NAME: ECR
 K203B 6*ENTRY NAME: ECR
 K203B 7*STORAGE: 13 OCTAL WORDS.
 K203B 8*ROUTINES CALLED: LIBMSG(SYSTEM).

K204A A* LARA BAKER ENG-DO 69
 K204A B*ECW WRITES ONE WORD TO ECS
 K204A C*COMPASS SR6600 SCP 3.1
 K204A D* SW 2 LS 1 TYPE 1
 K204A E*SOURCE CARDS 11 BCD OBJECT CARDS 3 BIN
 K204A F**ECS*ECW*WRITE
 K204A G*CARDS F4 COMPAT WU 08/01/69 DECK 08/01/69
 K204A 1*USAGE: CALL ECW (MCAD, LOCE)
 K204A 2*PURPOSE: TO WRITE ONE WORD INTO EXTENDED CORE STORAGE
 K204A 3*FROM MAIN CORE.
 K204A 4*TIMING: 12.6 MICROSECONDS
 K204A 5*STORAGE: 5 WORDS
 K204A 6*SELF CONTAINED.

K204B A* LARA BAKER TD-7 J. MOORE 72
 K204B B*ECW WRITES ONE WORD TO ECS
 K204B C*COMPASS SR7600 CROS
 K204B D* SW 2 LS 1 TYPE 1
 K204B E*CMP SOURCE CARDS 19 BCD OBJECT CARDS 4 BIN
 K204B F**ECS*ECW*WRITE
 K204B G*ON DISK F4 COMPAT WU 10/12/72 DECK 10/12/72
 K204B 1*FORM: CALL ECW(MCAD,LDCE)
 K204B 2*PURPOSE: WRITE ONE WORD INTO EXTENDED CORE STORAGE
 K204B 3* FROM MAIN CORE.
 K204B 4*ROUTINE NAME: ECW
 K204B 5*ENTRY NAME: ECW
 K204B 6*STORAGE: 7 OCTAL WORDS.
 K204B 7*ROUTINES CALLED: LIBMSG(SYSTEM).

K2AA A* D. PLAISTED C-4 J MOORE C-2 72
 K2AA B*QUICK EXCHANGE OF TWO SCM ARRAYS
 K2AA C*COMPASS SR7600 CROS
 K2AA D* SW 2 LS 2 TYPE 2
 K2AA E*SOURCE CARDS 85 BCD OBJECT CARDS 5 BIN
 K2AA F**VECTOR*SCM VECTOR*VECTOR EXCHANGE*QEXCH
 K2AA G*CARDS F4 COMPAT WU 09/18/72 DECK 09/18/72
 K2AA 1*FORM: CALL QEXCH(A,B,N,M,K)
 K2AA 2*PURPOSE: QUICK EXCHANGE OF TWO SCM ARRAYS
 K2AA 3*ROUTINE NAME: QEXCH
 K2AA 4*ENTRY NAME: QEXCH
 K2AA 5*STORAGE: 26 OCTAL WORDS
 K2AA 6*ROUTINES CALLED: SELF CONTAINED

K2AB A* D PLAISTED C-4 J MOORE C-2 72
 K2AB B*QUICK MOVE OF AN ARRAY IN SCM
 K2AB C*COMPASS SR7600 CROS
 K2AB D* SW 2 LS 2 TYPE 2
 K2AB E*SOURCE CARDS 87 BCD OBJECT CARDS 5 BIN
 K2AB F**VECTOR
 K2AB G*CARDS F4 COMPAT WU 09/18/72 DECK 09/18/72
 K2AB 1*FORM: CALL QMOVE(A,B,N,M,K)
 K2AB 2*FUNCTION: QUICK MOVE OF AN ARRAY IN SCM
 K2AB 3*ROUTINE NAME: QMOVE
 K2AB 4*ENTRY NAME: QMOVE
 K2AB 5*STORAGE: 27 OCTAL WORDS
 K2AB 6*ROUTINES CALLED: SELF CONTAINED

K3 SEQUENTIAL I/O

REVIEWER: J. NORRIS, C-2

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K301B A*          EMILY WILLBANKS C-2          71
K301B B*COPY,COPYF,COPYR - COPY PORTIONS OF FILESETS
K301B C*CMP          SR7600 CROS
K301B D*          SW 3      LS 0      TYPE 1
K301B E*          0      BCD          0      BIN
K301B F**COPY*COPYF*COPYR - COPY PORTIONS OF*FILESETS
K301B G*ON DISK      F4 COMPAT WU 07/12/71      DECK NONE
K301B 1*FORM: CALL COPY(I,0)
K301B 2*          CALL COPYF(I,0,NF)
K301B 3*          CALL COPYR(I,0,NR)
K301B 4*PURPOSE: COPY DATA FROM FILESET I TO FILESET 0, STARTING
K301B 5* AT CURRENT FILESET POSITIONS, COPY COPIES TO EOI.
K301B 6* COPYF COPIES NF FILES OR TO EOI. COPYR COPIES NR RECORDS
K301B 7* OR TO EOI.
K301B 8*ROUTINE NAME: COPY
K301B 9*ENTRY NAMES: COPY, COPYF, COPYR
K301B 10*STORAGE: 145B WORDS OF SCM.
K301B 11*ROUTINES CALLED: GETBA, OPEN., WAITR, SYSTEM, ABNORML,
K301B 12* (ALL ON SYSTEM).
K301B 13*OTHER SCM EXTERNALS: IOGEN, BUFF.

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K303B A*          EMILY WILLBANKS C-2          71
K303B B*COPIESF - COPY SHIFTED FILE FOR SINGLE SPACED LISTING
K303B C*FIV          SR7600 CROS
K303B D*          SW 3      LS 0      TYPE 1
K303B E*          0      BCD          0      BIN
K303B F**COPIESF*COPY*SHIFTED FILE
K303B G*ON DISK      F4 COMPAT WU 06/22/71      DECK NONE
K303B 1*FORM: CALL COPIESF(I,0,N,PR)
K303B 2*PURPOSE: COPY N FILES OF FILESET I (CONTAINING BCD CHAR-
K303B 3* ACTERS) TO FILESET 0, INSERTING A BLANK AS THE FIRST CHAR-
K303B 4* ACTER OF EACH RECORD. IF FILESET 0 HAS FILM OR SFILM ACTIVE
K303B 5* DISPOSITION, IT WILL BE WRITTEN IN 4020 COMMAND FORMAT.
K303B 6*ENTRY NAMES: COPIESF
K303B 7*ROUTINE NAME: COPIESF
K303B 8*STORAGE: 261B WORDS.
K303B 9*ROUTINES CALLED: EOI, IFENDF, INPUTC, LENGTH, MARG, OUTPTC,
K303B 10* (ALL ON SYSTEM).

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K306B A* FRED SCHILLING C-2 71
 K306B B*COPYL - UPDATE LIBRARY OF BINARY DECKS
 K306B C*F4 COMPASS SR7600 CROS
 K306B D* SW 14 LS 0 TYPE 1
 K306B E*SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 K306B F**COPYL*UPDATE*LIBRARY OF*BINARy DECKS
 K306B G*ON DISK F4 COMPAT WU 05/10/72REV.1 DECK NONE
 K306B 1*FORM: CALL COPYL(OLDBL,CHANGE,NEWBL,ORDER,OUT,CK)
 K306B 2*PURPOSE: MAINTAIN AND REARRANGE A LIBRARY OF BINARY DECKS.
 K306B 3*TIMING: LARGE LCM BUFFERS ARE NEEDED TO ACHIEVE SPEED.
 K306B 4*ROUTINE NAME: COPYL
 K306B 5*ENTRY NAMES: COPYL, REPLACE, BREAKUP, DFILE, SUM
 K306B 6*STORAGE: 4206 OCTAL WORDS OF SCM, PLUS BLANK COMMON.
 K306B 7*USES ONE WORD OF BLANK COMMON FOR EACH RECORD OF MERGE FILE,
 K306B 8* PLUS ONE WORD FOR EACH DECK NAME IN THE CONTROL CARD LIST
 K306B 9* PLUS TWO.
 K306B 10*ROUTINES CALLED: ABNORMAL, ACGOER, ADDRQT, COPYF, COPYR
 K306B 11* FETCH, IFENDF, MEMLEN, OPEN, OUTPTB, OUTPTC, PUTIT, RDBUF,
 K306B 12* REWIND, SHIFN, SKIPF, SKIPR (ON THE SYSTEM).

K307B A* J. NORRIS C-2 J. NORRIS 72
 K307B B*CKSUM - ADD OR VERIFY CHECKSUMS.
 K307B C*F4 SR7600 CROS
 K307B D* SW 4 LS 0 TYPE 1.2
 K307B E* SOURCE 0 C-2 OBJECT 0 C-2
 K307B F**CKSUM*CHECKSUM
 K307B G*ON DISK F4 COMPAT WU 06/15/73REV.1 DECK NONE
 K307B 1*FORM: CALL CKSUM(IN,OUT,NF,TYPE)
 K307B 2*PURPOSE: CALCULATE AND VERIFY CHECKSUMS
 K307B 3*ROUTINE NAME: CKSUM
 K307B 4*ENTRY NAME: CKSUM
 K307B 5*STORAGE: 1630 OCTAL WORDS SCM AND 10000 OCTAL WORDS OF LCM
 K307B 6*ROUTINES CALLED: RDBUF(Q417B), WTBUF(Q417B), SKIPR(W304B),
 K307B 7* CKSUM2(K310B), LCR0LOT/LCR0LIN(Q306B),
 K307B 8* MEMREQ/MEMREL/MEMLN(Q305B), OPEN(W115B),
 K307B 9* MESSAGE(Q116B), SHIFN(M401B), SYSFS(W116B),
 K307B 10* GETQ(Q414B), ENDFIL, OUTPTB, ABNORML, ACGOER, LAFST
 K307B 11* (ALL ON SYSTEM).

K308B A* EMILY WILLBANKS C-2 J. NORRIS 73
 K308B B*COPYSR-COPY ONE SEQUENTIAL RECORD TO RANDOM FILESET
 K308B C*COMPASS SR7600 CROS
 K308B D* SW 3 LS 0 TYPE 1.2
 K308B E* SOURCE 0 C-2 OBJECT 0 C-2
 K308B F**COPY*RANDOM*SEQUENTIAL
 K308B G*ON DISK F4 COMPAT WU 06/13/73REV.1 DECK NONE
 K308B 1*FORM: CALL COPYSR(IS,OR,SL)
 K308B 2* CALL COPYSR(IS,OR)
 K308B 3*PURPOSE: COPY ONE RECORD FROM SEQUENTIAL FILESET(IS) TO
 K308B 4* RANDOM FILESET(OR). IF SECTOR LIST(SL) IS NOT
 K308B 5* GIVEN, DATA WILL BE WRITTEN BEGINNING AT SECTOR
 K308B 6* ZERO. SECTOR LIST ALLOWS SELECTED SECTORS TO BE
 K308B 7* WRITTEN.
 K308B 8*ROUTINE NAME: COPYSR
 K308B 9* ENTRY NAME: COPYSR
 K308B 10*STORAGE: 230 OCTAL WORDS OF SCM AND UP TO
 K308B 11* 234000 OCTAL WORDS OF LCM.
 K308B 12*ROUTINES CALLED: GETBA, SYSTEM, ABNORML, (ALL ON SYSTEM)
 K308B 13* MEMREL(Q305B), MEMLEN(Q305B), MEMREQ(Q305B),
 K308B 14* LCROLIN(Q306B), COPYBFS(W404B).
 K308B 15*OTHER SCM EXTERNALS: IOGEN(SYSTEM)
 K308B 16*LCM BLOCK NAMES: MALCM, RANSEQ

K309B A* EMILY WILLBANKS C-2 J NORRIS 73
 K309B B*COPYRS - COPY RANDOM FILESET TO ONE SEQUENTIAL RECORD
 K309B C*COMPASS SR7600 CROS
 K309B D* SW 3 LS 0 TYPE 1.2
 K309B E* SOURCE 0 C-2 OBJECT 0 C-2
 K309B F**COPY*RANDOM*SEQUENTIAL
 K309B G*ON DISK F4 COMPAT WU 06/13/73 REV.1 DECK NONE
 K309B 1*FORM: CALL COPYRS(IR,OS,SL)
 K309B 2* CALL COPYRS(IR,OS)
 K309B 3*PURPOSE: COPY SECTORS FROM RANDOM FILESET(IR) TO
 K309B 4* ONE RECORD OF SEQUENTIAL FILESET(OS). IF SECTOR
 K309B 5* LIST(SL) IS NOT GIVEN, ALL RANDOM FILESET WILL
 K309B 6* BE READ. SECTOR LIST ALLOWS SELECTED SECTORS TO
 K309B 7* BE READ.
 K309B 8*ROUTINE NAME: COPYRS
 K309B 9*ENTRY NAME: COPYRS
 K309B 10*STORAGE: 256 (OCTAL) WORDS OF SCM AND UP TO 234000
 K309B 11* (OCTAL) WORDS OF LCM.
 K309B 12*ROUTINES CALLED: GETBA, SYSTEM, ABNORML, (ALL ON SYSTEM)
 K309B 13* MEMREL(Q305B), MEMLEN(Q305B), MEMREQ(Q305B)
 K309B 14* LCROLIN(Q306B), COPYBSF(W404B).
 K309B 15*OTHER EXTERNALS: IOGEN (ON SYSTEM)
 K309B 16*LCM BLOCK NAMES: MALCM, RANSEQ

K310B A* J. NORRIS C-2 J. NORRIS 73
K310B B*CKSUM2 - CALCULATE CHECKSUM OF LCM AREA
K310B C*CMP SR7600 CROS
K310B D* SW 3 LS 0 TYPE 1.2
K310B E*C-2 OLDPL4 NO CARDS
K310B F**CHECKSUM
K310B G*DISK F4 COMPAT WU 06/12/73 DECK NONE
K310B 1*FORM: CALL CKSUM2(BUFFER,LEN,IFLAG)
K310B 2*PURPOSE: FORM CHECKSUM OF LCM AREA.
K310B 3* BUFFER = LCM ARRAY OR INTEGER ADDRESS OF LCM AREA
K310B 4* LEN = LENGTH OF BUFFER
K310B 5* IFLAG = 0 FOR PARTIAL, = 1 FOR COMPLETE CHECKSUM
K310B 6*INITIALIZE WITH EITHER LEN = 0 OR IFLAG = 1
K310B 7*ROUTINE NAME: CKSUM2
K310B 8*ENTRY NAMES: CKSUM2
K310B 9*STORAGE: 24 OCTAL WORDS OF SCM
K310B 10*ROUTINES CALLED: SELF CONTAINED

K4 CONVERT SEQUENTIAL/RANDOM

REVIEWER: J. NORRIS, C-2

K402A A* MARGE ASPREY C-4 69
 K402A B*REORDR-PROGRAM FOR REORDERING ROUTINES ON TAPE FOR OVERLAY
 K402A C*F-4 MP6600 SCP 3.1
 K402A D* SW 2 LS 1 TYPE 1
 K402A E*SOURCE CARDS 55 BCD OBJECT CARDS 17 BIN
 K402A F**REORDR FOR TAPE*OVERLAY*EDIT
 K402A G*CARDS F4 COMPAT WU 12/12/69 DECK 12/12/69
 K402A 1*CALL NAME: REORDR
 K402A 2*PURPOSE: REARRANGES ROUTINES ON CARD IMAGES FROM BCD TAPE66
 K402A 3*AND REWRITES IN DESIRED ORDER ON BCD TAPE67.
 K402A 4*STORAGE: 42000 (OCTAL) WORDS.
 K402A 5*SELF CONTAINED

K403A A* MARGE ASPREY C-4 69
 K403A B*SUBLST-LISTS AND INDEXES ROUTINES FROM BCD TAPE
 K403A C*F4 MP6600 SCP 3.1
 K403A D* SW 2 LS 3 TYPE 1
 K403A E*SOURCE CARDS 143 BCD OBJECT CARDS 43 BIN
 K403A F**SUBLST*LISTS*INDEXES FROM*CATALOG
 K403A G*CARDS F4 COMPAT WU 12/12/69 DECK 12/12/69
 K403A 1*CALL NAME: SUBLST
 K403A 2*PURPOSE: PREPARES A REFERENCE INDEX BY CARD AND PAGE NUMBER
 K403A 3*OF PROGRAMS, SUBROUTINES, FUNCTIONS AND BLOCK DATA FROM BCD
 K403A 4*TAPE66.
 K403A 5*STORAGE: 45000 (OCTAL) WORDS
 K403A 6*SELF CONTAINED

K404A *(ATOFLO) HAS BEEN DELETED-SERVES NO PURPOSE WITHOUT IBM-7094

K5 MAGNETIC TAPE/TAPE, TAPE/CORE, ETC.

REVIEWER: J. NORRIS, C-2

K501A A* B. L. BUZBEE C-4 JAN NORRIS 72
 K501A B*READ(WRITE) A 7094 BINARY TAPE
 K501A C*F4 SR6600 SCP 3.1
 K501A D* SW 1 LS 2 TYPE 1
 K501A E*F4 SOURCE CARDS 32 BCD OBJECT CARDS 24 BIN
 K501A F**READ(WRITE) A 7094 BINARY*TAPE
 K501A G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 K501A 1*FORM: CALL WRIT94(A,NW,NT)
 K501A 2* CALL READ94(A,NW,NT)
 K501A 3*PURPOSE: WRITES BITS 56 THRU 21 OF WORDS A(1) THRU (NW)
 K501A 4* ONTO LOGICAL UNIT NT. READS A MAXIMUM OF NW 36 BIT WORDS
 K501A 5* FROM THE NEXT PHYSICAL RECORD ON UNIT NT. ON RETURN
 K501A 6* IABS(NW) IS THE NUMBER OF 36 BIT WORDS IN THE RECORD
 K501A 7* AND THEY ARE STORED IN BITS 56-21 OF A(I) THRU A(NW).
 K501A 8* NW=0 SIGNALS EOF ENCOUNTERED, NW.LT.0 SIGNALS PARITY
 K501A 9* ERROR.
 K501A 10*ROUTINE NAME: WRIT94
 K501A 11*ENTRY NAMES: WRIT94, READ94
 K501A 12*STORAGE: 246 OCTAL WORDS
 K501A 13*ROUTINES CALLED: SHIFN(M401A), LABRT(N103A).

K502A A* B. L. BUZBEE C-4 JAN NORRIS 72
 K502A B*READ(WRITE) ONE 7094 F4 LOGICAL BINARY RECORD
 K502A C*F4 SR6600 SCP 3.1
 K502A D* SW 2 LS 1 TYPE 1
 K502A E*F4 SOURCE CARDS 18 BCD OBJECT CARDS 12 BIN
 K502A F**READ(WRITE) ONE 7094 F4*LOGICAL BINARY RECORD
 K502A G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 K502A 1*FORM: CALL WR94FBT(A,NW,NT,T)
 K502A 2* CALL RD94FBT(A,NW,NT,T)
 K502A 3*PURPOSE: WR94FBT WRITES BITS 56 THRU 21 OF A(1) THRU A(NW)
 K502A 4* ON UNIT NT AS ONE 7094 F4 LOGICAL BINARY RECORD.
 K502A 5* RD94FBT PERFORMS THE CONVERSE. ON RETURN IABS(NW) IS
 K502A 6* THE NUMBER OF WORDS IN THE RECORD. NW=0 SIGNALS EOF
 K502A 7* ENCOUNTERED, NW.LT.0 SIGNALS PARITY ERROR.
 K502A 8*NOTE: IN BOTH ENTRIES T MUST BE 256 WORDS (60 BITS) OF
 K502A 9* TEMPORARY STORAGE.
 K502A 10*ROUTINE NAME: WR94FBT
 K502A 11*ENTRY NAMES: WR94FBT, RD94FBT
 K502A 12*STORAGE: 129 OCTAL WORDS
 K502A 13*ROUTINES CALLED: SHIFN(M401A)WRIT94FBT AND READ94(K501A).

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K503A A*          JAMES F. BEM      C-4          J. NORRIS      73
K503A B*CRO576 - READ 7600-FORMAT TAPE ON 6600
K503A C*F4-CMP          MP6600
K503A D*              SW 5    LS 0    TYPE 1.2
K503A E*F4-CMP    SOURCE 0    BCD    OBJECT CARDS 0    BIN
K503A F**MAGNETIC TAPE CONVERSION
K503A G*PERMFILE    F4 COMPAT    WU 03/13/73    DECK    NONE
K503A 1*CONTROL CARD FORM:
K503A 2*          ASSIGN AB,CRO576.
K503A 3*          COPY(CRO576,CRO5)
K503A 4*          RETURN(CRO576)
K503A 5*          ASSIGN MT,TAPEIN(PUL,XX.....,SMB)
K503A 6*          ASSIGN MT,TAPEOUT(...)
K503A 7*          CRO5(BIN,TAPEIN,TAPEOUT,OUTPUT)
K503A 8*PURPOSE:  CONVERT 7600-FORMAT TAPE TO 6600-FORMAT TAPE
K503A 9*ROUTINE NAME:  CRO576
K503A 10*STORAGE:  16000 OCTAL WORDS FOR BCD OUTPUT, VARIABLE
K503A 11*          FOR BINARY.  SEE WRITEUP.
K503A 12*SELF CONTAINED

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K5AA  A*          DUANE HARDER     C-4          J NORRIS      70
K5AA  B*TSUB
K5AA  C*COMPASS          MP7600    CRO5
K5AA  D*              SW 2    LS 3    TYPE 2
K5AA  E*SOURCE CARDS.    75    BCD    OBJECT CARDS 9    BIN
K5AA  F**TSUB
K5AA  G*CARDS          CMP          WU 09/28/72    DECK 09/28/72
K5AA  1*FORM:  MAIN PROGRAM
K5AA  2*PURPOSE:  TSUB IS A MAIN PROGRAM WHICH RUNS ON CRO5.  TSUB
K5AA  3*          READS A FILESET CALLED TAPE1 WHICH CONTAINS BCD CODED
K5AA  4*          INFORMATION IN BINARY FORM, CONVERTS THIS TO CARD
K5AA  5*          IMAGES, AND WRITES THEM TO THE FILESET CALLED TAPE2.
K5AA  6*          THE FILESETS TAPE1 AND TAPE2 MUST BE OPENED PRIOR TO
K5AA  7*          EXECUTING TSUB.  ALL DATA ON TAPE1 IS CONVERTED.
K5AA  8*ROUTINE NAME:  TSUB
K5AA  9*ENTRY NAME:  TSUB
K5AA  10*STORAGE:  1157 OCTAL WORDS
K5AA  11*ROUTINES CALLED:  SELF CONTAINED

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K6 PAPER TAPE

REVIEWER: J. NORRIS, C-2

K6AA A* LARA BAKER TD-7 JAN NORRIS 72
 K6AA B*UT01 - GE PAPER TAPE TO RUN FORTRAN CARD CONVERTER
 K6AA C*F4 MP6600 SCP 3.1 PAPER TAPE I/O
 K6AA D* SW 7 LS 17 TYPE 2
 K6AA E*F4 SOURCE CARDS 650 BCD OBJECT CARDS 84 BIN
 K6AA F**UT01*PAPER*TAPE*CARD*GE
 K6AA G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 K6AA 1*FORM: MAIN PROGRAM
 K6AA 2*PURPOSE: CONVERTS A RUNNING GE FORTRAN PROGRAM ON PAPER
 K6AA 3* TAPE TO 6600 RUN FORTRAN FORMAT. REQUIRES CONTROL
 K6AA 4* CARD: REQUEST TAPES,PR,UH.
 K6AA 5*ROUTINE NAME: UT01
 K6AA 6*ENTRY NAMES: UT01,FILL,WRITE,BUF,GETNXT,NEWLINE
 K6AA 7*STORAGE: 42,300 OCTAL WORDS.
 K6AA 8*SELF CONTAINED.

K6AB A* LARA BAKER TD-7 JAN NORRIS 72
 K6AB B*UT02 - PUNCHED CARD TO GE PAPER TAPE CONVERTER
 K6AB C*F4 MP6600 SCP 3.1 PAPER TAPE I/O
 K6AB D* SW 4 LS 5 TYPE 2
 K6AB E*F4 SOURCE CARDS 223 BCD OBJECT CARDS 36 BIN
 K6AB F**UT02*CARD*PAPER*TAPE*GE
 K6AB G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 K6AB 1*FORM: MAIN PROGRAM
 K6AB 2*PURPOSE: THIS PROGRAM IS A PUNCHED CARD TO ASCII-II PAPER
 K6AB 3* TAPE CONVERTER. ALL ALPHANUMERIC AND SOME SPECIAL
 K6AB 4* CHARACTERS ARE CONVERTED.
 K6AB 5* REQUIRES CONTROL CARD: REQUEST TAPE,PP,UD.
 K6AB 6*ROUTINE NAME: UT02
 K6AB 7*ENTRY NAME: UT02
 K6AB 8*STORAGE: 416000 (OCTAL) WORDS
 K6AB 9*SELF CONTAINED.

K6AC A* LARA BAKER TD-7 JAN NORRIS 72
K6AC B*UT03 - RUN FORTRAN CARDS TO GE PAPER TAPE CONVERTER
K6AC C*F4 MP6600 SCP 3.1 PAPER TAPE I/O
K6AC D* SW 3 LS 26 TYPE 2
K6AC E*F4 SOURCE CARDS 724 BCD OBJECT CARDS 125 BIN
K6AC F**UT03*CARDS*TAPE*GE
K6AC G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
K6AC 1*FORM: MAIN PROGRAM
K6AC 2*PURPOSE: THIS PROGRAM CONVERTS A RUNNING 6600 FORTRAN
K6AC 3* PROGRAM ON CARDS TO GE FORTRAN FORMAT ON PAPER TAPE.
K6AC 4* LINE NUMBERS ARE ADDED AND TRAILING BLANKS ARE REMOVED.
K6AC 5* REQUIRES THE CONTROL CARD: REQUEST TAPES,PP,UD.
K6AC 6*ROUTINE NAME: UT03
K6AC 7*ENTRY NAME: UT03
K6AC 8*STORAGE: 42,200 OCTAL WORDS.
K6AC 9*SELF CONTAINED.

L

PROGRAM MAINTENANCE

PROGRAMS WHICH MAKE IT EASIER TO MAINTAIN AND
DOCUMENT PROGRAMS.

L2 DOCUMENT

E.G., INDEX.

REVIEWER: A. SOLEM, C-4

L202B A* L RUDSINSKI C-4 A SOLEM 73
 L202B B*REGREF - EXAMINE REGISTER REFERENCES
 L202B C*CMP MP7600 CROS
 L202B D* SW 6 LS 0 TYPE 1
 L202B E*NO CARDS
 L202B F**OPTIMIZE*COMPASS*CODE
 L202B G*ON DISK WU 01/03/73 DECK NONE
 L202B 1*7600 CONTROL CARD FORM: \$REGREF(TYPE=COMPASS,
 L202B 2* SOURCE=SOURCE,DOC=BRIEF,EXP=YES,OUT=OUT)
 L202B 3*PURPOSE: EXAMINE REGISTER REFERENCES IN COMPASS
 L202B 4* CODE TO FACILITATE OPTIMIZATION OF COMPASS CODE.
 L202B 5*ROUTINE NAME: REGREF

L3 CLEAN

E.G., TIDY.

REVIEWER: A. SOLEM, C-4

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L301A A*          A SOLEM          C-4          72
L301A B*TIDY - RENUMBER, EDIT, AND TIDY FORTRAN SOURCE PROGRAMS.
L301A C*F4          MP6600      SCP 3.1
L301A D*          SW 15      LS 44      TYPE 1
L301A E*6600 SOURCE DECK = TAPE NO. LC650L00 OBJECT DECK 1583 BIN
L301A F**TIDY*RENUMBER AND *EDIT*FORTRAN*SOURCE PROGRAMS
L301A G*ON DISK      F4 COMPAT      WU 08/29/72      DECK 08/29/72
L301A 1*6600 CONTROL CARD FORM:
L301A 2*          TIDY(INPUT,PUNCH,OUTPUT,TAPE20,TAPE21)
L301A 3*PURPOSE: RENUMBER, EDIT, AND TIDY FORTRAN SOURCE PROGRAMS.
L301A 4*ROUTINE NAME: TIDY
L301A 5*ENTRY NAME: TIDY
L301A 6*STORAGE: 57000 OCTAL WORDS
L301A 7*ROUTINES CALLED: SELF CONTAINED

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L301B A*          A. SOLEM          C-4          72
L301B B*TIDY - RENUMBER, EDIT, AND TIDY FORTRAN SOURCE PROGRAMS
L301B C*F4          MP7600      CROS
L301B D*          SW 15      LS 44      TYPE 1
L301B E*7600 SOURCE DECK = TAPE NO. LE242L00 OBJECT DECK 809 BIN
L301B F**TIDY*RENUMBER AND *EDIT*FORTRAN*SOURCE PROGRAMS
L301B G*ON DISK      F4 COMPAT      WU 08/29/72      DECK 08/29/72
L301B 1*7600 CONTROL CARD FORM:
L301B 2*          STIDY(INP=INP,OUT=OUT,PUN=PUN,FSET20=FSET20,FSET21=FSET21)
L301B 3*PURPOSE: RENUMBER, EDIT, AND TIDY FORTRAN SOURCE PROGRAMS.
L301B 4*ROUTINE NAME: TIDY
L301B 5*ENTRY NAME: TIDY
L301B 6*STORAGE: 46000 OCTAL WORDS
L301B 7*ROUTINES CALLED: IOCHECK(SYSTEM)

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L4 UPDATE

E.G., UPDATE, COPYL.

REVIEWER: F. MCGIRT, C-4

L401A *(CREATE) DELETED FROM THE LIBRARY

L402A *(PREEDIT) DELETED FROM THE LIBRARY

L403A *(EDIT2) DELETED FROM THE LIBRARY

L404A *(VEREDIT) DELETED FROM THE LIBRARY

L405A *(AFWL) DELETED FROM THE LIBRARY

L407A A* ANN SOLEM C-2 70
 L407A B*UPDATE - MAINTAIN LIBRARY OF SYMBOLIC INFORMATION
 L407A C*COMPASS MP6600 SCOPE
 L407A D* SW 27 LS 0 TYPE 1
 L407A E*SOURCE CARDS 0 OBJECT CARDS 0
 L407A F**UPDATE*MAINTAIN*LIBRARY OF*SYMBOLIC*INFORMATION
 L407A G*ON DISK WU 05/15/70 DECK NONE
 L407A 1*CALL NAME: MAIN PROGRAM
 L407A 2*PURPOSE: UPDATE IS USED TO MAINTAIN A LIBRARY OF SOURCE
 L407A 3*INFORMATION. IT IS ON THE SYSTEM CALLABLE VIA CONTROL CARDS
 L407A 4*STORAGE: 36000 TO 50000 (OCTAL) WORDS.
 L407A 5*SELF CONTAINED

L4AA A* R. ELLIOTT TD-5 F. MCGIRT
L4AA B*MAINTAIN LIBRARY OF SYMBOLIC AND BINARY INFORMATION
L4AA C*F-4 COMPASS MP7600 CROS
L4AA D* SW 28 LS 0 TYPE 2
L4AA E*NO CARDS
L4AA F**MOLL*FIXUP*LIBRARY*SYMBOLIC INFORMATION*BINARy INFORMATION
L4AA G*PERMFILE WU 02/01/73 DECK NONE
L4AA 1*FORM: MAIN PROGRAM
L4AA 2*PURPOSE: MOLL-FIXUP IS A SET OF TWO PROGRAMS USED TO
L4AA 3* MAINTAIN A LIBRARY OF SYMBOLIC AND BINARY
L4AA 4* INFORMATION. MOLL IS USED TO UPDATE SOURCE CARDS.
L4AA 5* FIXUP IS USED TO UPDATE BINARY FILES.
L4AA 6*ROUTINE NAMES: MOLL, FIXUP

M

DATA HANDLING

M1 SORTING

REVIEWER: P. IWANCHUK, C-4

M101A A* R. M. FRANK C-4 67
M101A B*EXTENDED SORT ROUTINE - SORT1
M101A C*FORTRAN 4 SR6600 SCP 3.1
M101A D* SW 2 LS 2 TYPE 1
M101A E*F4 SOURCE DECK 48 BCD OBJECT CARDS 15 BIN
M101A F**SORT1 EXTENDED *SORT
M101A G*ON DISK F4 COMPAT WU 07/09/70REV 3 DECK 07/09/70REV 3
M101A 1*USE: CALL SORT1(N,L,X,T,Y1,....,YL)
M101A 2*PURPOSE: TO SORT, ALGEBRAICALLY, A TABLE, (X), OF INTEGER
M101A 3*OR NORMALIZED FLOATING POINT NUMBERS AND TO ORDER UP TO 7
M101A 4*TABLES, (YI), OF DEPENDENT NUMBERS ON THE X SORT.
M101A 5*STORAGE: 275 (OCTAL) WORDS. SORT TIME=58*N**1.29 MICROSEC.
M101A 6*ROUTINES CALLED: LOCF (ON THE SYSTEM).

M115A A* STANLEY HALL P-12 70
M115A B*SORTECS
M115A C*F4 SR6600 SCP 3.1
M115A D* SW 2 LS 2 TYPE 1
M115A E*SOURCE CARDS 72 BCD OBJECT CARDS 19 BIN
M115A F**SORT*ECS
M115A G*CARDS F4 COMPAT WU 08/13/70 DECK 08/13/70
M115A 1*USE: CALL SORTECS(N,L,X,T,IMC,NMC)
M115A 2*PURPOSE: TO SORT, IN INCREASING ORDER, A TABLE X OF N
M115A 3*INTEGERS OR NORMALIZED FLOATING POINT NUMBERS STORED IN ECS.
M115A 4*STORAGE: 346 (OCTAL) WORDS.
M115A 5*TIMING: ABOUT TWICE AS LONG AS SORT1(M101A),
M115A 6* I.E., 2*58*N**1.29 MICROSECONDS.
M115A 7*ROUTINES CALLED: ECRD, ECWR (ON THE SYSTEM).

M116A A* ROGER STUTZ T-2 71
M116A B*ORDER1, ORDER2
M116A C*F4 SR6600 SCP 3.1
M116A D* SW 3 LS 2 TYPE 1
M116A E*SOURCE CARDS 72 BCD OBJECT CARDS 17 BIN
M116A F**ORDER
M116A G*CARDS F4 COMPAT WU 04/21/71 DECK 04/21/71
M116A 1*USE: CALL ORDER1(IA,ISEARCH,NX,IC,JJ,NZ)
M116A 2* CALL ORDER2(IA,ISEARCH,NX,IC,JJ,NZ)
M116A 3*PURPOSE: RETURN A SORTED KEY OF AN ARRAY (IA).
M116A 4*STORAGE: 320 (OCTAL) WORDS.
M116A 5*ROUTINES CALLED: PUT,FETCH(M403A).

M117A A* PAUL IWANCHUK C-4 P. IWANCHUK 72
M117A B*SORT2 - TWO LEVEL EXTENDED SORT ROUTINE
M117A C*F4 SR6600 SCP 3.1
M117A D* SW 3 LS 2 TYPE 1.1
M117A E*F4 SOURCE CARDS 44 BCD OBJECT CARDS 12 BIN
M117A F**SORT2*SORTING*TWO LEVEL EXTENDED SORT
M117A G*CARDS F4 COMPAT WU 06/14/73 REV 2 DECK 06/14/73 REV 1
M117A 1*FORM: CALL SORT2(N,IY1,INC1,IY2,INC2,IT,M)
M117A 2*PURPOSE: OBTAIN THE SORTING ORDER FOR TWO TABLES IY1 AND IY2.
M117A 3* IY2 IS USED TO DETERMINE THE ORDERING ONLY OF ELEMENTS
M117A 4* OF IY1 WHICH ARE IDENTICAL. OTHERWISE, THE ORDERING
M117A 5* IS BASED ON THE ELEMENTS OF IY1.
M117A 6*ROUTINE NAME: SORT2
M117A 7*ENTRY NAME: SORT2
M117A 8*STORAGE: 204 (OCTAL) WORDS
M117A 9*SELF CONTAINED

M117B A* PAUL IWANCHUK C-4 P. IWANCHUK 72
M117B B*SORT2 - TWO LEVEL EXTENDED SORT ROUTINE
M117B C*F4 SR7600 CROS
M117B D* SW 3 LS 2 TYPE 1.1
M117B E*F4 SOURCE CARDS 44 BCD OBJECT CARDS 12 BIN
M117B F**SORT2*SORTING*TWO LEVEL EXTENDED SORT
M117B G*CARDS F4 COMPAT WU 06/14/73 REV 2 DECK 06/14/73 REV 1
M117B 1*FORM: CALL SORT2(N,IY1,INC1,IY2,INC2,IT,M)
M117B 2*PURPOSE: OBTAIN THE SORTING ORDER FOR TWO TABLES IY1 AND IY2.
M117B 3* IY2 IS USED TO DETERMINE THE ORDERING ONLY OF ELEMENTS
M117B 4* OF IY1 WHICH ARE IDENTICAL. OTHERWISE, THE ORDERING
M117B 5* IS BASED ON THE ELEMENTS OF IY1.
M117B 6*ROUTINE NAME: SORT2
M117B 7*ENTRY NAME: SORT2
M117B 8*STORAGE: 207 (OCTAL) WORDS
M117B 9*SELF CONTAINED

M118A A* R.M. FRANK C-4 P. IWANCHUK 72
 M118A B*RAPID SEARCH OF A FLOATING POINT TABLE
 M118A C*F4 SR6600 SCP 3.1
 M118A D* SW 3 LS 2 TYPE 1
 M118A E*F4 SOURCE CARDS 57 BCD OBJECT CARDS 27 BIN
 M118A F**RAPID*SEARCH*TABLE*LOOK-UP
 M118A G*ON DISK F4 COMPAT WU 08/29/72 DECK 08/29/72
 M118A 1*FORM: CALL SEARCH (XBAR,X,N,I,MFLAG)
 M118A 2*PURPOSE: SEARCHES A TABLE OF N MONOTONIC INTEGER OR NORMAL-
 M118A 3* IZED FLOATING POINT NUMBERS, X, FOR XBAR. ON RETURN
 M118A 4* I CONTAINS THE INDEX OF THE TABLE ENTRY FOUND EQUAL
 M118A 5* TO XBAR AND MFLAG = 0, OR I IS SET SO THAT ABS(X(I)).
 M118A 6* .LT.XBAR.LT.ABS(X(I+1)) AND MFLAG = 1. IF XBAR IS NOT
 M118A 7* WITHIN THE RANGE OF THE TABLE X RETURN IS WITH MFLAG = 2.
 M118A 8*ROUTINE NAME: SEARCH
 M118A 9*ENTRY NAME: SEARCH
 M118A 10*STORAGE: 207 OCTAL WORDS.
 M118A 11*ROUTINES CALLED: LABRT(N103A).

M119A A* LARA BAKER TD-7 P. IWANCHUK 72
 M119A B*ESEARCH - A BINARY SEARCH THROUGH EXTENDED CORE STORAGE
 M119A C*F4 CMP SR6600 SCP 3.1
 M119A D* SW 2 LS 1 TYPE 1
 M119A E*SOURCE CARDS 27 BCD OBJECT CARDS 10 BIN
 M119A F**ESEARCH*ECS
 M119A G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 M119A 1*FORM: CALL ESEARCH(XBAR,XBAS,N,I,MFLAG,INC)
 M119A 2*PURPOSE: TO RAPIDLY SEARCH AN ARRAY OF MONOTONICALLY INCREAS-
 M119A 3* ING INTEGERS OR NORMALIZED FLOATING POINT NUMBERS IN ECS.
 M119A 4*ROUTINE NAME: ESEARCH
 M119A 5*ENTRY NAME: ESEARCH
 M119A 6*STORAGE: 154 OCTAL WORDS.
 M119A 7*ROUTINES CALLED: ECR(K203A).

M1AA A * R.F. THOMAS T-5 69
 M1AA B *ALPHABETIC SORT FILE
 M1AA C *FORTRAN IV SR6600 SCP 3.1 ECS
 M1AA D * SW 4 LS 10 TYPE 2
 M1AA E *SOURCE CARDS 553 BCD OBJECT CARDS 131 BIN
 M1AA F **ALPHABETIC*SORT*FILE
 M1AA G *CARDS F4 COMPAT WU 08/07/69 DECK 08/07/69
 M1AA 1 *CALL SORT(INP,OUT,TMPSTO,LREC,LTMP,DB,NF,FC,NC,MXECs)
 M1AA 2 *SORT READS FILE #INP# AND SORTS THE RECORDS ALPHABETICALLY,
 M1AA 3 *WRITING THE SORTED RECORDS ON FILE #OUT#.
 M1AA 4 *OCCUPIES 3014 (OCTAL) WORDS.
 M1AA 5 *THE PACKAGE INCLUDES 6 FORTRAN SUBROUTINES, WHICH IN ADDITION
 M1AA 6 *TO *SORT#HAVE THE NAMES #CORSET#, #IERSRT#, #MERGE#, #LEN1#,
 M1AA 7 *AND #LEN2#. THE FOLLOWING STANDARD LIBRARY SUBROUTINES ARE
 M1AA 8 *USED: CPAREA(Q401A), SHIFT(M401A), ECWR, ECRD, AND LENGTH.

M2 CONVERSION/SCALING

PERTAINS TO ANY CONVERSION OR SCALING ROUTINE (PACKED OR UNPACKED, SINGLE OR MULTIPLE PRECISION), SUCH AS CARD IMAGE TO BCD, BINARY TO BCD, FIXED TO FLOATING. THE PRIMARY FUNCTION MUST BE CONVERSION OR SCALING, NOT INPUT/OUTPUT.

REVIEWER: P. IWANCHUK, C-4

M2AA *(UT01) HAS BEEN REDESIGNATED K6AA.

M2AB *(UT02) HAS BEEN REDESIGNATED K6AB.

M2AC *(UT03) HAS BEEN REDESIGNATED K6AC.

M2AD A* B.L.BUZBEE C-4 P.IWANCHUK 72
M2AD B*CONVERT 6600(7094) FLOATING PT. TO 7094(6600) FL. PT.
M2AD C*F4 SR6600 SCP 3.1
M2AD D* SW 1 LS 1 TYPE 2
M2AD E*F4 SOURCE CARDS 7 BCD OBJECT CARDS 6 BIN
M2AD F**CONVERT 6600(7094)FL. PT. TO 7094(6600) FL. PT.
M2AD G*CARDS F4 COMPAT WU 09/22/72 DECK 09/22/72
M2AD 1*FORM: Y = F66F94(X)
M2AD 2* X = F94F66(Y)
M2AD 3*PURPOSE: F66F94 CONVERTS THE 60 BIT 6600 FL.PT. NUMBER
M2AD 4* IN X INTO A 36 BIT 7094 FL.PT. NUMBER STORED IN
M2AD 5* BITS 56 THRU 21 OF Y.
M2AD 6* F94F66 IS THE CONVERSE OF THE ABOVE.
M2AD 7*ROUTINE NAME: F66F94
M2AD 8*ENTRY NAMES: F66F94, F94F66
M2AD 9*STORAGE: 53 OCTAL WORDS.
M2AD 10*SELF CONTAINED.

M2AE A* B.L.BUZBEE C-4 P.IWANCHUK 72
M2AE B*CONVERT 6600 DISPLAY CODE TO 7094INTERNAL BCD(AND CONVERSE)
M2AE C*F4 SR6600 SCP 3.1
M2AE D* SW 1 LS 1 TYPE 2
M2AE E*F4 SOURCE CARDS 19 BCD OBJECT CARDS 11 BIN
M2AE F**CONVERT 6600 DC TO 7094 INTERNAL BCD (AND CONVERSE)
M2AE G*CARDS F4 COMPAT WU 09/22/72 DECK 09/22/72
M2AE 1*FORM: Y = DISI94(X)
M2AE 2* X = I94DIS(Y)
M2AE 3*PURPOSE: DISI94 CONVERTS THE 10 CHARACTERS OF DISPLAY
M2AE 4* CODE IN X INTO THE ASSOCIATED 7094 INTERNAL BCD
M2AE 5* REPRESENTATION
M2AE 6* I94DIS PERFORMS THE CONVERSE
M2AE 7*ROUTINE NAME: DISI94
M2AE 8*ENTRY NAMES: DISI94,I94DIS
M2AE 9*STORAGE: 125 OCTAL WORDS
M2AE 10*ROUTINES CALLED: SHIFN(M401A).

M4 BIT OR CHARACTER MANIPULATION

E.G., SHIFT, PUT, FETCH.

REVIEWER: P. IWANCHUK, C-4

M401A A# H.L. BUZBEE C-4 J.D. KERSHNER 67
M401A B*SHIFT
M401A C*COMPASS SR6600 SCP 3.1
M401A D# SW 1 LS 1
M401A E*COMPASS SOURCE CARDS 30 BCD 4 BIN
M401A F**SHIFT AND SHIFN
M401A G*ON DISK F4 COMPAT WU 01/24/69REV 3 DECK 01/02/69REV 2
M401A 1*CALL SHIFT(IN,OUT,NBITS) WHERE IN IS THE WORD TO BE
M401A 2*SHIFTED, OUT IS THE SHIFTED RESULT NBITS IS THE NUMBER
M401A 3*OF BITS TO BE SHIFTED LEFT OR RIGHT,NBITS POSITIVE
M401A 4*INDICATES A RIGHT SHIFT,NEGATIVE A LEFT SHIFT
M401A 5*SIGN EXTENSION AND END AROUND ARE ZEROED OUT
M401A 6*CALL SHIFN(A,B,N) WHERE A IS THE WORD TO BE SHIFTED, B IS THE
M401A 7*RESULT, AND N IS THE NUMBER OF BITS TO SHIFT. N POSITIVE
M401A 8*PRODUCES LEFT SHIFT(END AROUND), N NEGATIVE PRODUCES RIGHT
M401A 9*SHIFT(END-OFF WITH SIGN EXTENSION).
M401A 10*STORAGE 13 WORDS
M401A 11*THIS ROUTINE IS SELF CONTAINED

M403A A* R. FRANK C-4 P. IWANCHUK 69
M403A B*PUTS AND FETCHES CHARACTERS
M403A C*COMRASS SR6600 SCP 3.1
M403A D* SW 1 LS 1 TYPE 1.1
M403A E*SOURCE CARDS 43 BCD OBJECT CARDS 6 BIN
M403A F**PUT*FETCH*CHARACTER
M403A G*DISK F4 COMPAT WU 05/25/73 REV.3 DECK 05/12/70 REV.2
M403A 1*FORMI CALL PUT (N,X,Y)
M403A 2* WHERE N= NTH CHARACTER OF ARRAY X.
M403A 3* X= ARRAY INTO WHICH Y IS TO BE PUT.
M403A 4* Y= CHARACTER TO BE PUT INTO ARRAY X.
M403A 5* CALL FETCH(N,X,Y)
M403A 6* WHERE N= NTH CHARACTER OF ARRAY X.
M403A 7* X= ARRAY FROM WHICH CHARACTER IS TO BE FETCHED.
M403A 8* Y= WORD INTO WHICH NTH CHARACTER OF X IS TO BE STORED.
M403A 9*PURPOSE: PUT A CHARACTER INTO NTH CHARACTER OF AN ARRAY
M403A 10* OR FETCH THE NTH CHARACTER FROM AN ARRAY OF
M403A 11* 10 CHARACTER WORDS,
M403A 12* AND STORE IT RIGHT ADJUSTED INTO A WORD.
M403A 13*ROUTINE NAME: PUT
M403A 14*ENTRY NAMES: PUT, FETCH
M403A 15*STORAGE: 42 (OCTAL) WORDS
M403A 16*SELF CONTAINED

M404A A* L. RUDSINSKI C=4 R FRANK 72
 M404A B*MOVE STRING OF CHARACTERS FROM X TO Y
 M404A C*COMBRASS SR6600 SCP 3.1
 M404A D* SW 2 LS 6 TYPE 1
 M404A E*SOURCE CARDS 132 BCD OBJECT CARDS 8 BIN
 M404A F**CHARACTER *STRING
 M404A G*CARDS F4 COMPAT WU 05/26/72REV.3 DECK 05/26/72REV.3
 M404A 1*FORM: CALL PUTIT(X,JCH1,JCH2,Y,K1)
 M404A 2*PURPOSE: MOVE CHARACTERS JCH1 THRU JCH2 FROM ARRAY X TO
 M404A 3* ARRAY Y AT POSITION K1.
 M404A 4*ROUTINE NAME: PUTIT
 M404A 5*ENTRY NAME: PUTIT
 M404A 6*STORAGE: 102 OCTAL WORDS
 M404A 7*ROUTINES CALLED: PUT(M403A)

M404B A* L. RUDSINSKI C=4 R. FRANK 72
 M404B B*MOVE STRING OF CHARACTERS FROM X TO Y
 M404B C*COMPASS SR7600 CROS
 M404B D* SW 2 LS 6 TYPE 1
 M404B E*SOURCE CARDS 132 BCD OBJECT CARDS 8 BIN
 M404B F**CHARACTER *STRING
 M404B G*ON DISK F4 COMPAT WU 05/26/72REV.1 DECK05/26/72REV.1
 M404B 1*FORM: CALL PUTIT(X,JCH1,JCH2,Y,K1)
 M404B 2*PURPOSE: MOVE CHARACTERS JCH1 THRU JCH2 FROM ARRAY X TO
 M404B 3* ARRAY Y AT POSITION K1.
 M404B 4*ROUTINE NAME: PUTIT
 M404B 5*ENTRY NAME: PUTIT
 M404B 6*STORAGE: 102 (OCTAL) WORDS
 M404B 7*ROUTINES CALLED: PUT(M403A)

M405A A* JENNIE BORING C=4 69
 M405A B*GETIT
 M405A C*FORTRAN IV SR6600 SCP 3.1
 M405A D* SW 2 LS 1 TYPE 1
 M405A E*SOURCE CARDS 18 BCD OBJECT CARDS 7 BIN
 M405A F**GETIT
 M405A G*CARDS F4 COMPAT WU 08/14/69 DECK 08/14/69
 M405A 1*USAGE: CALL GETIT(X,JCH1,JCH2,Y) WHERE: X= AN ARRAY.
 M405A 2*PURPOSE: TO STORE A STRING OF CHARACTERS (MAX. LENGTH 10)
 M405A 3*OF AN ARRAY INTO A VARIABLE.
 M405A 4*STORAGE: 76 (OCTAL) WORDS
 M405A 5*USES: ASHIFT(M406A), SHIFT(M401A).

M406A A* JENNIE BORING C-4 69
M406A B*ASHIFT
M406A C*FORTRAN IV SR6600 SCP 3.1
M406A D* SW 2 LS 1 TYPE 1
M406A E*SOURCE CARDS 17 BCD OBJECT CARDS 7 BIN
M406A F**ASHIFT
M406A G*CARDS F4 COMPAT WU 08/14/69 DECK 08/14/69
M406A 1*USAGE: CALL ASHIFT(X,JCH1,JCH2,Y) WHERE: X= AN ARRAY.
M406A 2*PURPOSE: TO STORE A STRING OF CHARACTERS OF A WORD OF AN
M406A 3*ARRAY INTO A VARIABLE.
M406A 4*STORAGE: 74 (OCTAL) WORDS
M406A 5*USES: SHIFT(M401A).

M407A A* WILLARD DRAISIN C-4 TOM GODFREY 69
M407A B*LSHIFT
M407A C*CMP IR6600 SCP 3.1
M407A D* SW 1 LS 1 TYPE 1
M407A E*SOURCE CARDS 9 BCD OBJECT CARDS 3 BIN
M407A F**LSHIFT
M407A G*CARDS F4 COMPAT WU 08/25/69 DECK 08/25/69
M407A 1*CALL: LSHIFT
M407A 2*PURPOSE: LSHIFT IS A COMPASS FUNCTION.
M407A 3*THE STATEMENT B = LSHIFT (A,X) SHIFTS A LEFT X BITS
M407A 4*END AROUND AND STORES THE RESULT IN B. A IS NOT CHANGED.
M407A 5*STORAGE: 3 LOCATIONS.
M407A 6*SELF-CONTAINED.

M411A A* VERNA GARDINER C-4 72
M411A B*NONES AND IPARITY -RETURN NUMBER OF ONES OR PARITY
M411A C*CMP SR6600 SCP 3.1
M411A D* SW 2 LS 1 TYPE 1
M411A E*CMP SOURCE CARDS 20 BCD OBJECT CARDS 4 BIN
M411A F**NONES*IPARITY
M411A G*CARDS F4 COMPAT WU 03/02/72 DECK 03/02/72
M411A 1*FORM: N = NONES(WORD)
M411A 2* I = IPARITY(WORD)
M411A 3*PURPOSE: NONES RETURNS NUMBER OF ONES IN WORD.
M411A 4* IPARITY RETURNS 1 IF NUMBER OF ONES IN WORD IS ODD OR
M411A 5* 0 IF NUMBER OF ONES IS EVEN.
M411A 6*ROUTINE NAME: NONES
M411A 7*ENTRY POINTS: NONES, IPARITY
M411A 8*STORAGE: 12(OCTAL) WORDS.
M411A 9*SELF CONTAINED.

M411B A* Verna GARDINER C=4 72
 M411B B*NONES AND IPARITY -RETURN NUMBER OF ONES OR PARITY
 M411B C*CMP SR7600 CROS
 M411B D* SW 2 LS 1 TYPE 1
 M411B E*CMP SOURCE CARDS 20 BCD OBJECT CARDS 4 BIN
 M411B F**NONES*IPARITY
 M411B G*ON DISK F4 COMPAT WU 03/02/72 DECK 03/02/72
 M411B 1*FORM: N = NONES(WORD)
 M411B 2* I = IPARITY(WORD)
 M411B 3*PURPOSE: NONES RETURNS NUMBER OF ONES IN WORD. IPARITY
 M411B 4* RETURNS 1 IF NUMBER OF ONES IN WORD IS ODD OR 0 IF
 M411B 5* NUMBER OF ONES IS EVEN.
 M411B 6*ROUTINE NAME: NONES
 M411B 7*ENTRY POINTS: NONES, IPARITY
 M411B 8*STORAGE: 12(OCTAL) WORDS.
 M411B 9*SELF CONTAINED.

M412A A* B. BACON C-2 P. IWANCHUK, C-4 70
 M412A B*LOGICAL DIFFERENCE (EXCLUSIVE OR) INLINE FUNCTION
 M412A C*CMP OR6600 SCP 3.1RUN COMPILER
 M412A D* SW 1 LS 0 TYPE 1.2
 M412A E* SOURCE 0 C=2 OBJECT 0 C=2
 M412A F**EXCLUSIVE OR*LOGICAL DIFFERENCE*INLINE FUNCTION
 M412A G*DISK F4 COMPAT WU 04/20/73 DECK NONE
 M412A 1*FORM: OUT = EXOR (IN1,IN2)
 M412A 2*PURPOSE: RETURN THE LOGICAL DIFFERENCE (I.E., EXCLUSIVE
 M412A 3* OR) OF THE TWO ARGUMENTS IN1 AND IN2. THIS
 M412A 4* FUNCTION IS INLINE (IN THE RUN COMPILER) AND IS
 M412A 5* MODELESS (I.E., THE RESULT WILL NEVER BE CONVERTED
 M412A 6* TO ANOTHER MODE).
 M412A 7*ENTRY NAMES: EXOR

M412B A* B. BACON C-2 P. IWANCHUK, C-4 70
 M412B B*LOGICAL DIFFERENCE (EXCLUSIVE OR) INLINE FUNCTION
 M412B C*CMP OR7600 CROS RUN COMPILER
 M412B D* SW 1 LS 0 TYPE 1.2
 M412B E* SOURCE 0 C=2 OBJECT 0 C=2
 M412B F**EXCLUSIVE OR*LOGICAL DIFFERENCE*INLINE FUNCTION
 M412B G*DISK F4 COMPAT WU 04/20/73 DECK NONE
 M412B 1*FORM: OUT = EXOR (IN1,IN2)
 M412B 2*PURPOSE: RETURN THE LOGICAL DIFFERENCE (I.E., EXCLUSIVE
 M412B 3* OR) OF THE TWO ARGUMENTS IN1 AND IN2. THIS
 M412B 4* FUNCTION IS INLINE (IN THE RUN COMPILER) AND IS
 M412B 5* MODELESS (I.E., THE RESULT WILL NEVER BE CONVERTED
 M412B 6* TO ANOTHER MODE).
 M412B 7*ENTRY NAMES: EXOR

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M413A A*          B, BACON          C-2          P, IWANCHUK, C-4 70
M413A B*SHIFT - INLINE FUNCTION
M413A C*CMP          OR6600      SCP 3,1RUN COMPILER
M413A D*          SW      1      LS  0      TYPE 1.2
M413A E*          SOURCE      0 C-2          OBJECT      0 C-2
M413A F**SHIFT*INLINE FUNCTION
M413A G*DISK          F4 COMPAT WU 04/20/73          DECK NONE
M413A 1*FORM:      OUT = SHIFT (IN,BITS)
M413A 2*PURPOSE:  SHIFT THE WORD IN BY IABS(NBITS) BITS AND RETURN
M413A 3*          THE RESULT. IABS(NBITS).LT.64
M413A 4*          IF NBITS.GE.0, LEFT SHIFT CIRCULAR.
M413A 5*          IF NBITS.LT.0, RIGHT SHIFT WITH SIGN EXTENSION.
M413A 6*          THIS FUNCTION IS INLINE (IN THE RUN COMPILER) AND
M413A 7*          IS MODELESS (I.E., THE RESULT WILL NEVER BE
M413A 8*          CONVERTED TO ANOTHER MODE). SHIFT(M413) BEHAVES
M413A 9*          THE SAME AS SHIFN(M401).
M413A 10*ENTRY NAMES:  SHIFT

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M413B A*          B, BACON          C-2          P, IWANCHUK, C-4 70
M413B B*SHIFT - INLINE FUNCTION
M413B C*CMP          OR7600      CROS RUN COMPILER
M413B D*          SW      1      LS  0      TYPE 1.2
M413B E*          SOURCE      0 C-2          OBJECT      0 C-2
M413B F**SHIFT*INLINE FUNCTION
M413B G*DISK          F4 COMPAT WU 04/20/73          DECK NONE
M413B 1*FORM:      OUT = SHIFT (IN,BITS)
M413B 2*PURPOSE:  SHIFT THE WORD IN BY IABS(NBITS) BITS AND RETURN
M413B 3*          THE RESULT. IABS(NBITS).LT.64
M413B 4*          IF NBITS.GE.0, LEFT SHIFT CIRCULAR.
M413B 5*          IF NBITS.LT.0, RIGHT SHIFT WITH SIGN EXTENSION.
M413B 6*          THIS FUNCTION IS INLINE (IN THE RUN COMPILER) AND
M413B 7*          IS MODELESS (I.E., THE RESULT WILL NEVER BE
M413B 8*          CONVERTED TO ANOTHER MODE). SHIFT(M413) BEHAVES
M413B 9*          THE SAME AS SHIFN(M401).
M413B 10*ENTRY NAMES:  SHIFT

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N

DEBUGGING

N1 TRACING OR TRAPPING

E.G., LABRT, ALSO INCLUDES SOME INTERRUPT HANDLING
(SEE Q2).

REVIEWER: A. SOLEM, C-4

N103A A* PAUL HARPER T-1 67
 N103A O*LOS ALAMOS ABORTER AND MESSAGE PRINTER
 N103A B*MATH SR ERRORS N1 F4 SR6600 SCOPE
 N103A C* SW 2 LS 1
 N103A D*F4 SOURCE CARDS 21BCDREL BIN 8BIN
 N103A S**ERROR*TERMINATION*COMMENT
 N103A 10*ON DISK F4 COMPAT WU 08/31/67 DECK 08/31/67
 N103A 11*CALL LABRT(ISW,LHOL,INT) WHERE ISW AND INT ARE NAMES OF
 N103A 12*FORTRAN IV INTEGERS AND LHOL IS THE NAME OF 50 HOLLERITH
 N103A 13*CHARACTERS. PRINTS MESSAGES UNDER FORMAT(1H0,9X,5A10,3X,06),
 N103A 14*SETS LINE COUNT, AND CAUSES JOB TERMINATION ACCORDING TO ISW
 N103A 15*SETTINGS. USED WITH MATH SUBROUTINES FOR ERROR MESSAGES
 N103A 16*AND/OR JOB TERMINATION.
 N103A 17*SELF-CONTAINED. 73 WORDS STORAGE.

N105A A* JAMES T. KOCH C-2 69
 N105A B*MODE ERRORS PROCESSED BY PROGRAMMER (MEPBP)
 N105A C*CMP SR6600 SCP 3.1
 N105A D* SW 3 LS 1 TYPE 1
 N105A E*SOURCE CARDS 43 BCD OBJECT CARDS 4 BIN
 N105A F**MODE*ERROR*MEPBP
 N105A G*ON DISK F4 COMPAT WU 10/30/69 DECK 10/30/69
 N105A 1*CALL NAME: MEPBP(IA)
 N105A 2*PURPOSE: ALLOWS THE OBJECT PROGRAM TO PROCESS MODE ERRORS.
 N105A 3*STORAGE: 15 (OCTAL) WORDS.
 N105A 4*ROUTINES CALLED: PP ROUTINE (ON DISK).

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N106B A*                JERRY MELENDEZ   C-4                71
N106B B*ENTER AN INTERRUPT ADDRESS
N106B C*CMP                SR7600   CROS
N106B D*                SW  4      LS  0      TYPE 1
N106B E*CMP SOURCE CARDS    0   BCD   OBJECT CARDS    0   BIN
N106B F**ENTER*INTERRUPT ADDRESS
N106B G*ON DISK          F4  COMPAT   WU 08/04/71      DECK   NONE
N106B 1*FORM:  CALL ENTRH (IADD)
N106B 2*          CALL ENTRS (IADD)
N106B 3*          CALL ENTRTM (IADD)
N106B 4*PURPOSE:  TO ENTER INTERRUPT ADDRESSES IN USER MONITOR.
N106B 5*ROUTINE NAME:  ENTR
N106B 6*ENTRY NAMES:  ENTRH, ENTRS, ENTRTM
N106B 7*STORAGE:  34 OCTAL WORDS OF SCM.
N106B 8*SELF CONTAINED.

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N107B A*                JERRY MELENDEZ   C-4                71
N107B B*RETURN FROM AN INTERRUPT STATE
N107B C*CMP                SR7600   CROS
N107B D*                SW  2      LS  0      TYPE 1
N107B E*CMP SOURCE CARDS    0   BCD   OBJECT CARDS    0   BIN
N107B F**RETURN FROM AN *INTERRUPT STATE
N107B G*ON DISK          F4  COMPAT   WU 08/04/71      DECK   NONE
N107B 1*FORM:  CALL RETNH
N107B 2*          CALL RETNS
N107B 3*          CALL RETNTM
N107B 4*          CALL RETND
N107B 5*PURPOSE:  RETURN THE JOB TO ITS PREVIOUS OPERATING STATE.
N107B 6*ROUTINE NAME:  RETN
N107B 7*ENTRY NAMES:  RETNH, RETNS, RETNTM, RETND.
N107B 8*STORAGE:  30 OCTAL WORDS OF SCM.
N107B 9*SELF CONTAINED.

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N108B A*          ANN SOLEM          C-4          71
N108B B*XIT,XITFIX AND XITSAVE - HANDLE TASK ABORT
N108B C*F4          SR7600          CROS
N108B D*          SW 4          LS 0          TYPE 1.2
N108B E*F4 SOURCE CARDS          0          C-2          OBJECT CARDS          0          C-2
N108B F**XIT*HANDLE*TASK*ABORT*SOFTWARE*INTERRUPT
N108B G*ON DISK          F4          COMPAT          WU 03/14/73REV 1 DECK          NONE
N108B 1*FORM:          CALL XIT(LOC)
N108B 2*          CALL XITFIX(KJST,IP,IPSD)
N108B 3*          CALL XITSAVE(LOC,LOOP)
N108B 4*          CALL XIT(LOC,LOOP)
N108B 5*PURPOSE:          XIT ALLOWS A TASK TO CONTINUE RUNNING AFTER A
N108B 6*          TASK ABORT HAS BEEN REQUESTED. TRANSFERRING
N108B 7*          CONTROL TO LOC.
N108B 8*          XITFIX RETURNS INFORMATION REGARDING THE LAST
N108B 9*          TASK ABORT AND TURNS OFF THE ERROR FLAG.
N108B 10*          XITSAVE AND XIT SAVE AND RESTORE AN EXIT, SO THAT
N108B 11*          A DIFFERENT EXIT CAN BE ESTABLISHED.
N108B 12*ROUTINE NAME:          XIT
N108B 13*ENTRY NAMES:          XIT, XITFIX,XITSAVE
N108B 14*STORAGE:          266 (OCTAL) WORDS OF SCM
N108B 15*ROUTINES CALLED:          ENTRS(N106), GETSPK(Q413), SETSPK(Q413),
N108B 16*          RETNS(N107), REMARK(Q16), ABORT(N203), OUTPTS(SYSTEM)

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N109B A*          JERRY MELENDEZ          C-4          71
N109B B*END INTERRUPT REQUEST
N109B C*CMP          SR7600          CROS
N109B D*          SW 2          LS 0          TYPE 1
N109B E*CMP SOURCE CARDS          0          BCD          0          BIN
N109B F**END*INTERRUPT REQUEST
N109B G*ON DISK          F4          COMPAT          WU 08/05/71          DECK          NONE
N109B 1*FORM:          CALL ENDH
N109B 2*          CALL ENDS
N109B 3*          CALL ENDTM
N109B 4*          CALL ENDD
N109B 5*PURPOSE:          TO END THE OUTSTANDING INTERRUPT REQUEST(S) OF A
N109B 6*          GIVEN TYPE.
N109B 7*ROUTINE NAME:          ENDS
N109B 8*ENTRY NAMES:          ENDH, ENDS, ENDTM, ENDD
N109B 9*STORAGE:          33 OCTAL WORDS OF SCM.
N109B 10*SELF CONTAINED

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N2

DUMPING

CORE, TAPE, DISK, CONSOLE PRINTOUTS (ONLINE OR OFFLINE). E.G., ABORT, DUMP, DMRPK.

REVIEWER: A. SOLEM, C-4

N203A A* VERNA GARDINER C-4 71
 N203A B*ABORT JOB
 N203A C*F4, CMP SR6600 SCP 3.1
 N203A D* SW 3 LS 3 TYPE 1
 N203A E*SOURCE CARDS 85 BCD OBJECT CARDS 13 BIN
 N203A F**ABORT
 N203A G*ON DISK F4 COMPAT WU 01/16/73REV.6 DECK 05/12/72REV.4
 N203A 1*FORM: CALL ABORT
 N203A 2*PURPOSE: TO TERMINATE A JOB ABNORMALLY,
 N203A 3* GIVING ERROR 39 AND A TRACEBACK
 N203A 4*ROUTINE NAME: ABORT
 N203A 5*ENTRY NAME: ABORT
 N203A 6*STORAGE: 170 (OCTAL) WORDS
 N203A 7*OTHER EXTERNALS: N203SR, N203RR
 N203A 8*ROUTINES CALLED: SYSTEMC, SYSTEMP (ON THE SYSTEM).

N203B A* VERNA GARDINER C-4 71
 N203B B*ABORT JOB
 N203B C*F4, CMP SR7600 CROS
 N203B D* SW 3 LS 3 TYPE 1
 N203B E*F4 SOURCE CARDS 88 BCD OBJECT CARDS 13 BIN
 N203B F**ABORT
 N203B G*ON DISK F4 COMPAT WU 01/16/73REV.3 DECK 01/16/73REV.2
 N203B 1*FORM: CALL ABORT
 N203B 2*PURPOSE: TO ABORT A TASK, GIVING ERROR 39 AND A TRACEBACK,
 N203B 3*ROUTINE NAME: ABORT
 N203B 4*ENTRY NAME: ABORT
 N203B 5*STORAGE: 170 OCTAL WORDS
 N203B 6*OTHER EXTERNALS: N203SR, N203RR
 N203B 7*ROUTINES CALLED: SYSTEMC, SYSTEMP (ON THE SYSTEM).

N204A A* BARBARA BACON C-2 67
 N204A 0*DUMP CENTRAL MEMORY LOCATIONS
 N204A B*DUMPING N2 FORTRANCOMPASS SR6600 SCOPE
 N204A C* SW 2 LS 2
 N204A D*FORTRAN,COMPASS CARDS 73BCDBINARY CARDS 28BIN
 N204A S**DUMPING
 N204A 10*ON DISK F4 COMPAT WU 05/09/68 REV DECK 05/09/68 REV
 N204A 11*CALL DUMPA (FWA,LWA,M)
 N204A 12*DUMPS CENTRAL MEMORY FROM LOCATION RA+FWA TO
 N204A 13*LOCATION RA+LWA IN FORMAT M.
 N204A 14*STORAGE - 430 OCTAL WORDS
 N204A 15*ROUTINES CALLED: SYSTEM, OUTPTC, SIOS, C4020, BS4020, XRCL,
 N204A 16*(ON THE SYSTEM)

N205A A* B L BUZBEE C-4 68
 N205A 0*SELECTIVE DUMPING OF A CDC 6600 LOGICAL I/O UNIT
 N205A B*DEBUGGING N2 F4 SR6600 SCOPE
 N205A C* SW 4 LS 1
 N205A D*F4 SOURCE CARDS 22BCDF4 OBJECT CARDS 20BIN
 N205A S*SELECTIVE*DUMPING OF A CDC 6600 LOGICAL I/O UNIT
 N205A 10*CARDS F4 COMPAT WU 10/01/68 DECK 10/01/68
 N205A 11*CALL TAPDMP (NT,MT,NF1,NR1,NF,N1,N2,MD,A,ML) DUMPS RECORDS N1
 N205A 12*THRU N2 OF FILE NF ON UNIT NT. STORAGE = 220 WORDS. USES
 N205A 13*PDUMP AND LENGTH(ON THE SYSTEM)

N207B A* EMILY WILLBANKS C-2 A. SOLEM 71
 N207B B*DUMP BLOCK NAME
 N207B C*CMP SR7600 CROS
 N207B D* SW 2 LS 0 TYPE 1
 N207B E*NO CARDS
 N207B F**DMPBN*DUMP BLOCK NAME
 N207B G*ON DISK F4 COMPAT WU 10/19/72 DECK NONE
 N207B 1*FORM: CALL DMPBN(BN,FWA,LWA,FORMAT,TYPE,FSO)
 N207B 2* CALL DMPBN(BN,LWA)
 N207B 3*PURPOSE: DUMP PORTION OF SCM OR LCM NAMED BLOCK
 N207B 4* ONTO A FILESET ACCORDING TO A FORMAT.
 N207B 5*ROUTINE NAME: DMPBN
 N207B 6*ENTRY NAMES: DMPBN
 N207B 7*SCM-LCM BLOCK NAMES: MALCM OR MASCM AND
 N207B 8* BLOCK NAME GIVEN AS ARGUMENT(SCM OR LCM).
 N207B 9*STORAGE: 146 OCTAL WORDS OF SCM
 N207B 10*ROUTINES CALLED: MEMREQ, MEMLEN, MEMREL (ALL ON THE SYSTEM).

N208B A* EMILY WILLBANKS C-2 71
 N208B B*DMPK, DMPXX, DMPXPG - DISPLAY EXCHANGE PACKAGE
 N208B C*F4 SR7600 CROS
 N208B D* SW 3 LS 0 TYPE 1
 N208B E* 0 BCD 0 BIN
 N208B F**DMPK*DMPXX*DMPXPG*DISPLAY*EXCHANGE PACKAGE
 N208B G*ON DISK F4 COMPAT WU 07/09/71 DECK NONE
 N208B 1*FORM: CALL DMPK(FSO,PACK)
 N208B 2* CALL DMPXX(FSO,PACK,NTASK,NAME)
 N208B 3* CALL DMPXPG(FSO)
 N208B 4*PURPOSE: PRINT THE 16-WORD EXCHANGE PACKAGE IN PACK IN
 N208B 5* DMPX EXCHANGE PACKAGE FORMAT ON FILESET FSO. LABEL IT
 N208B 6* WITH THE TASK NAME IN NAME AND NUMBER IN NTASK. DMPXPG
 N208B 7* SKIPS TWO LINES ON FILESET FSO.
 N208B 8*ROUTINE NAME: DMPXX
 N208B 9*ENTRY NAMES: DMPK, DMPXPG, DMPXX
 N208B 10*STORAGE: 327B WORDS OF SCM.
 N208B 11*ROUTINES CALLED: OUTPTC, SHIFT(ALL ON SYSTEM).

N209B A* EMILY WILLBANKS C-2 71
 N209B B*PDUMP AND DUMP - DUMP SCM AND LCM LOCATIONS
 N209B C*CMP SR7600 CROS
 N209B D* SW 3 LS 0 TYPE 1
 N209B E* 0 BCD 0 BIN
 N209B F**DUMP*PDUMP
 N209B G*ON DISK F4 COMPAT WU 06/22/71 DECK NONE
 N209B 1*FORM: CALL PDUMP(A1,B1,F1,...,AN,BN,FN)
 N209B 2* FOR N.LE.20
 N209B 3* CALL DUMP(A1,B1,F1,...,AN,BN,FN)
 N209B 4*PURPOSE: DUMP CONTENTS OF SCM OR LCM LOCATIONS IN AN
 N209B 5* INDICATED FORMAT ON FILESET OUT.
 N209B 6*ROUTINE NAME: DUMP
 N209B 7*ENTRY NAMES: DUMP,PDUMP↑,DUMP↑,PDUMP
 N209B 8*STORAGE: 2048 WORDS OF SCM.
 N209B 9*ROUTINES CALLED: STOP, OUTPTC, GENDMP (ALL ON SYSTEM).

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N210B A*          EMILY WILLBANKS C-2          71
N210B B*DUMPA,DUMPL - DUMP ABSOLUTE SCM OR LCM MEMORY LOCATIONS
N210B C*CMP          SR7600 CROS
N210B D*          SW 2      LS 0      TYPE 1
N210B E*          0      BCD          0      BIN
N210B F**DUMPA*DUMPL*DUMP*SCM AND *LCM*MEMORY
N210B G*ON DISK F4 COMPAT WU 06/28/71 DECK NONE
N210B 1*FORM: CALL DUMPA(FWA,LWA,M)
N210B 2*          CALL DUMPL(FWA,LWA,M)
N210B 3*PURPOSE: DUMP SCM OR LCM MEMORY LOCATIONS RA+FWA THRU
N210B 4* RA+LWA IN FORMAT M.
N210B 5*ROUTINE NAME: DUMPA
N210B 6*ENTRY NAMES: DUMPA, DUMPL
N210B 7*STORAGE: 22B WORDS OF SCM.
N210B 8*ROUTINES CALLED: GENDMP (ON THE SYSTEM)

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N211B A*          LARRY RUDSINSKI C-4          71
N211B B*DMPXI AND DMPX - PRINT THE EXCHANGE PACKAGE
N211B C*CMP          SR7600 CROS
N211B D*          SW 2      LS 0      TYPE 1
N211B E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
N211B F**DUMP*EXCHANGE PACKAGE*DMPX
N211B G*ON DISK F4 COMPAT WU 08/26/71 DECK NONE
N211B 1*FORM: CALL DMPXI(LOC)
N211B 2*          CALL DMPX
N211B 3*PURPOSE: DMPX PRINTS THE EXCHANGE PACKAGE AT THE TIME
N211B 4* OF THE CALL. DMPXI INITIALIZES DMPX.
N211B 5*ROUTINE NAME: DMPXI
N211B 6*ENTRY NAMES: DMPXI,DMPX
N211B 7*STORAGE: 60 OCTAL WORDS OF SCM.
N211B 8*ROUTINES CALLED: ENTRH(N106B), GETHPK(Q413B), SETHPK(Q413B),
N211B 9* DMPPK(N208B), RETNH(N107B), ENDH(N109B),
N211B 10* (ALL ON THE SYSTEM).

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N2128 A* J. NORRIS C-4 A. SOLEM /3
N2128 B*DUMP MEMORY TO ANY FILESET WITH SPECIFIED RA AND FORMAT
N2128 C*CMP SR/600 CRUS
N2128 D* SW 4 LS 0 TYPE 1.2
N2128 E* SOURCE OLUPL4 C-2 OBJECT 0 C-2
N2128 F**DUMP
N2128 G*DISK F4 COMPAT WU 06/12/73 DECK NONE
N2128 1*FORM: CALL DMP(FWA,LWA,FORMAT,TYPE,FSO,RA)
N2128 2* CALL DMP(LWA)
N2128 3*PURPOSE: DUMP CONTENTS OF SCM OR LCM IN AN INDICATED
N2128 4* FORMAT UNTO A FILESET. THE DUMP MAY BE RELATIVE TO AN
N2128 5* ADDRESS OTHER THAN THE USERS RA.
N2128 6*ROUTINE NAME: DMP
N2128 7*ENTRY NAMES: DMP, DMP↑
N2128 8*STORAGE: 77 OCTAL WORDS OF SCM
N2128 9*ROUTINES CALLED: GENDMP, OUTPTC(ON SYSTEM).

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SIMULATION OF COMPUTERS AND DATA PROCESSORS - INTERPRETERS

04

PSEUDO-COMPUTERS

SIMULATION OF THEORETICAL OR PSEUDO-COMPUTERS.

REVIEWER: J. NEERGAARD, C-7

04AA A * GEORGE SWAIN MP-3 69
 04AA B *HACK- AN INTERPRETIVE SYSTEM WITH PRECISION AND UNITS
 04AA C *FORTRAN IV MP6600 SCP 3.1
 04AA D * SW 5 LS 24 TYPE 2
 04AA E *SOURCE CARDS 1330 BCD OBJECT CARDS 257 BIN
 04AA F **INTERPRETER*SYSTEM*PRECISION*UNITS*USER-DEFINED OPERATIONS
 04AA G *CARDS F4 COMPAT WU 06/02/67 DECK 06/02/69
 04AA 1 *THIS PROGRAM FORMS AN INTERPRETIVE SYSTEM WHICH ALLOWS THE
 04AA 2 *USER TO ASSOCIATE PRECISION AND UNITS WITH VARIABLES AND
 04AA 3 *WHICH OFFERS THE USER SEVERAL AIDS IN DEVELOPING HIS OWN
 04AA 4 *PROBLEM-ORIENTED LANGUAGE FOR SHORT PROBLEMS. LANGUAGE
 04AA 5 *FEATURES INCLUDE USER-DEFINED OPERATIONS AND SUBROUTINES.
 04AA 6 *LOOPING, CONDITIONAL BRANCHING, AND UNLIMITED NAME LENGTH.
 04AA 7 *TIMING- VARIES WITH USE. ROUGHLY 0.5 SEC/OUTPUT PAGE.
 04AA 8 *COMPILER FIELD LENGTH 52K OCTAL. OBJECT TIME FIELD LENGTH
 04AA 9 *43400 OCTAL.

Q

SERVICE

Q1 TIME, DAYFILE, OR PAUSE

E.G., SECOND, CLOCK, TIME, DATE, REMARK, PAUSE. (ALSO INCLUDES SOME FILE MANIPULATION (SEE W).)

REVIEWER: J. MELENDEZ, C-4

Q102A A* JIM CLARK C-2 67
 Q102A 0*CLOCK ROUTINE
 Q102A B*TIMING Q1 COMPASS SR6600 SCOPE
 Q102A C* SW 2 LS 2
 Q102A D*COMPASS SOURCE CARDS 99BCDCOMPASS OBJECT CARDS 7BIN
 Q102A S**CLOCK*TIMING
 Q102A 10*ON DISK F4 COMPAT WU 04/15/68 REV 04/15/68 REV
 Q102A 11*CALL CLOCK(X)
 Q102A 12*RESULTS IN X CONTAINING THE FLOATING POINT VALUE OF THE
 Q102A 13*TIME CLOCK IN MINUTES PLUS HUNDRED OF MINUTES
 Q102A 14*STORAGE 61 OCTAL WORDS.
 Q102A 15*THIS ROUTINE USE THE PP ROUTINE DCL.

Q105A A* JIM CLARK C-2 67
 Q105A 0*CLOCK ROUTINE
 Q105A B*SERVICE Q1 COMPASS SR6600 SCOPE
 Q105A C* SW 2 LS 1
 Q105A D*COMPASS SOURCE CARDS 35BCDCOMPASS OBJECT CARDS 5BIN
 Q105A S**CLOCK
 Q105A 10*ON DISK F4 COMPAT WU 04/17/68 REV DECK 04/17/68 REV
 Q105A 11*CALL CLOCK1(Y)
 Q105A 12*RESULTS IN Y CONTAINING THE TIME OF DAY(IN DISPLAY CODE),
 Q105A 13*IN THE FORM HH.MM.SS, WHERE HH IS THE NUMBER OF HOURS,
 Q105A 14*MM IS THE NUMBER OF MINUTES, AND SS IS THE NUMBER OF SECONDS
 Q105A 15*STORAGE 30 OCTAL WORDS.
 Q105A 16*USES PP ROUTINE DCL.

Q106A A* JIM CLARK C-2 67
 Q106A 0*DATE ROUTINE
 Q106A B*SERVICE Q1 COMPASS SR6600 SCOPE
 Q106A C* SW 2 LS 1
 Q106A D*COMPASS SOURCE CARDS 28BCDCOMPASS OBJECT CARDS 4BIN
 Q106A S**DATE
 Q106A 10*ON DISK F4 COMPAT WU 04/17/68 REV DECK 04/17/68 REV
 Q106A 11*CALL DATE(Y)
 Q106A 12*RESULTS IN Y CONTAINING THE DATE(IN DISPLAY CODE), IN THE
 Q106A 13*FORM MMDDYY WHERE MM IS THE MONTH, DD IS THE DAY, AND YY IS
 Q106A 14*THE YEAR
 Q106A 15*STORAGE 24 OCTAL WORDS.
 Q106A 16*USES PP ROUTINE DCL.

Q107A A* JIM CLARK C-2 67
 Q107A 0*DATE ROUTINE
 Q107A B*SERVICE Q1 COMPASS SR6600 SCOPE
 Q107A C* SW 2 LS 1
 Q107A D*COMPASS SOURCE CARDS 35BCDCOMPASS OBJECT CARDS 5BIN
 Q107A S**DATE
 Q107A 10*ON DISK F4 COMPAT WU 04/17/68 REV DECK 04/17/68 REV
 Q107A 11*CALL DATE1(X)
 Q107A 12*RESULTS IN X CONTAINING THE DATE(IN DISPLAY CODE), IN THE
 Q107A 13*FORM MM/DD/YY WHERE MM IS THE MONTH, DD IS THE DAY, AND
 Q107A 14*YY IS THE YEAR
 Q107A 15*STORAGE 30 OCTAL WORDS.
 Q107A 16*USE PP ROUTINE DCL.

Q110A A* ANN SOLEM C-2 JIM CLARK 70
 Q110A B*SECOND - ELAPSED CP TIME FOR THIS JOB
 Q110A C*CMP SR6600 SCP 3.1
 Q110A D* SW 2 LS 1 TYPE 1
 Q110A E* 0 BCD OBJECT CARDS 0 BIN
 Q110A F**SECOND*TIME*CP*TIMER
 Q110A G*ON DISK WU 03/12/70 DECK NONE
 Q110A 1*CALL NAME: CALL SECOND(CP)
 Q110A 2*PURPOSE: TO OBTAIN THE ELAPSED CENTRAL PROCESSOR TIME FOR
 Q110A 3*THIS JOB, IN SECONDS TO THE NEAREST THOUSANDTH OF A SECOND.
 Q110A 4*STORAGE: 24 OCTAL WORDS
 Q110A 5*SELF CONTAINED.

Q111A A* ANN SOLEM C-2 JIM CLARK 70
 Q111A B*TIME - ENTER TIME OF DAY AND COMMENT IN DAYFILE
 Q111A C*CMP SR6600 SCP 3.1
 Q111A D* SW 2 LS 1 TYPE 1
 Q111A E* 0 BCD OBJECT CARDS 0 BIN
 Q111A F**TIME*COMMENT*DAYFILE
 Q111A G*ON DISK WU 03/12/70 DECK NONE
 Q111A 1*CALL NAME: CALL TIME(MESSAGE)
 Q111A 2*PURPOSE: TO ENTER A MESSAGE OF 34 CHARACTERS OR LESS IN THE
 Q111A 3*DAYFILE PRECEDED BY THE CHARACTERS *TIME*. STRING MUST BE
 Q111A 4*TERMINATED BY A ZERO BYTE (12-BITS).
 Q111A 5*STORAGE: 23 (OCTAL) WORDS.
 Q111A 6*SELF CONTAINED

Q112A A* ANN SOLEM C-2 BARBARA BACON 70
 Q112A B*REMARK - ENTER COMMENT IN DAYFILE
 Q112A C*CMP SR6600 SCP 3.1
 Q112A D* SW 2 LS 1 TYPE 1
 Q112A E* 0 BCD OBJECT CARDS 0 BIN
 Q112A F**REMARK*COMMENT*DAYFILE
 Q112A G*ON DISK WU 03/12/70 DECK NONE
 Q112A 1*CALL NAME: CALL REMARK(MESSAGE)
 Q112A 2*PURPOSE: TO ENTER A MESSAGE OF 40 CHARACTERS OR LESS IN THE
 Q112A 3*DAYFILE. THE CHARACTER STRING MUST BE TERMINATED BY A ZERO
 Q112A 4*BYTE (12-BITS).
 Q112A 5*STORAGE: 22 (OCTAL) WORDS.
 Q112A 6*SELF CONTAINED

Q113A A* ANN SOLEM C-2 70
 Q113A B*DISPLA - DISPLAY CURRENT VALUE OF VARIABLE IN DAYFILE
 Q113A C*CMP SR6600 SCP 3.1
 Q113A D* SW 3 LS 5 TYPE 1
 Q113A E* 0 BCD OBJECT CARDS 0 BIN
 Q113A F**DISPLAY CURRENT*VALUE OF*VARIABLE IN*DAYFILE
 Q113A G*ON DISK WU 03/12/70 DECK NONE
 Q113A 1*CALL NAME: CALL DISPLA(MESSAGE,VALUE)
 Q113A 2*PURPOSE: TO DISPLAY IN THE DAYFILE A MESSAGE OF 10 CHAR-
 Q113A 3*ACTERS OR LESS AND A VALUE. THE VALUE WILL BE TREATED AS
 Q113A 4*FLOATING POINT OR INTEGER.
 Q113A 5*STORAGE: 247 (OCTAL) WORDS.
 Q113A 6*SELF CONTAINED.

Q114A A* ANN SOLEM C-2 DAVE SCHULTZ 70
 Q114A B*SWITCH - BUFFER POOLING, MULTIREEL TAPE SWITCHING
 Q114A C*CMP SR6600 SCP 3.1
 Q114A D* SW 2 LS 1 TYPE 1
 Q114A E* 0 BCD OBJECT CARDS 0 BIN
 Q114A F**SWITCH*BUFFER*POOLING*MULTIREEL*TAPE*SWITCHING
 Q114A G*ON DISK WU 03/12/70 DECK NONE
 Q114A 1*CALL NAME: CALL SWITCH(NAME1,NAME2)
 Q114A 2*PURPOSE: TO CHANGE FILE REFERENCES DURING FORTRAN EXECUTION,
 Q114A 3*IN ORDER TO POOL BUFFERS AND/OR SWITCH REELS FOR MULTIREEL
 Q114A 4*FILES.
 Q114A 5*STORAGE: 24 (OCTAL) WORDS.
 Q114A 6*SELF CONTAINED.

Q115B A* EMILY WILLBANKS C-2 71
 Q115B B*CLOCK,DATE AND SECOND ROUTINE
 Q115B C*CMP SR7600 CROS
 Q115B D* SW 3 LS 0 TYPE 1
 Q115B E* 0 BCD 0 BIN
 Q115B F**CLOCK*DATE AND*SECOND
 Q115B G*ON DISK F4 COMPAT WU 06/16/71 DECK NONE
 Q115B 1*FORM: CALL CLOCK(C1) CALL CLOCK1(C2)
 Q115B 2* CALL SECOND(S)
 Q115B 3* CALL DATE(D1) CALL DATE1(D2)
 Q115B 4*PURPOSE: TO GIVE TIMES AND DATE TO USER.
 Q115B 5*C1=TIME OF DAY IN MINUTES(FLOAT PT)
 Q115B 6*C2=TIME OF DAY IN DISPLAY CODE 8HHR.MI.SE WHERE HR=HOURS,
 Q115B 7* MI=MINUTES, SE=SECONDS
 Q115B 8* S=ELAPSED CP(REAL) TIME IN SECONDS(FLOAT PT)
 Q115B 9*D1=DATE IN DISPLAY CODE 6HMMDDYY
 Q115B 10*D2=DATE IN DISPLAY CODE 8HMM/DD/YY
 Q115B 11* WHERE MM=MONTH, DD=DAY, YY=YEAR
 Q115B 12*ROUTINE NAME: CLOCKF
 Q115B 13*ENTRY NAMES: CLOCK, CLOCK1, DATE, DATE1, SECOND
 Q115B 14*STORAGE: 1038 WORDS.
 Q115B 15*SELF CONTAINED.

Q116B A* N. NAGY C-2 J MELENDEZ C-4 71
 Q116B B*REMARK, TIME - SEND REMARK TO DAYFILE
 Q116B C*CMP SR7600 CROS
 Q116B D* SW 3 LS 0 TYPE 1
 Q116B E* 0 BCD 0 BIN
 Q116B F**REMARK*TIME*MESSAGE*DAYFILE
 Q116B G*ON DISK F4 COMPAT WU 11/21/72REV.1 DECK NONE
 Q116B 1*FORM: CALL REMARK(MSG)
 Q116B 2* CALL TIME(MSG)
 Q116B 3* CALL MESSAGE(M,N)
 Q116B 4*PURPOSE: ENTER A COMMENT IN THE DAYFILE.
 Q116B 5*ROUTINE NAME: REMARK
 Q116B 6*ENTRY NAMES: REMARK, TIME, MESSAGE
 Q116B 7*STORAGE: 33 OCTAL WORDS OF SCM
 Q116B 8*ROUTINES CALLED: ABNORML(SYSTEM)

Q117B A* N. NAGY C-2 J. MELENDEZ C-4 72
 Q117B B*KILLDF - SUPPRESS THE WHOLE DAYFILE
 Q117B C*COMPASS SR7600 CROS
 Q117B D* SW 2 LS 0 TYPE 1
 Q117B E*NO CARDS
 Q117B F**DAYFILE*SUPPRESS
 Q117B G*ON DISK F4 COMPAT WU 11/27/72 DECK NONE
 Q117B 1*FORM: CALL KILLDF
 Q117B 2*PURPOSE: SUPPRESS THE WHOLE DAYFILE. THIS SHOULD
 Q117B 3* BE USED WITH CAUTION.
 Q117B 4*ROUTINE NAME: KILLDF
 Q117B 5*ENTRY NAME: KILLDF
 Q117B 6*STORAGE: 46 (OCTAL) WORDS
 Q117B 7*ROUTINES CALLED: GETBA, ADDRQT, DFNAME (ALL ON SYSTEM).

Q118B A* N. NAGY C-2 J. MELENDEZ 73
 Q118B B*ROLLOUT JOB
 Q118B C*F4 SR7600 CROS
 Q118B D* SW 3 LS 0 TYPE 1
 Q118B E* NO CARDS
 Q118B F**ROLLOUT
 Q118B G*ON DISK F4 COMPAT WU 01/31/73 DECK NONE
 Q118B 1*FORM: CALL ROLLOUT(ITIME)
 Q118B 2*PURPOSE: ROLL A JOB OUT TO THE DISK FOR A PREDETERMINED
 Q118B 3* AMOUNT OF TIME
 Q118B 4*ROUTINE NAME: ROLLOUT
 Q118B 5*ENTRY NAME: ROLLOUT
 Q118B 6*STORAGE: 475 (OCTAL) WORDS
 Q118B 7*ROUTINES CALLED: REMARK(Q116B), ENTRTM(N106B),
 Q118B 8* ABNORML(SYSTEM)

Q1198 A* JAN NORRIS C-4 J MELENDEZ 13
 Q1198 B*COPY DAYFILE TO GIVEN FILESET
 Q1198 C*F4 SR7600 CRUS
 Q1198 D* SW 3 LS 0 TYPE 1.2
 Q1198 E* SOURCE OLUPL4 C-4 OBJECT 0 C-4
 Q1198 F**DAYFILE
 Q1198 G*DISK F4 COMPAT WU 07/16/73 DECK NONE
 Q1198 1*FORM: CALL COPYDF (FSNAME)
 Q1198 2*PURPOSE: COPY THE JOB DAYFILE TO THE FILESET - FSNAME-
 Q1198 3*ROUTINE NAME: COPYDF
 Q1198 4*ENTRY NAMES: COPYDF
 Q1198 5*STORAGE: 224 OCTAL WORDS OF SCM
 Q1198 6*ROUTINES CALLED: CLOSER(114B),LENGTH(W204B),REMARK(Q116B),
 Q1198 7* SYSFS(W116B),ADDRGT,DFNAME,FLUSHDF,INPUTC,NARG,
 Q1198 8* OUTPIC (ALL ON SYSTEM)

Q1AA A* LARA BAKER TD-7 J. MELENDEZ 72
 Q1AA B*DATE INCREMENTATION ROUTINE
 Q1AA C*F4 SR6600 SCP 3.1
 Q1AA D* SW 1 LS 2 TYPE 2
 Q1AA E*F4 SOURCE CARDS 68 BCD OBJECT CARDS 17 BIN
 Q1AA F**DATE*CHANGE*JULIAN
 Q1AA G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 Q1AA 1*FORM: NEXT=NXTDAY(IODATE).
 Q1AA 2* I=JULIAN(IODATE)
 Q1AA 3*PURPOSE: IF IODATE CONTAINS THE DATE IN THE FORM
 Q1AA 4* YYMMDD(INTEGER), NEXT WILL CONTAIN THE DATE, IN THE SAME
 Q1AA 5* FORMAT, OF THE NEXT DAY. NXTDAY WILL INCREMENT
 Q1AA 6* CORRECTLY FOR ANY DATE IN A GIVEN CENTURY.
 Q1AA 7* I WILL CONTAIN THE JULIAN DATE (DAY OF THE YEAR) FOR
 Q1AA 8* IODATE IN THE ABOVE FORMAT. IODATE IS NOT ALTERED
 Q1AA 9* BY EITHER ENTRY.
 Q1AA 10*NOTE: THE FIRST VALUE OF IODATE WOULD PROBABLY BE READ INTO
 Q1AA 11* THE MACHINE UNDER AN -I- FORMAT.
 Q1AA 12*ROUTINE NAME: NXTDAY
 Q1AA 13*ENTRY NAMES: NXTDAY, JULIAN
 Q1AA 14*STORAGE: 157 OCTAL WORDS
 Q1AA 15*SELF CONTAINED.

Q3 DYNAMIC STORAGE ALLOCATION

REVIEWER: J. MELENDEZ, C-4

Q301A *(SKFILE) HAS BEEN REDESIGNATED W110A.

Q302A *(RELEASE) HAS BEEN REDESIGNATED W111A.

Q303A *(UNLODE) HAS BEEN REDESIGNATED W112A.

Q304A *(OPEN,CLOSE) HAS BEEN REDESIGNATED W113A.

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Q305B A*          EMILY WILLBANKS  C-2          J MELENDEZ          72
Q305B B*MEMREQ, MEMREL, MEMLEN
Q305B C*CMP          SR7600    CROS
Q305B D*          SW 3          LS 0          TYPE 1,2
Q305B E*SOURCE CARDS          0    C-2    OBJECT CARDS          0    C-2
Q305B F**MEMREQ*MEMREL*MEMLEN
Q305B G* ON DISK    F4    COMPAT    WU 05/03/73REV 1 DECK NONE
Q305B 1*FORM:    CALL MEMREQ(NWDS,TYPE,BN1,BN2,PR)
Q305B 2*          CALL MEMREL(NWDS,TYPE,BN1,BN2,PR)
Q305B 3*          CALL MEMLEN(L,TYPE,BN)
Q305B 4*PURPOSE: MEMREQ REQUESTS NWDS FOR NAMED BLOCK BN1 FROM
Q305B 5*          NAMED BLOCK BN2 AND MEMREL RELEASES NWDS FROM BN1
Q305B 6*          TO BN2 IN LCM OR SCM(TYPE). PR SUPPRESSES DAYFILE
Q305B 7*          COMMENTS. MEMLEN OBTAINS IN L THE LENGTH OF
Q305B 8*          BLOCK NAME BN IN LCM OR SCM.
Q305B 9*ROUTINE NAME: MEMORY
Q305B 10*ENTRY NAMES: MEMREQ, MEMREL, MEMLEN
Q305B 11*STORAGE: 161 (OCTAL) WORDS OF SCM
Q305B 12*ROUTINES CALLED: SELF CONTAINED

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Q306B A* EMILY WILLBANKS C-2 J MELENDEZ 73
 Q306B B*LCROLOT LCRROLIN - MALCM ROLL OUT OR IN
 Q306B C*COMPASS SR7600 CROS
 Q306B D* SW 2 LS 0 TYPE 1,2
 Q306B E* SOURCE 0 C-2 OBJECT 0 C-2
 Q306B F**ROLLOUT*ROLLIN*LCM
 Q306B G* ON DISK F4 COMPAT WU 06/13/73REV.1 DECK NONE
 Q306B 1*FORM: CALL LCRLOLOT(NWDS,LCADD)
 Q306B 2* CALL LCRROLIN(NWDS,LCADD)
 Q306B 3*PURPOSE: ROLL OUT OR ROLL IN DATA BETWEEN MALCM AND
 Q306B 4* RANDOM FILESET RANLCM. DEFAULT NWDS IS ALL OF
 Q306B 5* MALCM. DEFAULT LCADD IS LOCATION ZERO.
 Q306B 6*ROUTINE NAME: LCRLOLOT
 Q306B 7*ENTRY NAMES: LCRLOLOT, LCRROLIN
 Q306B 8*STORAGE: 57 (OCTAL) WORDS SCM
 Q306B 9*ROUTINES CALLED: MEMLEN(Q305B) ON SYSTEM
 Q306B 10*OTHER SCM EXTERNALS: IOGEN(SYSTEM)
 Q306B 11*LCM BLOCK NAME: MALCM

Q3AA A* FRANK MCGIRT C-4 J. MELENDEZ 72
 Q3AA B*ASAP-AUTOMATED STORAGE ALLOCATION PROGRAM
 Q3AA C*F4 SR6600 SCP 3.1
 Q3AA D* SW 24 LS 22 TYPE 2
 Q3AA E*F4 SOURCE CARDS 487 BCD OBJECT CARDS 148 BIN
 Q3AA F**DYNAMIC*ALLOCATION
 Q3AA G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 Q3AA 1*FORM: COMPLETE INSTRUCTIONS FOR USE ARE GIVEN IN K-1-4620,
 Q3AA 2* AN INTERNAL K-1 DOCUMENT WHICH IS ATTACHED TO THIS
 Q3AA 3* WRITEUP, INCLUDING A SAMPLE PROBLEM UTILIZING ALL THE
 Q3AA 4* ASAP FEATURES.
 Q3AA 5*PURPOSE: Q3AA IS A PACKAGE OF SUBROUTINES WHICH CAN BE
 Q3AA 6* USED TO ASSIGN STORAGE AND DEFINE INTEGER POINTERS FOR
 Q3AA 7* USE WITH DYNAMIC STORAGE ALLOCATION PROGRAMMING
 Q3AA 8* TECHNIQUES.
 Q3AA 9*METHOD: SEE K-1-4620 OR ALLEN S. KENNEDY, #POINTR, A
 Q3AA 10* DYNAMIC STORAGE ALLOCATION PROGRAM, # ARGONNE NATIONAL
 Q3AA 11* LABORATORY, AMD-28, FEBRUARY 28, 1967.
 Q3AA 12*ROUTINE NAME: ASAP
 Q3AA 13*ENTRY NAME: ASAP
 Q3AA 14*STORAGE: 1420 OCTAL CELLS.

Q4 GET AND SET JOB-RELATED INFORMATION

E.G., CPAREA, FIELD LENGTH, SENSE SWITCHES, PACKAGE, GETQ, SETQ. (ALSO INCLUDES SOME PROGRAMMING AIDS (SEE X) AND I/O (SEE K).)

REVIEWER: J. MELENDEZ, C-4

Q401A A* C. BOGENHOLM C-2 J. MELENDEZ 67
 Q401A B*CPAREA
 Q401A C*COMPASS SR6600 SCP 3.1
 Q401A D* SW 4 LS 1 TYPE 1.1
 Q401A E*SOURCE CARDS 25 BCD OBJECT CARDS 4 BIN
 Q401A F**CONTROL POINT
 Q401A G*ON DISK F4 COMPAT WU 04/17/73REV 6 DECK 04/01/70REV 2
 Q401A 1*FORM: CALL CPAREA(A)
 Q401A 2*PURPOSE: PROVIDE THE PROGRAMMER WITH THE
 Q401A 3* CONTENTS OF THE CONTROL POINT AREA.
 Q401A 4* WHERE:
 Q401A 5* A = THE FIRST WORD OF AN AREA AT LEAST 200 OCTAL (128
 Q401A 6* DECIMAL) WORDS LONG. THE CONTROL POINT AREA WILL
 Q401A 7* BE COPIED INTO THIS AREA BEGINNING WITH LOCATION
 Q401A 8* A. THE LAST WORD GOES INTO LOCATION A+177 OCTAL
 Q401A 9*STORAGE: 17 OCTAL WORDS
 Q401A 10*TIMING: CP.145 SEC. PP 2.028 SEC.
 Q401A 11*ROUTINES CALLED: THIS PROGRAM USES PP ROUTINE CPA WHICH IS
 Q401A 12 ON SYSTEM.

Q402A A* B. BACON C-2 J. MELENDEZ C-4 67
 Q402A B*OBTAIN JOB NAME
 Q402A C*CMP SR6600 SCP 3.1
 Q402A D* SW 1 LS 0 TYPE 1.2
 Q402A D*E* SOURCE 29 C-2 OBJECT 4 C-2
 Q402A F**JOB NAME
 Q402A G*DISK F4 COMPAT WU 05/01/73 REV.2 DECK NONE
 Q402A 1*FORM: CALL JOBNAME (NAME)
 Q402A 2*PURPOSE: RETURN JOBNAME IN NAME AS DISPLAY CODE
 Q402A 3* NAME = 7HNNNNSSS
 Q402A 4* WHERE NNNN IS FROM THE NAME PARAMETER OF THE JOB
 Q402A 5* CARD AND SSS IS THE SEQUENCE NUMBER.
 Q402A 6*ROUTINE NAME: JOBNAME
 Q402A 7*ENTRY NAMES: JOBNAME
 Q402A 8*STORAGE: 20 OCTAL WORDS
 Q402A 9*ROUTINES CALLED: JBN(PP ROUTINE)

Q405A *(TIDY) HAS BEEN REDESIGNATED L301A.

Q405B *(TIDY) HAS BEEN REDESIGNATED L301B.

Q406A A* ROBERT FORREST C-2 JIM MOORE 69
 Q406A B*GETEQN
 Q406A C*COMPASS SR6600 SCP 3.1
 Q406A D*GETBA,XRCL SW 2 LS 2 TYPE 1
 Q406A E*SOURCE CARDS 55 BCD OBJECT CARDS 4 BIN
 Q406A F**GETEQN
 Q406A G*ON DISK F4 COMPAT WU 04/07/70REV 1 DECK 03/18/69
 Q406A 1*CALL GETEQN(N,I) TO GET THE EQUIPMENT NUMBER ASSIGNED TO
 Q406A 2*A FILE NAME. TIMING IS LESS THAN 1/2 SECOND.
 Q406A 3*STORAGE - 32 OCTAL CM.
 Q406A 4*USES GETBA, XRCL (ON THE SYSTEM).

Q407A A* BILL HUNTEMAN C-2 69
 Q407A B*PROGRAM CYCLE CHECK
 Q407A C*COMPASS SR6600 SCP 3.1
 Q407A D* SW 3 LS 1 TYPE 1
 Q407A E*SOURCE CARDS 45 BCD OBJECT CARDS 5 BIN
 Q407A F**PROGRAM*CYCLE*CHECK
 Q407A G*ON DISK F4 COMPAT WU 05/19/69 DECK 05/19/69
 Q407A 1*CALL NAME CALL INTVL(ERROR RETURN, CONTROL WORD, INTERVAL)
 Q407A 2*PURPOSE ESTABLISHES A SECONDARY TIME LIMIT OR CYCLE CHECK
 Q407A 3*FOR PORTIONS OF A PROGRAM EXECUTION.
 Q407A 4*STORAGE 22 WORDS
 Q407A 5*SELF CONTAINED.

Q408A A* JENNIE BORING C-4 R.M. FRANK 70
 Q408A B*READ/WRITE A BINARY PRU(PHYSICAL RECORD)
 Q408A C*CMP SR6600 SCP 3.1
 Q408A D* SW 3 LS 3 TYPE 1
 Q408A E*SOURCE CARDS 120 BCD OBJECT CARDS 8 BIN
 Q408A F**PRU*READ*WRITE*BINARY
 Q408A G*CARDS F4 COMPAT WU 06/15/70 DECK 06/15/70
 Q408A 1*USE: CALL PRUSIZE(NOWDS,LFN) CALL RDPRU(A,LFN,LEN)
 Q408A 2*CALL WRITPRU(A,LFN,LEN)
 Q408A 3*PURPOSE: ALLOWS USER TO READ OR WRITE A BINARY PHYSICAL
 Q408A 4*RECORD IN CONTRAST TO THE LOGICAL RECORD FACILITY THAT
 Q408A 5*FORTRAN PROVIDES.
 Q408A 6*STORAGE: 71 (OCTAL) WORDS.
 Q408A 7*ROUTINES CALLED: OPEN,CLOSE(Q304A)

Q409A A* J. BORING C-4 70
 Q409A B*DATA TRANSFER FROM ECS TO FILE AND VICE VERSA
 Q409A C*F4 SR6600 SCP 3.1
 Q409A D* SW 2 LS 1 TYPE 1
 Q409A E*SOURCE CARDS 31 BCD OBJECT CARDS 11 BIN
 Q409A F**ECS*READ*WRITE*FILE
 Q409A G*CARDS F4 COMPAT WU 07/27/70 DECK 07/27/70
 Q409A 1*USE: CALL ECSBUFO(FWA,LFN,NOWDS,SCRATCH)
 Q409A 2* CALL ECSBUFI(FWA,LFN,NOWDS,SCRATCH)
 Q409A 3*PURPOSE: ALLOWS THE USER TO DO I/O DIRECTLY TO OR FROM ECS
 Q409A 4*WITHOUT BRINGING THE TOTAL LOGICAL RECORD INTO CORE.
 Q409A 5*STORAGE: 153 (OCTAL) WORDS.
 Q409A 6*ROUTINES CALLED: OPEN(Q304A),PRUSIZE(Q408A),RDPRU(Q408A),
 Q409A 7*WRITPRU(Q408A).

Q410A A* GEORGE V. MARTIN CDC 70
 Q410A B*CPWORD
 Q410A C*COMPASS SR6600 SCP 3.1
 Q410A D* SW 2 LS 1 TYPE 1
 Q410A E*SOURCE CARDS 24 BCD OBJECT CARDS 4 BIN
 Q410A F**CONTROL POINT*CPAREA
 Q410A G*DISK F4 COMPAT WU 08/11/70 DECK 08/11/70
 Q410A 1*USE: CALL CPWORD(A,B)
 Q410A 2*PURPOSE: TO PROVIDE THE FORTRAN PROGRAMMER WITH A SINGLE
 Q410A 3*WORD FROM THE CONTROL POINT AREA. A IS THE NAME OF THE
 Q410A 4*DESIRED CONTROL POINT WORD AS SHOWN ON THE LEFT SIDE OF THE
 Q410A 5*DIAGRAM. E.G., 10HW.CPSTAT OR 10HW.CPTIME .
 Q410A 6*B WILL CONTAIN THE DESIRED WORD.
 Q410A 7*STORAGE: 16 (OCTAL) WORDS.
 Q410A 8*SELF CONTAINED.

Q411A A* R. M. FRANK C=4 70
 Q411A B*READ/WRITE A BINARY BUFFERFULL
 Q411A C*CMP SR6600 SCP 3.1
 Q411A D* SW 3 LS 4 TYPE 1
 Q411A E*SOURCE CARDS 167 BCD OBJECT CARDS 9 BIN
 Q411A F**BUFFER*READ*WRITE*BINARY
 Q411A G*CARDS F4 COMPAT WU 09/22/70 DECK 09/22/70
 Q411A 1*USE: CALL BUFSIZE(NOWDS,LFN)
 Q411A 2* CALL RDBUF(A,LFN,LEN)
 Q411A 3* CALL WRITBUF(A,LFN,LEN)
 Q411A 4*PURPOSE: ALLOWS USER TO READ OR WRITE A BUFFER FULL (BINARY
 Q411A 5*PARITY) IN CONTRAST TO THE LOGICAL RECORD FACILITY THAT
 Q411A 6*FORTRAN PROVIDES.
 Q411A 7*STORAGE: 106 (OCTAL) WORDS.
 Q411A 8*ROUTINES CALLED: OPEN,CLOSE(Q304A).

Q413B A* JERRY MELENDEZ C=4 71
 Q413B B*GET AND SET EXCHANGE PACKAGE
 Q413B C*CMP SR7600 CROS
 Q413B D* SW 3 LS 0 TYPE 1
 Q413B E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 Q413B F**GET*SET*INTERRUPT*EXCHANGE PACKAGE
 Q413B G*ON DISK F4 COMPAT WU 08/04/71 DECK NONE
 Q413B 1*FORM: CALL GETNPK(IPAK)
 Q413B 2* CALL SETNPK(IPAK)
 Q413B 3* CALL GETDPK(IPAK)
 Q413B 4* CALL SETDPK(IPAK)
 Q413B 5* CALL GETTMPK(IPAK)
 Q413B 6* CALL SETTMPK(IPAK)
 Q413B 7* CALL GETSPK(IPAK)
 Q413B 8* CALL SETSPK(IPAK)
 Q413B 9* CALL GETHPK(IPAK)
 Q413B 10* CALL SETHPK(IPAK)
 Q413B 11* IPAK - ARRAY OF DIMENSION AT LEAST 16.
 Q413B 12*PURPOSE: GET OR SET THE EXCHANGE PACKAGES WHICH ARE KEPT BY
 Q413B 13* USER MONITOR FOR EACH OF THE OPERATING STATES.
 Q413B 14*ROUTINE NAME: PACKAGE
 Q413B 15*ENTRY NAMES: GETNPK GETDPK, GETTMPK, GETSPK, GETHPK,
 Q413B 16* GETTEPK, SETNPK, SETDPK, SETTMPK, SETSPK, SETHPK
 Q413B 17*STORAGE: 65 OCTAL WORDS OF SCM.
 Q413B 18*SELF CONTAINED.

Q414B A* JERRY MELENDEZ C-4 J. MELENDEZ 71
 Q414B B*SETQ, GETQ - SET AND GET JOB RELATED QUANTITIES
 Q414B C*CMP SR7600 CROS
 Q414B D* SW 10 LS 0 TYPE 1.2
 Q414B E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 Q414B F**SETQ*GETQ*SET AND*GET*JOB RELATED*QUANTITIES
 Q414B G*ON DISK F4 COMPAT WU 05/09/73 REV.2 DECK NONE
 Q414B 1*FORM! CALL SETQ(KEY,Q,OP)
 Q414B 2* CALL GETQ(KEY,Q)
 Q414B 3*PURPOSE! SET OR GET JOB-RELATED QUANTITIES LOCATED IN
 Q414B 4* SPECIAL USER MONITOR CELLS.
 Q414B 5*TIMING! SETQ - 70 - 120 MS, GETQ - 65 MS
 Q414B 6*ROUTINE NAME! SETQ
 Q414B 7*ENTRY NAMES! SETQ, GETQ
 Q414B 8*STORAGE! 236 OCTAL WORDS OF SCM.
 Q414B 9*SELF CONTAINED.

Q415B A* EMILY WILLBANKS C-2 71
 Q415B B*SLITE,SLITET - SET AND TEST SENSE LIGHTS
 Q415B C*CMP SR7600 CROS
 Q415B D* SW 3 LS 0 TYPE 1
 Q415B E* 0 BCD 0 BIN
 Q415B F**SLITE*SLITET - SET AND TEST*SENSE*LIGHTS
 Q415B G*ON DISK F4 COMPAT WU 07/19/71 DECK NONE
 Q415B 1*FORM! CALL SLITE(I)
 Q415B 2* CALL SLITET(I,J)
 Q415B 3*PURPOSE! SLITE(I) TURNS ON SENSE LIGHT I WHERE 1.LE.I.LE.60.
 Q415B 4* SLITE(0) TURNS OFF ALL LIGHTS.
 Q415B 5* SLITET(I,J) TESTS AND TURNS OFF LIGHT I, SETTING J=1 IF
 Q415B 6* LIGHT WAS ON, J=2 IF OFF.
 Q415B 7*ROUTINE NAME! SLITE
 Q415B 8*ENTRY NAMES! SLITE, SLITET
 Q415B 9*STORAGE! 41B WORDS OF SCM.

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Q416B A*          EMILY WILLBANKS C-2                               71
Q416B B*ONSWCH, OFFSWCH, COMPSW, SSWTCH - SENSE SWITCH ACCESS
Q416B C*CMP          SR7600 CROS
Q416B D*          SW 3      LS 0      TYPE 1
Q416B E*          0      BCD          0      BIN
Q416B F**SSWTCH*ONSWCH*OFFSWCH*COMPSW*SENSE*SWITCH ACCESS
Q416B G*ON DISK    F4 COMPAT WU 07/16/71      DECK NONE
Q416B 1*FORM:    CALL ONSWCH(I)
Q416B 2*          CALL OFFSWCH(I)
Q416B 3*          CALL COMPSW(I)
Q416B 4*          CALL SSWTCH(I,J)
Q416B 5*PURPOSE: ONSWCH TURNS ON SENSE SWITCH I, WHERE 1.LE.I.LE.60.
Q416B 6*          OFFSWCH TURNS OFF SWITCH I.
Q416B 7*          COMPSW SWITCHES SWITCH I.
Q416B 8*          SSWTCH TESTS AND TURNS OFF SWITCH I, SETTING J=1
Q416B 9*          IF SWITCH I WAS ON, J=2 IF OFF.
Q416B 10*ROUTINE NAME: SSWTCH
Q416B 11*ENTRY NAMES: SSWTCH, ONSWCH, OFFSWCH, COMPSW
Q416B 12*STORAGE: 66B WORDS OF SCM.
Q416B 13*ROUTINE CALLED: SYSTEM (ON THE SYSTEM).

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Q417B A*          JAN NORRIS          C-2          J. MELENDEZ          71
Q417B B*RDBUF - READ OR WRITE FIXED NUMBER WORDS FROM/TO FILESET
Q417B C*CMP          SR7600 CROS
Q417B D*          SW 3      LS 0      TYPE 1.2
Q417B E*          SOURCE NONE C-2          OBJECT NONE C-2
Q417B F**RDBUF*READ OR*WRITE*FIXED*NUMBER WORDS FROM/TO*FILESET
Q417B G*DISK      F4 COMPAT WU 06/06/73 REV.1 DECK NONE
Q417B 1*FORM:    CALL RDBUF(FSET,BUFFER,LENGTH,LENGTH2,LSTATUS,I)
Q417B 2*          CALL WTBUF(FSET,BUFFER,LENGTH,I)
Q417B 3*PURPOSE: RDBUF IS USED TO READ A SPECIFIED NUMBER OF WORDS
Q417B 4* FROM A DESIGNATED SEQUENTIAL FILESET. WTBUF IS USED TO
Q417B 5* WRITE A SPECIFIED NUMBER OF WORDS TO A DESIGNATED SEQUEN-
Q417B 6* TIAL FILESET. THESE ROUTINES READ BINARY INFORMATION
Q417B 7* WITHOUT REGARD TO FORMAT CONSIDERATION.
Q417B 8*ROUTINE NAME: RDBUF
Q417B 9*ENTRY NAMES: RDBUF,WTBUF
Q417B 10*STORAGE: 131 (OCTAL) WORDS.
Q417B 11*ROUTINES CALLED: ABNORML, GETBA, SYSTEM (ALL ON SYSTEM).

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Q418A A* M. CARPENTER C-2 J. MELENDEZ, C-4 72
 Q418A B*OBTAIN MACHINE NUMBER OF COMPUTER
 Q418A C*F4 SR6600 SCP 3.1
 Q418A D* SW 1 LS 0 TYPE 1.2
 Q418A E* SOURCE 4 C-2 OBJECT 0 C-2
 Q418A F**MACHINE NUMBER
 Q418A G*DISK F4 COMPAT WU 04/20/73 DECK NONE
 Q418A 1*FORM: CALL MACH (N)
 Q418A 2*PURPOSE: RETURN THE MACHINE NUMBER OF THE COMPUTER UPON
 Q418A 3* WHICH THIS JOB IS CURRENTLY RUNNING.
 Q418A 4* N WILL BE SET TO 0, 1, OR 2.
 Q418A 5*ROUTINE NAME: MACH
 Q418A 6*ENTRY NAMES: MACH
 Q418A 7*STORAGE: 12 OCTAL WORDS
 Q418A 8* SELF CONTAINED

Q4AA A* DUANE HARDER C-2 70
 Q4AA B*LINES
 Q4AA C*CMP SR6600 SCP 3.1
 Q4AA D* SW 1 LS 0 TYPE 2
 Q4AA E* 0 BCD OBJECT CARDS 4 BIN
 Q4AA F**OUTPUT*LINE*LIMIT
 Q4AA G*CARDS F4 COMPAT WU 02/20/70 DECK 02/20/70
 Q4AA 1*CALL NAME: LINES
 Q4AA 2*PURPOSE: LINES IS A FUNCTION SUBPROGRAM WHICH RETURNS THE
 Q4AA 3*NUMBER OF LINES AVAILABLE ON THE OUTPUT (PRINT) FILE.
 Q4AA 4*USAGE: I = LINES(DUM.) DUM IS A DUMMY VARIABLE WHICH IS
 Q4AA 5*USED ONLY TO INDICATE TO THE COMPILER THAT LINES IS A
 Q4AA 6*FUNCTION.
 Q4AA 7*STORAGE: 10 (OCTAL) WORDS.
 Q4AA 8*ROUTINES CALLED: GETBA (SYSTEM ROUTINE).

T

APPLICATIONS AND APPLICATION-ORIENTED PROGRAMS

REVIEWER: SEE SUBMITTER FOR PARTICULAR #T# ROUTINE

T1 PHYSICS (INCLUDING NUCLEAR)

T1AB A* CHARLES WILSON C-7 FRED CORNWELL 69
 T1AB B*TACS1 TRANSPORT AND CHARGE STORAGE DEVICE ANALYSIS CODE
 T1AB C*F4 6600 SCP 3.1
 T1AB D* SW 37 LS 72 TYPE 2
 T1AB E*SOURCE CARDS 3421 BCD 0 BIN
 T1AB F**TACS1*TRANSPORT AND*CHARGE*STORAGE*DEVICE*ANALYSIS CODE
 T1AB G*CARDS F4 COMPAT WU 12/08/69 DECK 12/08/69
 T1AB 1*USES THE FOLLOWING SUBROUTINES: ADV(J506A),CONVRT(J526A),
 T1AB 2*ERF(C310A),GYA(J518A),PLOT(J541A),SORT1(M101A),
 T1AB 3*SPLIT(J508A),TCP(J521A),TSP(J520A),WLCH(J542A),WLCV(J542A).

T4 ENGINEERING

T4AA A* LUKE NEY J-7 71
T4AA B*CBSIII - BEAM FRAME SYSTEM ANALYZER
T4AA C*F4 CMP MP6600 SCP 3.1SC4020
T4AA D* SW 33 LS 0 TYPE 2
T4AA E*F4,CMP SOURCE CARDS NONE OBJECT CARDS NONE
T4AA F**CBSIII*BEAM*FRAME*SYSTEM*ANALYZER
T4AA G*ON TAPE F4 COMPAT WU 07/28/71 DECK NONE
T4AA 1*FORM: MAIN PROGRAM
T4AA 2*PURPOSE: BEAM FRAME SYSTEM ANALYZER PROGRAM.
T4AA 3* 100 BRANCH * 101 BRANCH INTERSECTION POINT CAPACITY.
T4AA 4*TIMING: MAXIMUM IS 5 MINUTES
T4AA 5*ROUTINE NAME: CBSIII
T4AA 6*STORAGE: 156000 OCTAL WORDS CENTRAL MEMORY
T4AA 7* AND 607000 OCTAL WORDS ECS
T4AA 8*ROUTINES CALLED: ADV(J506A),SPLOT(J508A),PLOT(J541A),
T4AA 9* WLCH AND WLCV(J542A),SIN AND COS(B106A),
T4AA 10* ECWR,ECRD,LOCF (ALL ON SYSTEM).
T4AA 11*NOTE: BINARY AVAILABLE ON MAGNETIC TAPES; LC996L00
T4AA 12* OR LB797L00.
T4AA 13* CBSIII HAS THE FOLLOWING PROGRAM CARD;
T4AA 14* PROGRAM CBS3(INPUT,OUTPUT,FILM,TAPE7,TAPE8)

T4AB A* TOM DOYLE C-6 TOM DOYLE 73
T4AB B*LENS DESIGN
T4AB C*F4 MP7600 CROS
T4AB D* SW 14 LS 0 TYPE 2
T4AB E* SOURCE TAPE NO. LE441L00
T4AB F**LENS DESIGN
T4AB G*TAPE AND FILESET F4 COMPAT WU 04/27/73 DECK NONE
T4AB 1*FORM I MAIN PROGRAM
T4AB 2*PURPOSE: LENS DESIGN
T4AB 3*ROUTINE NAME: LENSDES
T4AB 4*STORAGE: 100300 OCTAL WORDS OF SCM, ALL OF LCM
T4AB 5*ROUTINES CALLED: OPTIMIZ(E4AA)

U

LANGUAGES

U1 ASSEMBLY
 E.G., COMPASS.
 REVIEWER: J. MOORE, C-2

U101A *(FTN) HAS BEEN REDESIGNATED U2AA.

U102A *(LAGENT) HAS BEEN REDESIGNATED U1AA.

U1AA A* GLEN CARTER C-4 J. MOORE 72
 U1AA B*LACENT 6600 ASSEMBLY LANGUAGE
 U1AA C*LACENT MP6600 SCP 3.1
 U1AA D* SW 55 LS 0 TYPE 2
 U1AA E*SOURCE CARDS 0 OBJECT CARDS 0
 U1AA F**LACENT*ASSEMBLER
 U1AA G*ON DISK WU 09/22/72 DECK NONE
 U1AA 1*FORM; MAIN PROGRAM
 U1AA 2*PURPOSE; LACENT IS A 6600 ASSEMBLY LANGUAGE ON THE SYSTEM,
 U1AA 3* CALLABLE VIA CONTROL CARDS.
 U1AA 4*ROUTINE NAME; LACENT
 U1AA 5*STORAGE; 40000 (OCTAL) WORDS
 U1AA 6*SELF CONTAINED.

U2

COMPILING

E.G., RUN.

REVIEWER: J. MOORE, C-2

U2AA A* BARBARA BACON C-2 J. MOORE 72
 U2AA B*FTN-FORTRAN EXTENDED LANGUAGE
 U2AA C*CMP MP6600 SCP 3.1
 U2AA D* SW 24 LS 0 TYPE 2
 U2AA E*SOURCE CARDS NONE OBJECT CARDS NONE
 U2AA F**FTN*FORTRAN*EXTENDED*COMPILER
 U2AA G*ON DISK F4 COMPAT WU 02/22/72 DECK NONE
 U2AA 1*FORM: MAIN PROGRAM
 U2AA 2*PURPOSE: FTN, FORTRAN EXTENDED, IS A FORTRAN COMPILER ON
 U2AA 3* THE SYSTEM, CALLABLE VIA CONTROL CARDS.
 U2AA 4*ROUTINE NAME: FTN
 U2AA 5*STORAGE: 50000 (OCTAL) WORDS
 U2AA 6*SELF CONTAINED.

V

(WILL NOT BE USED FOR FUTURE PROGRAMS)

V102A *(RANDOM) HAS BEEN REDESIGNATED G801A.

V103A *(RANF) HAS BEEN REDESIGNATED G802A.

V201A *(MESSNI) HAS BEEN REDESIGNATED 0803A.

W

FILE MANIPULATION

W1 ACCESS

E.G., OPEN, CLOSE, CREATE, RELEASE, MODIFY, UNLOAD,
RENAME, SWITCH, GET RQT, DATAREL. (ALSO SEE Q1).

REVIEWER: J. NORRIS, C-2

W104B A* J. NORRIS C-4 J. NORRIS 73
 W104B B*CHANGE NAME IN FILESET REQUEST TABLE
 W104B C*CMP SR7600 CROS
 W104B D* SW 3 LS 0 TYPE 1.2
 W104B E* SOURCE 0 ULUPL4 C-2 OBJECT 0 C-2
 W104B F**RENAME*RQT
 W104B G*DISK F4 COMPAT WU 07/13/73 DECK NONE
 W104B 1*FORM: CALL RENAME (FS1,FS2)
 W104B 2*PURPOSE: CHANGE THE NAME IN A FILESET REQUEST TABLE
 W104B 3* FS1 = THE ORIGINAL NAME AS ON THE PROGRAM CARD
 W104B 4 FS2 = THE NEW NAME
 W104B 5*ROUTINE NAME: RENAME
 W104B 6*ENTRY NAMES: RENAME
 W104B 7*STORAGE: 115 OCTAL WORDS OF SCM
 W104B 8*ROUTINES CALLED: GETBA,SYSTEM,ABNORML,BS4020,RQTA.
 W104B 9* (ALL ON SYSTEM)

W105B A* JERRY MELENDEZ C-4 71
 W105B B*RELEASE DATA FROM A TEMPORARY SEQUENTIAL FILESET
 W105B C*CMP SR7600 CROS
 W105B D* SW 2 LS 0 TYPE 1
 W105B E*CMP SOURCE CARDS 0 BCD OBJECT CARDS 0 BIN
 W105B F**RELEASE*DATA FROM A*TEMPORARY*SEQUENTIAL*FILESET
 W105B G*ON DISK F4 COMPAT WU 08/04/71 DECK NONE
 W105B 1*FORM: CALL DATAREL(NAME1,NAME2)
 W105B 2*PURPOSE: RELEASE DATA FROM A TEMPORARY SEQUENTIAL FILESET
 W105B 3* WITHOUT CHANGING ANY OTHER ATTRIBUTES OF THE FILESET.
 W105B 4*ROUTINE NAME: DATAREL
 W105B 5*ENTRY NAME: DATAREL
 W105B 6*STORAGE: 150 OCTAL WORDS OF SCM.
 W105B 7*ROUTINES USED: AFSREL(W101B), GETBA, SYSTEM, ABNORML,
 W105B 8* (ALL ON SYSTEM).


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W106B A*           R. STUTZ           TD-3           71
W106B B*FORQTS - CREATE RQT FOR FILESET
W106B C*CMP           SR7600   CROS
W106B D*           SW 2           LS 2           TYPE 1
W106B E*CMP SOURCE CARDS 49   BCD   OBJECT CARDS 4   BIN
W106B F**FORQTS*CREATE*RQT FOR*FILESET
W106B G*ON DISK      F4   COMPAT   WU 05/15/72REV.1 DECK05/15/72REV.1
W106B 1*FORM: CALL FORQTS(FS,ARRAY)
W106B 2*PURPOSE: CREATE I/O REQUEST TABLE(RQT) IN 20-WORD ARRAY
W106B 3*   FOR FILESET FS.
W106B 4*ROUTINE NAME: FORQTS
W106B 5*ENTRY NAME: FORQTS
W106B 6*STORAGE: 12 (OCTAL) WORDS.
W106B 7*SELF CONTAINED.

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W108B A*           NICK NAGY           C-2           J. NORRIS           72
W108B B*CREVER
W108B C*F 4   CMP           SR7600   CROS
W108B D*           SW 3           LS 0           TYPE 1.2
W108B E*NO CARDS
W108B F**CREVER
W108B G*ON DISK      F4   COMPAT   WU 05/03/73REV.1 DECK NONE
W108B 1*FORM: CALL GETQ(4LKCCF,ICCD)
W108B 2*           CALL SETQ(36,ICCD)
W108B 3*           CALL SETQ(37,PW)
W108B 4*           CALL CREVER(FS,CL,OAC,0,NF,MT,MTB,FSL)
W108B 5*PURPOSE: STAGE TAPE AND RESTORE RESIDENT FILESETS
W108B 6*ROUTINE NAME: CREVER
W108B 7*ENTRY NAME: CREVER
W108B 8*STORAGE: 1005 OCTAL WORDS OF SEM. (NOTE THAT CKSUM(K307B)
W108B 9*           REQUIRES 10000 OCTAL WORDS OF LCM FROM THE FREE POOL
W108B 10*          AND/OR MALCM.)
W108B 11*ROUTINES CALLED: GETQ(Q414B), XIT(N108B), RDBUF(Q417B),
W108B 12*          SKIPF(W302B), SETQ(Q414B), CREATE(L401B), ABORT(N203B)
W108B 13*          REWIND((W301B), OPEN(Q304B), CKSUM(K307B),
W108B 14*          MEMLEN(Q305B), MESSAGE(Q116B) AFSREL, ADDRQT, RENAME,
W108B 15*          ENDFIL, CLOSER, (ALL ON SYSTEM).

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W109B A* FRED SCHILLING C-2 J. NORRIS 72
 W109B B*OPERM
 W109B C*F4 CMP SR7600 CROS
 W109B D* SW 2 LS 0 TYPE 1
 W109B E*NO CARDS
 W109B F**OPERM
 W109B G*ON DISK F4 COMPAT WU 05/12/72 DECK NONE
 W109B 1*FORM: CALL OPERM(FS,QAC,PW,FSI,BUF)
 W109B 2*PURPOSE: TEST FILESET FOR EMPTY
 W109B 3*ROUTINE NAME: OPERM
 W109B 4*ENTRY NAME: OPERM
 W109B 5*STORAGE: 367 OCTAL WORDS SCM
 W109B 6*ROUTINES CALLED: GETQ(Q414B), SETQ(Q414B), RDBUF(Q417B),
 W109B 7* REWIND(W310B),OPERM1,OPERM2,OPEN,ABNORME(ALL ON
 W109B 8* THE SYSTEM).

W110A A* D. HARDER C-4 JAN NORRIS 72
 W110A B*SKPFIL OR SKFILE TO SKIP FILES
 W110A C*CMP SR6600 SCP 3.1
 W110A D* SW 3 LS 4 TYPE 1
 W110A E*CMP SOURCE CARDS 137 BCD OBJECT CARDS 9 BIN
 W110A F**TAPE*FILE
 W110A G*ON DISK F4 COMPAT WU 08/29/72 DECK 08/29/72
 W110A 1*FORM: CALL SKPFIL(ITPNO,NOFILS,IPAR)
 W110A 2* CALL SKFILE(LOGTPN,NOFILS,IPAR)
 W110A 3*PURPOSE: SKPFIL OR SKFILE MAY BE USED TO MOVE FORWARD OR
 W110A 4* BACKWARD TO ANY FILE MARK ON A TAPE OR DISK.
 W110A 5*ROUTINE NAME: SKFILE
 W110A 6*ENTRY NAMES: SKPFIL,SKFILE
 W110A 7*STORAGE: 112 OCTAL WORDS.
 W110A 8*ROUTINES CALLED: CPC(ON THE SYSTEM).

W111A A* SCHULTZ, D.E. C-2 JAN NORRIS 72
 W111A B*RELEASE MAGNETIC TAPE UNIT
 W111A C*CMP SR6600 SCP 3.1
 W111A D* SW 1 LS 4 TYPE 1
 W111A E*CMP SOURCE CARDS 112 BCD OBJECT CARDS 8 BIN
 W111A F**RELEASE*MAGNETIC*TAPE
 W111A G*ON DISK F4 COMPAT WU 08/29/72 DECK 08/29/72
 W111A 1*FORM: CALL RELEASE(N)
 W111A 2*PURPOSE: REWIND AND UNLOAD TAPE DURING EXECUTION, WHEN THE
 W111A 3* PROGRAM NO LONGER HAS ANY USE FOR THE TAPE. N IS EITHER
 W111A 4* A LOGICAL TAPE NUMBER OR A LEFT ADJUSTED HOLLERITH
 W111A 5* LITERAL, I.E., 5LTAPE3
 W111A 6*ROUTINE NAME: RELEASE
 W111A 7*ENTRY NAME: RELEASE
 W111A 8*TIMING: NOT APPLICABLE
 W111A 9*STORAGE: 50 OCTAL WORDS
 W111A 10*ROUTINES CALLED: ZFN(ON THE SYSTEM).

W112A A* BARBARA BACON C-2 JAN NORRIS 72
 W112A B*REWIND AND UNLOAD A MAGNETIC TAPE
 W112A C*CMP SR6600 SCP 3.1
 W112A D* SW 2 LS 3 TYPE 1
 W112A E*CMP SOURCE CARDS 87 BCD OBJECT CARDS 6 BIN
 W112A F**UNLOAD*UNLODE*MAGNETIC*TAPE
 W112A G*ON DISK F4 COMPAT WU 08/29/72 DECK 08/29/72
 W112A 1*FORM: CALL UNLODE(N)
 W112A 2*PURPOSE: REWIND AND UNLOAD A TAPE DURING EXECUTION SO
 W112A 3* THAT A CONTINUATION TAPE CAN BE USED. N IS EITHER A
 W112A 4* LOGICAL TAPE NUMBER OR A LEFT ADJUSTED HOLLERITH
 W112A 5* LITERAL, I.E., 5LTAPE3
 W112A 6*ROUTINE NAME: UNLODE
 W112A 7*ENTRY NAME: UNLODE
 W112A 8*STORAGE: 52 OCTAL WORDS.
 W112A 9*SELF CONTAINED.

W113A A* JENNIE BORING C-DO JAN NORRIS 72
 W113A B*OPEN AND CLOSE FILES
 W113A C*CMP SR6600 SCP 3.1
 W113A D* SW 1 LS 3 TYPE 1
 W113A E*CMP SOURCE CARDS 76 BCD OBJECT CARDS 7 BIN
 W113A F**OPEN*CLOSE*FILE
 W113A G*CARDS F4 COMPAT WU 08/29/72 DECK 08/29/72
 W113A 1*FORM: CALL OPEN(KODE,NAME)
 W113A 2* CALL CLOSE(KODE,NAME)
 W113A 3*PURPOSE: KODE IS A FUNCTION CODE FROM SCOPE 3.1 MANUAL.
 W113A 4* SUGGESTED VALUES FOR KODE ON OPEN ARE 122B FOR BINARY
 W113A 5* AND 120B FOR BCD. SUGGESTED VALUES ON CLOSE ARE 132B
 W113A 6* FOR BINARY AND 130B FOR BCD. NAME EITHER A LOGICAL UNIT
 W113A 7* NUMBER OR A LEFT ADJUSTED HOLLERITH LITERAL, I.E.,
 W113A 8* 6LTAPE10.
 W113A 9*ROUTINE NAME: OPEN
 W113A 10*ENTRY NAMES: OPEN, CLOSE
 W113A 11*STORAGE: 51 OCTAL WORDS
 W113A 12*SELF CONTAINED.

W114B A* N. NAGY C-2 J. NORRIS 73
 W114B B*CLOSE AND REWIND FILESET
 W114B C*COMPASS SR7600 CROS
 W114B D* SW 2 LS 0 TYPE 1
 W114B E*NO CARDS
 W114B F**CLOSE*FILESET*REWIND
 W114B G*ON DISK F4 COMPAT WU 02/01/73 DECK NONE
 W114B 1*FORM: CALL CLOSER (FSET)
 W114B 2*PURPOSE: CLOSE AND REWIND THE FILESET
 W114B 3*ROUTINE NAME: CLOSER
 W114B 4*ENTRY NAME: CLOSER
 W114B 5*STORAGE: 71 (OCTAL) WORDS
 W114B 6*ROUTINES CALLED: GETBA, BS4020, RQTA.(ALL ON SYSTEM)

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W115B A*          JAN NORRIS          C-2          JAN NORRIS          73
W115B B*OPEN A FILESET
W115B C*CMP          SR7600          CROS
W115B D*          SW 6          LS 0          TYPE 1.2
W115B E*NO CARDS
W115B F**OPEN*SEQUENTIAL*FILESET*BUFFER
W115B G*ON DISK          F4 COMPAT          WU 03/27/73          DECK NONE
W115B 1*FORM: CALL OPEN(FS,TYPE,BUF,USE,OAC,PW,SCT,ADISP,DEV)
W115B 2*PURPOSE: MAKE A FILESET AVAILABLE TO A JOB, SET
W115B 3*          FILESET PARAMETERS, AND ESTABLISH BUFFERS.
W115B 4*          FS=FILESET NAME(REQUIRED)
W115B 5*          TYPE=2LST,2LSR,2LRT, OR 2LRR
W115B 6*          BUF=LCM BUFFER LENGTH
W115B 7*          USE=1LR OR 2LRW
W115B 8*          OAC=OWNER ACCESS CODE
W115B 9*          PW=PASSWORD
W115B 10*         SCT=SECTOR LIMIT
W115B 11*         ADISP=3LPRT,4LPCHB,5LPCHD1,5LPCH80,4LTAPE,
W115B 12          4LFILM,5LSFILM,4LNONE,3LNOT - IN TABLE FORM.
W115B 13*         DEV=5LDISKA,5LDISKB, OR 5LDISKC
W115B 14*ROUTINE NAME: OPEN
W115B 15*ENTRY NAME: OPEN
W115B 16*STORAGE: 502 OCTAL WORDS OF SCM
W115B 17*ROUTINES CALLED: GETBA,SYSFS (ON SYSTEM)

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W116B A*          JAN NORRIS          C-2          J NORRIS          73
W116B B*SYSFS - CHECK FILESET NAME, AND FORMAT IF IT IS AN INTEGER
W116B C*CMP          SR7600          CROS
W116B D*          SW 2          LS 0          TYPE 1.2
W116B E*NO CARDS
W116B F**FILESET*NAME
W116B G*ON DISK          F4 COMPAT          WU 04/12/73          DECK NONE
W116B 1*FORM: CALL SYSFS(INAME,ONAME)
W116B 2*PURPOSE: CHECK INAME TO SEE IF IT IS A LEGAL FILESET
W116B 3*          NAME OR INTEGER 1-99. IF IT IS AN INTEGER N, CONVERT
W116B 4*          IT TO FSETN. THE PROPERLY FORMATTED NAME IS RETURNED
W116B 5*          IN ONAME. IF INAME IS NOT A LEGAL FILESET NAME OR
W116B 6*          NUMBER, -1 IS RETURNED.
W116B 7*ROUTINE NAME: SYSFS
W116B 8*ENTRY NAME: SYSFS
W116B 8*STORAGE: 34 OCTAL WORDS OF SCM.
W116B 10*ROUTINES CALLED: SELF CONTAINED

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W117B A* JAN NORRIS C-4 JAN NORRIS 13
W117B B*ACTIVE FILESET RELEASE - RELEASE BUFFER, INITIATE OUTPUT
W117B C*CMP SR7600 CRUS
W117B D* SW 5 LS 0 TYPE 1.2
W117B E* SOURCE 0 ULUPL4 C-2 OBJECT 0 C-2
W117B F**AFSREL*ACTIVE*FILESET*RELEASE*BUFFER*DISPOSITION
W117B G*DISK F4 COMPAT WU 07/06/73 DECK NONE
W117B 1*FORM: CALL AFSREL(FS,A DISP,ITAPE,RENAME)
W117B 2*PURPOSE: INITIATE OUTPUT PROCESSING OF AN ACTIVE
W117B 3* FILESET BEFORE JOB COMPLETION AND RELEASE UNNEEDED
W117B 4* LCM AND DISK SPACE.
W117B 5* FS = NAME OF FILESET TO BE RELEASED (REQUIRED).
W117B 6* A DISP = TABLE OF DISPOSITIONS.
W117B 7* ITAPE = POSTSTAGE PARAMETERS (MODE,DENSITY,FILES,LABEL).
W117B 8* RENAME = NEW FILESET NAME.
W117B 9*ROUTINE NAME: AFSREL
W117B 10*ENTRY NAMES: AFSREL
W117B 11*STORAGE: 665 OCTAL WORDS OF SCM
W117B 12*ROUTINES CALLED: SYSFS(W116B),GETBA,BS4020 (ON SYSTEM)
W117B 13*OTHER EXTERNAL: RQTA.

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W118B A*          JAN NORRIS          C-4          JAN NORRIS          73
W118B B*CREATE A FILESET OR MODIFY RESIDENT FILESET PARAMETERS
W118B C*CMP          SR7600          CRUS
W118B D*          SW 11          LS 0          TYPE 1.2
W118B E*          SOURCE OLDPL4 C-4          OBJECT 0          C-4
W118B F**CREMOD*CREATE*MODIFY*RESIDENT*FILESET
W118B G*DISK          F4 COMPAT WU 07/06/73          DECK NONE
W118B 1*FORM: CALL CREATE(FS,CL,TYPE,OPW,REL,RDISP,ITAPE,RWU,
W118B 2*          RU,SCT,DEV)
W118B 3*          CALL MODIFY(FS,OPW,REL,RDISP,DROP,RWU,RU,SCT,
W118B 4*          RENAME)
W118B 5*PURPOSE: CREATE AND ACTIVATE FILESET, STAGE IN TAPE.
W118B 6* FS=FILESET NAME,          CL=CLASSIFICATION.
W118B 7* TYPE=2LST,2LSR,2LRT,OK 2LRR,          OPW=OWNER PASSWORD.
W118B 8* REL=RELEASE DATE.
W118B 9* RDISP=TABLE OF DISPOSITIONS.
W118B 10* ITAPE=PRESTAGE PARAMETERS(MODE,DENSITY,FILES,LABEL).
W118B 11* RWU=TABLE OF READ/WRITE USERS AND PASSWORDS.
W118B 12* RU=TABLE OF READ ONLY USERS AND PASSWORDS.
W118B 13* SCT=SECTOR LIMIT,          DEV=DEVICE.
W118B 14* DROP=TABLE OF USERS TO BE DROPPED.
W118B 15* RENAME=NEW FILESET NAME.
W118B 16*ROUTINE NAME: CREMOD
W118B 17*ENTRY NAMES: CREATE,MODIFY
W118B 18*STORAGE: 1754 OCTAL WORDS OF SCM.
W118B 19*ROUTINES CALLED: SYSFS(W116B), GETBA(SYSTEM).

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W2 GET INFORMATION ON STATUS OF I/O
 E.G., IF(EOF), LENGTH, BOI, IOCHECK.
 REVIEWER: J. NORRIS, C-2

W201B A* EMILY WILLBANKS C-2 71
 W201B B*BOI - BEGINNING OF INFORMATION TEST
 W201B C*CMP SR7600 CROS
 W201B D* SW 3 LS 0 TYPE 1
 W201B E* 0 BIN 0 BCD
 W201B F**BOI*I/O STATUS
 W201B G*ON DISK F4 COMPAT WU 06/28/71 DECK NONE
 W201B 1*FORM: Y=BOI(N)
 W201B 2*PURPOSE: FUNCTION TO DETERMINE STATUS (BOI) OF I/O ON
 W201B 3* UNIT N. RETURNS NON-ZERO IF FILESET POSITIONED AT BOI.
 W201B 4* =+0 IF FILESET NOT POSITIONED AT BOI.
 W201B 5*ROUTINE NAME: BOI
 W201B 6*ENTRY NAME: BOI
 W201B 7*STORAGE: 44 OCTAL WORDS OF SCM.
 W201B 8*ROUTINES CALLED: GETBA, OPEN., WAITR, SYSTEM, ABNORML,
 W201B 9* (ALL ON SYSTEM).

W202B A* EMILY WILLBANKS C-2 71
 W202B B*EOI - END OF INFORMATION TEST
 W202B C*CMP SR7600 CROS
 W202B D* SW 3 LS 0 TYPE 1
 W202B E* 0 BIN 0 BCD
 W202B F**EOI*I/O*STATUS
 W202B G*ON DISK F4 COMPAT WU 06/28/71 DECK NONE
 W202B 1*FORM: Y=EOI(N)
 W202B 2*PURPOSE: FUNCTION TO DETERMINE STATUS (EOI) OF I/O ON
 W202B 3* UNIT N. RETURNS NON-ZERO IF EOI STATUS, =+0 IF
 W202B 4* NO EOI STATUS.
 W202B 5*ROUTINE NAME: EOI
 W202B 6*ENTRY NAME: EOI
 W202B 7*STORAGE: 16B WORDS OF SCM.
 W202B 8*ROUTINES CALLED: GETBA, WAITR, SYSTEM, ABNORML, (ALL
 W202B 9* ON SYSTEM).

W203B A* ANN SOLEM C=4 71
 W203B B*IOCHECK - DETERMINE STATUS OF I/O REQUEST
 W203B C*FIV SR7600 CROS
 W203B D* SW 4 LS 0 TYPE 1
 W203B E* 0 BCD 0 BIN
 W203B F**IOCHECK - DETERMINE*STATUS OF*I/O REQUEST
 W203B G*ON DISK F4 COMPAT WU 06/22/71 DECK NONE
 W203B 1*FORM: J=IOCHECK(I,ITIME)
 W203B 2*PURPOSE: FUNCTION TO DETERMINE STATUS (EOF,EOI) OF I/O ON
 W203B 3* UNIT I. ITIME MAY BE SET TO AMOUNT OF TIME WAITED IF
 W203B 4* ITIME.EQ.2
 W203B 5*ROUTINE NAME: IOCHECK
 W203B 6*ENTRY NAME: IOCHECK
 W203B 7*STORAGE: 240B WORDS OF SCM.
 W203B 8*ROUTINES CALLED: BOI, EOI, IOCHECK, LENGTH,
 W203B 9* OUTPTC (ALL ON SYSTEM).

W204B A* EMILY WILLBANKS C=2 71
 W204B B*LENGTH - AMOUNT OF DATA TRANSFERRED BY INPUT OPERATION
 W204B C*CMP SR7600 CROS
 W204B D* SW 2 LS 0 TYPE 1
 W204B E* 0 BCD 0 BIN
 W204B F**LENGTH - AMOUNT OF DATA TRANSFERRED BY*INPUT OPERATION
 W204B G*ON DISK F4 COMPAT WU 07/19/71 DECK NONE
 W204B 1*FORM: L=LENGTH(N)
 W204B 2*PURPOSE: INTEGER FUNCTION TO RETURN THE NUMBER OF WORDS
 W204B 3* TRANSFERRED INTO MEMORY BY THE PREVIOUS I/O OPERATION
 W204B 4* ON UNIT N.
 W204B 5*ROUTINE NAME: LENGTH
 W204B 6*ENTRY NAME: LENGTH
 W204B 7*STORAGE: 20B WORDS OF SCM.
 W204B 8*ROUTINES CALLED: SYSTEM, ABNORML, GETBA, WAITR,
 W204B 9* (ALL ON SYSTEM).

W205B A* R. STUTZ TD=3 71
 W205B B*GETADD - GET ADDRESS OF RQT FOR A FILESET
 W205B C*CMP SR7600 CROS
 W205B D* SW 2 LS 2 TYPE 1
 W205B E*CMP SOURCE CARDS 48 BCD OBJECT CARDS 4 BIN
 W205B F**GETADD*ADDRESS*RQT
 W205B G*CARDS F4 COMPAT WU 10/14/71 DECK 10/14/71
 W205B 1*FORM: RQT = GETADD(N)
 W205B 2*PURPOSE: RETURN ADDRESS OF I/O REQUEST TABLE(RQT) FOR
 W205B 3* FILESET N.
 W205B 4*ROUTINE NAME: GETADD
 W205B 5*ENTRY NAME: GETADD
 W205B 6*STORAGE: 13 (OCTAL) WORDS.
 W205B 7*ROUTINES CALLED: FORMF(W208B).

W206B A* EMILY WILLBANKS C-2 J. NORRIS 71
 W206B B*IDONE, IDONEQ, ISTATUS
 W206B C*CMP SR7600 CROS
 W206B D* SW 2 LS 3 TYPE 1
 W206B E*CMP SOURCE CARDS 94 BCD OBJECT CARDS 5 BIN
 W206B F**IDONE*IDONEQ*ISTATUS*STATUS
 W206B G*ON DISK F4 COMPAT WU 10/10/72REV 1 DECK 10/10/72REV 1
 W206B 1*FORM: I = IDONE(N)
 W206B 2* I = IDONEQ(RQT)
 W206B 3* I = ISTATUS(RQT)
 W206B 4*PURPOSE: IDONE/IDONEQ FUNCTION RETURNS STATUS OF I/O FOR
 W206B 5* FILESET N OR FOR FILESET IN REQUEST TABLE RQT.=1 FOR
 W206B 6* I/O COMPLETE. =0 OTHERWISE. ISTATUS FUNCTION RETURNS
 W206B 7* THE I/O STATUS AS IS OF THE INDICATED FS. IDONE IS
 W206B 8* SLOWER THAN IDONEQ OR ISTATUS.
 W206B 9*ROUTINE NAME: IDONE
 W206B 10*ENTRY NAMES: IDONE, IDONEQ, ISTATUS
 W206B 11*STORAGE: 13 OCTAL WORDS.
 W206B 12*ROUTINES CALLED: GETBA(ON THE SYSTEM).

W207B *(STATUS) DELETED FROM LIBRARY-NOW COMBINED WITH W206B.

W208B A* R. STUTZ TD-3 71
 W208B B*FORMF - CONVERT UNIT NUMBER TO FILESET NAME
 W208B C*CMP SR7600 CROS
 W208B D* SW 2 LS 3 TYPE 1
 W208B E*CMP SOURCE CARDS 57 BCD OBJECT CARDS 4 BIN
 W208B F**FORMF*UNIT NUMBER*FILESET NAME
 W208B G*CARDS F4 COMPAT WU 10/14/71 DECK 10/14/71
 W208B 1*FORM: FS = FORMF(N)
 W208B 2*PURPOSE: GIVEN INTEGER UNIT NUMBER N, RETURN
 W208B 3* ALPHANUMERIC FILESET NAME 5LFSETN.
 W208B 4*ROUTINE NAME: FORMF
 W208B 5*ENTRY NAME: FORMF
 W208B 6*STORAGE: 16 (OCTAL) WORDS.
 W208B 7*SELF CONTAINED.

W209B *(IDONEQ) DELETED FROM LIBRARY-NOW COMBINED WITH W206B.

W210B A* N. NAGY C-2 J. NORRIS 73
W210B B*CHECK FOR UNRECOVERED PARITY ERRORS ON MAG TAPE INPUT
W210B C*COMPASS SR7600 CROS
W210B D* SW 2 LS 0 TYPE 1
W210B E*NO CARDS
W210B F**PARITY*ERROR
W210B G*ON DISK F4 COMPAT WU 01/30/73 DECK NONE
W210B 1*FORM: CALL PARITY(FSNAME,N)
W210B 2*PURPOSE: CHECK FOR EXISTENCE OF AN UNRECOVERED PARITY
W210B 3* ERROR WHEN A FILESET WAS STAGED IN FROM MAGNETIC TAPE.
W210B 4*ROUTINE NAME: PARITY
W210B 5*ENTRY NAME: PARITY
W210B 6*STORAGE: 70 (OCTAL) WORDS
W210B 7*ROUTINES CALLED: MESSAGE(Q116), SYSFS (ON SYSTEM)

W3

POSITIONING

E.G., SKIP FILE, BACKSPACE, END FILE, REWIND.

REVIEWER: J. NORRIS, C-2

W301B A* EMILY WILLBANKS C-2 71
W301B B*REWIND
W301B C*CMP SR7600 CROS
W301B D* SW 2 LS 0 TYPE 1
W301B E* 0 BCD 0 BIN
W301B F**REWIND*REWIND
W301B G*ON DISK F4 COMPAT WU 06/22/71 DECK NONE
W301B 1*FORM: CALL REWIND(FS)
W301B 2*PURPOSE: REWIND FILESET FS.
W301B 3*ROUTINE NAME: REWIND
W301B 4*ENTRY NAMES: REWIND, REWIND
W301B 5*STORAGE: 338 WORDS OF SCM.
W301B 6*ROUTINES CALLED: GETBA, SYSTEM, ABNORMAL, OPEN.,
W301B 7* WAITR (ALL ON SYSTEM).
W301B 8*OTHER SCM EXTERNALS: IOGEN (ON SYSTEM)

W302B A* EMILY WILLBANKS C-2 71
W302B B*SKIPF,SKPFIL,SKFILE - SKIP FILES FORWARD OR BACKWARD
W302B C*CMP SR7600 CROS
W302B D* SW 2 LS 2 TYPE 1
W302B E*SOURCE CARDS 47 BCD OBJECT CARDS 5 BIN
W302B F**SKIPF*SKPFIL*SKFILE
W302B G*ON DISK F4 COMPAT WU 11/01/72REV.1 DECK 11/01/72
W302B 1*FORM: CALL SKIPF(FS,N)
W302B 2* CALL SKPFIL(FS,N)
W302B 3* CALL SKFILE(FS,N)
W302B 4*PURPOSE: SKIP N FILES FORWARD OR BACKWARD ON FILESET FS.
W302B 5*ROUTINE NAME: SKIPF
W302B 6*ENTRY NAMES: SKIPF, SKPFIL, SKFILE
W302B 7*STORAGE: 27 OCTAL WORDS OF SCM
W302B 8*ROUTINES CALLED: SKIPX (ON SYSTEM).

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W303B A*          EMILY WILLBANKS C-2                      71
W303B B*SKIPI - SKIP TO END-OF-INFORMATION
W303B C*CMP          SR7600  CROS
W303B D*            SW  2    LS  0    TYPE  1
W303B E*            0    BCD                                0  BIN
W303B F**SKIPI*EOI
W303B G*ON DISK     F4  COMPAT  WU 06/22/71    DECK  NONE
W303B 1*FORM: CALL SKIPI(FS)
W303B 2*PURPOSE: POSITION FILESET FS AT END-OF-INFORMATION
W303B 3*ROUTINE NAME: SKIPI
W303B 4*ENTRY NAME: SKIPI
W303B 5*STORAGE: 12B WORDS OF SCM.
W303B 6*OTHER SCM EXTERNALS: IOGEN (ON SYSTEM)
W303B 7*ROUTINES CALLED: SKIPX (ON SYSTEM)

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W304B A*          EMILY WILLBANKS C-2                      71
W304B B*SKIPR - SKIP RECORDS FORWARD OR BACKWARD
W304B C*CMP          SR7600  CROS
W304B D*            SW  2    LS  0    TYPE  1
W304B E*            0    BCD                                0  BIN
W304B F**SKIPR
W304B G*ON DISK     F4  COMPAT  WU 06/22/71    DECK  NONE
W304B 1*FORM: CALL SKIPR(FS,N)
W304B 2*PURPOSE: SKIP N RECORDS FORWARD OR BACKWARD ON FILESET FS.
W304B 3*ROUTINE NAME: SKIPR
W304B 4*ENTRY NAMES: SKIPX,SKIPR
W304B 5*STORAGE: 51B WORDS OF SCM.
W304B 6*OTHER SCM EXTERNAL: IOGEN (ON SYSTEM)
W304B 7*ROUTINES CALLED: SYSTEM, ABNORML, GFTBA, OPEN,
W304B 8*  WAITR(ALL ON SYSTEM).

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W305B A* J. NORRIS C-2 J. NORRIS 73
 W305B B*BACKSPACE ONE OR MORE RECORDS
 W305B C*CMP SR7600 CROS
 W305B D* SW 1 LS 0 TYPE 1.2
 W305B E* SOURCE OLDPL4 C-2 OBJECT 0 C-2
 W305B F**BAEKSPACE
 W305B G* DISK F4 COMPAT WU 07/09/73 DECK NONE
 W305B 1*FORM! CALL BKSP(FS,N)
 W305B 2* CALL BKSP(FS)
 W305B 3* BACKSPACE I
 W305B 4*PURPOSE! BACKSPACE A FILESET ONE OR MORE RECORDS
 W305B 5* FS = FILESET NAME (LEFT-JUSTIFY, ZERO-FILL)
 W305B 6* OR INTEGER M, 1-99, TO BE CONVERTED TO FSETM
 W305B 7* N = INTEGER NUMBER OF RECORDS TO BACKSPACE OVER
 W305B 8* I = INTEGER UNIT NUMBER OR INTEGER VARIABLE WHOSE
 W305B 9* VALUE IS FILESET NAME OR UNIT NUMBER.
 W305B 10*ROUTINE NAME! BACKSP
 W305B 11*ENTRY NAMES! BACKSP,BKSP
 W305B 12*STORAGE! 27 OCTAL WORDS OF SCM
 W305B 13*ROUTINES CALLED! SKIPX(W304B)

W4 GET INFORMATION ON FILE
 DUMP FILE, CATALOG, DIRL, CRSREF,
 REVIEWER: J. NORRIS, C-2

W402B A* RON KRANTZ C-2 71
 W402B B*DIRL - LIST DIRECTORY OF RANDOM LIBRARY FILESET
 W402B C*CMP SR7600 CROS
 W402B D* SW 2 LS 0 TYPE 1
 W402B E* 0 BCD 0 BIN
 W402B F**DIRL - LIST*DIRECTORY OF*RANDOM*LIBRARY*FILESET
 W402B G*ON DISK F4 COMPAT WU 06/22/71 DECK NONE
 W402B 1*FORM: CALL DIRL(D,0)
 W402B 2*PURPOSE: LIST DIRECTORY OF RANDOM LIBRARY FILESET D ONTO
 W402B 3* OUTPUT FILESET 0.
 W402B 4*ROUTINE NAME: DIRL
 W402B 5*ENTRY NAME: DIRL
 W402B 6*STORAGE: 5,300B WORDS OF SCM, 10,000B WORDS OF LCM.
 W402B 7*ROUTINES CALLED: GETBA(ON SYSTEM).

W403B A* EMILY WILLBANKS C-2 J. NORRIS 71
 W403B B*DMPFS - DUMP CONTENTS OF FILESET
 W403B C*F4 SR7600 CROS
 W403B D* SW 3 LS 3 TYPE 1
 W403B E*SOURCE CARDS 110 BCD OBJECT CARDS 37 BIN
 W403B F**DMPFS*DUMP CONTENTS OF*FILESET
 W403B G*ON DISK F4 COMPAT WU 11/01/72REV.1 DECK 11/01/72REV.1
 W403B 1*FORM: CALL DMPFS(FS,NWDS,NR,NF,FORMAT,IF,IR,FSO)
 W403B 2*PURPOSE: PRINT THE CONTENTS OF FILESET FS, STARTING AT
 W403B 3* ITS CURRENT POSITION, ON FILESET FSO IN THE SPECIFIED
 W403B 4* FORMAT(FORMAT,IF,IR). NWDS WORDS PER RECORD AND NR
 W403B 5* RECORDS PER FILE ARE PRINTED FOR NF FILES. IF NWDS=0,
 W403B 6* EACH RECORD OF NF FILES IS CATALOGED. IF NWDS=0 AND
 W403B 7* NF.LT.0, EACH FILE OF THE FILESET IS CATALOGED.
 W403B 8*ROUTINE NAME: DMPFS
 W403B 9*ENTRY NAME: DMPFS
 W403B 10*STORAGE: 714 (OCTAL) WORDS OF SCM
 W403B 11*ROUTINES CALLED: NARG, SKIPF, BOI, OUTPTC, DREADI,
 W403B 12* DREADR (ALL ON SYSTEM).

W404B A* EMILY WILLBANKS C-2 J. NORRIS C-2 72
W404B B*COPYBFS - DETERMINE OPTIMUM RANDOM AND SEQUENTIAL BUFFERS
W404B C*F4 SR7600 CROS
W404B D* SW 2 LS 0 TYPE 1.2
W404B E* SOURCE 0 C-2 OBJECT 0 C-2
W404B F**COPYBFS
W404B G*ON DISK F4 COMPAT WU 06/13/73REV.1 DECK NONE
W404B 1*FORM: CALL COPYBFS(LCAV,IRANBL,ISEQ,MALCM,IROLL)
W404B 2*PURPOSE: GIVEN AMOUNT OF FREE LCM AND SIZE OF MALCM,
W404B 3* DETERMINE THE OPTIMUM SIZES FOR RANDOM AND
W404B 4* SEQUENTIAL BUFFERS AND ROLL OUT MALCM TO PROVIDE
W404B 5* ROOM.
W404B 6*ROUTINE NAME: COPYBFS
W404B 7*ENTRY NAME: COPYBFS
W404B 8*STORAGE: 66 OCTAL WORDS
W404B 9*ROUTINES CALLED: LCR0LOT(Q306B) ON SYSTEM

Z

(NOT USED FOR NEW PROGRAMS)

Z102A A* LARRY RUDSINSKI C-4 ALEX MARUSAK 67
 Z102A B*INDEX
 Z102A C*FORTRAN MP6600 SCP 3.1 ECS
 Z102A D* SW 7 LS 0 TYPE 1
 Z102A E*F4 SOURCE CARDS 0 OBJECT CARDS 0
 Z102A F**INDEX*CROSS-REFERENCE*DIRECTORY
 Z102A G*ON DISK F4 COMPAT WU 11/10/71REV 4 NO DECK
 Z102A 1*6600 CONTROL CARD FORM: INDEX(INPUT,OUTPUT)
 Z102A 2*PURPOSE: ANALYZE FORTRAN SOURCE DECKS AND PRODUCE A
 Z102A 3* DIRECTORY OF ALL STATEMENT NUMBERS AND VARIABLE
 Z102A 4* NAMES USED IN THE SOURCE.
 Z102A 5*ROUTINE NAME: INDEX
 Z102A 6*ENTRY NAME: INDEX
 Z102A 7*STORAGE: 45000 OCTAL WORDS CENTRAL MEMORY AND
 Z102A 8* 46000 TO 303000 OCTAL WORDS ECS.

Z102B A* LARRY RUDSINSKI C-4 ALEX MARUSAK 71
 Z102B B*INDEX
 Z102B C*FORTRAN MP7600 CROS ECS
 Z102B D* SW 7 LS 0 TYPE 1
 Z102B E*F4 SOURCE CARDS NONE OBJECT CARDS NONE
 Z102B F**INDEX*CROSS-REFERENCE*DIRECTORY
 Z102B G*ON DISK F4 COMPAT WU 11/10/71 NO DECK
 Z102B 1*7600 CONTROL CARD FORM: SINDEX(INP=INP,OUT=OUT,LC=200000B)
 Z102B 2*PURPOSE: ANALYZE FORTRAN SOURCE DECKS AND PRODUCE A
 Z102B 3* DIRECTORY OF ALL STATEMENT NUMBERS AND VARIABLE
 Z102B 4* NAMES USED IN THE SOURCE.
 Z102B 5*ROUTINE NAME: INDEX
 Z102B 6*ENTRY NAME: INDEX
 Z102B 7*STORAGE: 45000 OCTAL WORDS SCM
 Z102B 8* AND 46000 TO 303000 OCTAL WORDS LCM

Z103A *(NXTDAY) HAS BEEN REDESIGNATED Q1AA.

Z104A *(F66F94) HAS BEEN REDESIGNATED M2AD.

Z105A *(DISI94) HAS BEEN REDESIGNATED M2AE.

Z106A *(WRIT94) HAS BEEN REDESIGNATED K501A.

Z1-2

Z107A *(WR94FBT) HAS BEEN REDESIGNATED K502A.

Z1AA *(ASAP) HAS BEEN REDESIGNATED Q3AA.

PART III

INDEXES

INDEX 1 - PROGRAMS BY NAME

Currently, this index contains all program names and entry points found in the 6600 and 7600 System Libraries and Local Libraries. "PROGRAM NAME" refers to these names. The "\$" appended to the name means that the program is a 7600 control card. The "↑" appended to a name means that the program is an LEXT 7600 program (see the LCM FORTRAN Supplement to the CDC FORTRAN Reference Manual).

"PROGRAM NUMBER" refers to the program designation associated with that program. "NONE" indicates that there is no program designation because that program has not been submitted to the Program Library.

"7600 RESIDENCE" refers to where the 7600 program may be found. "6600 RESIDENCE" refers to where the 6600 program may be found. "DISK" indicates that the program is in the System Library of that computer; if the program was submitted to the Program Library, it is probably also available on cards or tape in the Program Library. "CARDS", "TAPE", or "PERMFILE" indicates that the program is not in the System Library, but it is available in the Program Library on cards or magnetic tape or in the computer on a permanent disk file, respectively. A name in parenthesis is a cross reference to a similar program which is available on that computer.

"ABSTRACT IN CATALOG SECTION" refers to the section of the "Catalog of Programs" published in this volume in which an abstract for this program will be found. "NONE" indicates that the Program Library does not have an abstract or writeup for this program. In many cases, the 6600 writeup will do for the 7600 program which has none.

PROGRAM NAME -----	PROGRAM NUMBER -----	7600 RESIDENCE -----	6600 RESIDENCE -----	ABSTRACT IN CATALOG SECTION -----
ABNORML	NONE	DISK	DISK	NONE
ABORT	N203	DISK	DISK	N2
ABORTJ	NONE	DISK		NONE
ABTDSS	F413		CARDS	F4
ABWTLAG	D1AD		CARDS	D1
ABWTLEG	D1AE		CARDS	D1
ACFCN	G602	DISK	CARDS	G6
ACGOER	NONE	DISK	DISK	NONE
ACOS	B108	DISK	DISK	B1
ADDRQT	NONE	DISK		NONE
ADDVEC	F133	DISK	DISK	F1
ADV	J506	DISK	DISK	J5
AFSREL	W117	DISK		W1
AFSRELS	NONE	DISK		NONE
AFST	NONE	DISK		NONE
AIDS	G6AA		CARDS	G6
AKNINT	E106	DISK	DISK	E1
ALNLOG	B305	DISK	DISK	B3
ALNLOG↑	B305	DISK		B3
ALOG10	B305	DISK	DISK	B3
ALOG10↑	B305	DISK		B3
ALOG	B305	DISK	DISK	B3
ALOG↑	B305	DISK		B3
APT	NONE		DISK	NONE
ARCCOS	B108	DISK	DISK	B1
ARCOS	B108	DISK	DISK	B1
ARCSIN	B108	DISK	DISK	B1
ARLM2	NONE		DISK	NONE
ARSIN	B108	DISK	DISK	B1
ASAP	Q3AA		CARDS	Q3
ASCL	J510	DISK	DISK	J5
ASHIFT	M406		CARDS	M4
	NONE	DISK		NONE
ASIN	B108	DISK	DISK	B1
ATAN	B104		DISK	B1
	NONE	DISK		NONE
ATAN2	B104		DISK	B1
	NONE	DISK		NONE
AXIS	J547	DISK	CARDS	J5
BACK	NONE	DISK		NONE
BACKSP	NONE		DISK	NONE
	W305	DISK		W3
BACKUP	NONE	DISK		NONE
BANMAT	F411	DISK	CARDS	F4
BARPLOT	J604	DISK	CARDS	J6
BASF	C327	DISK	DISK	C3
BENDIX	NONE		DISK	NONE
BESJN	C301		DISK	C3
	NONE	DISK		NONE
BETAIC	C336	DISK		C3

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
BISECT	F230		CARDS	F2
BJYIK	C328	DISK	DISK	C3
BKSP	NONE		DISK	NONE
	W305	DISK		W3
BKSPS	NONE	DISK		NONE
BKSPRU.	NONE		DISK	NONE
BKSPS	NONE	DISK		NONE
BLOCK	J551		CARDS	J5
	NONE	DISK		NONE
BOI	W201	DISK		W2
BOUNDS	E4AA	TAPE		E4
BREAKUP	K306	DISK		K3
BS4020	J565		CARDS	J5
	NONE	DISK	DISK	NONE
BUF	K6AA		CARDS	K6
BUFEI	NONE	DISK	DISK	NONE
BUFEO	NONE	DISK	DISK	NONE
BUFF.	NONE	DISK		NONE
BUFSIZE	Q411		CARDS	Q4
BURG	NONE		DISK	NONE
C4020	NONE	DISK	DISK	NONE
CABS	A203		DISK	A2
	NONE	DISK		NONE
CABS↑	NONE	DISK		NONE
CALCVT	J5AB		CARDS	J5
CALLER	NONE	DISK		NONE
CALLUMT	NONE	DISK		NONE
CALSEC2	NONE		DISK	NONE
CALSEC3	NONE		DISK	NONE
CART3D	J590		CARDS	J5
CATALOG	NONE	(DMPFSS)	DISK	NONE
CATFAC	F416	DISK	CARDS	F4
CATFILE	NONE		DISK	NONE
CATINV	F137	DISK	CARDS	F1
CBAIEX	NONE	DISK	DISK	NONE
CBJYIK	C333	DISK	CARDS	C3
CBSF	C332	DISK	CARDS	C3
CBSHV	D111		DISK	D1
	NONE	DISK		NONE
CBSIII	T4AA		TAPE	T4
CCOS	B109		DISK	B1
	NONE	DISK		NONE
CCPS	NONE	DISK		NONE
CCPS1	NONE	DISK		NONE
CCP2	NONE	DISK		NONE
CCP3	NONE	DISK		NONE
CCPIO	NONE	DISK		NONE
CCPJOB1	NONE	DISK		NONE
CCPMSG	NONE	DISK		NONE
CCPREAD	NONE	DISK		NONE
CCPZZZ	NONE	DISK		NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
CCT	NONE	DISK		NONE
CDG	B106		DISK	B1
	NONE	DISK		NONE
CDG↑	NONE	DISK		NONE
CDOTPRO	F136	DISK	CARDS	F1
CELLI	C304		CARDS	C3
	NONE	DISK		NONE
CEXP	B310		DISK	B3
	NONE	DISK		NONE
CFL	NONE		DISK	NONE
CI01.	NONE		DISK	NONE
CIN261	NONE		DISK	NONE
CINMAT	NONE		DISK	NONE
CIRCA	J580		CARDS	J5
	NONE	DISK		NONE
CIRCL	J581		CARDS	J5
	NONE	DISK		NONE
CIRCLE	D1AA		CARDS	D1
CKO	NONE	DISK		NONE
CKSUM	K307	DISK		K3
CKSUM2	K310	DISK		K3
CKSUMS	NONE	DISK		NONE
CLEAR	NONE		DISK	NONE
CLEARA	NONE	DISK		NONE
CLOCK	Q102		DISK	Q1
	Q115	DISK		Q1
CLOCK1	Q105		DISK	Q1
	Q115	DISK		Q1
CLOCKF	Q115	DISK		Q1
CLOG	B307		DISK	B3
	NONE	DISK		NONE
CLOSE	W113	(CLOSER)	CARDS	W1
CLOSE2	NONE		DISK	NONE
CLOSE2A	NONE		DISK	NONE
CLOSE2S	NONE		DISK	NONE
CLOSER	W114	DISK	(CLOSE)	W1
CLOSERS	NONE	DISK		NONE
CLSIT	F417	DISK		F4
CLSS	F408	DISK		F4
COBOL	NONE		DISK	NONE
COBOL10	NONE		DISK	NONE
COBOL11	NONE		DISK	NONE
COBOL12	NONE		DISK	NONE
COBOL13	NONE		DISK	NONE
COBOL14	NONE		DISK	NONE
COBOL15	NONE		DISK	NONE
COBOL16	NONE		DISK	NONE
COBOL20	NONE		DISK	NONE
COBOL21	NONE		DISK	NONE
COBOL22	NONE		DISK	NONE
COBOL23	NONE		DISK	NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
COLOR	J569	DISK	DISK	J5
COMBES	C323		CARDS	C3
	NONE	DISK		NONE
COMP1\$	NONE	DISK	DISK	NONE
COMP2	NONE	DISK		NONE
COMP2\$	NONE		DISK	NONE
COMP11\$	NONE		DISK	NONE
COMP12\$	NONE		DISK	NONE
COMPARE	NONE		DISK	NONE
COMPAS2	NONE		DISK	NONE
COMPASS	NONE	DISK		NONE
COMPASS	NONE		DISK	NONE
COMPSW	Q416	DISK		Q4
COMPSW\$	NONE	DISK		NONE
COMPTR	NONE		DISK	NONE
CONTOUR	J560		CARDS	J5
	NONE	DISK		NONE
CONTRJB	J563	DISK	DISK	J5
CONVRT	J526		DISK	J5
	NONE	DISK		NONE
CONVT	NONE		DISK	NONE
COPY	NONE		DISK	NONE
	K301	DISK		K3
COPYBCD	NONE		DISK	NONE
COPYBF	NONE	(COPYF\$)	DISK	NONE
COPYBFS	W404	DISK		W4
COPYBR	NONE	(COPYR\$)	DISK	NONE
COPYCF	NONE	(COPYF\$)	DISK	NONE
COPYCR	NONE	(COPYR\$)	DISK	NONE
COPYDF	Q119	DISK		Q1
COPYDFS	NONE	DISK		NONE
COPYF	K301	DISK		K3
COPYFF	NONE		DISK	NONE
	K305	DISK		K3
COPYFF\$	NONE	DISK		NONE
COPYF\$	NONE	DISK		NONE
COPYL	NONE		DISK	NONE
	K306	DISK		K3
COPYL\$	NONE	DISK		NONE
COPYN	NONE		DISK	NONE
COPYR	K301	DISK		K3
COPYRS	K309	DISK		K3
COPYR\$	NONE	DISK	(COPYBR)	NONE
COPYSBF	NONE	(COPYSF\$)	DISK	NONE
COPYSF	K303	DISK		K3
COPYSF\$	NONE	DISK	(COPYSBF)	NONE
COPYSR	K308	DISK		K3
COPY\$	NONE	DISK	(COPY)	NONE
CORINV	F125		DISK	F1
	NONE	DISK		NONE
COS	B106		DISK	B1

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
COS	NONE	DISK		NONE
COSH	B203	DISK	DISK	B2
COS↑	NONE	DISK		NONE
COT	B107	DISK	DISK	B1
COTAN	B107	DISK	DISK	B1
COTPRO	F136	DISK	CARDS	F1
CPAREA	Q401	(GETQ)	DISK	Q4
CPC	NONE		DISK	NONE
CPC02	NONE		DISK	NONE
CPC03	NONE		DISK	NONE
CPC04	NONE		DISK	NONE
CPC99	NONE		DISK	NONE
CPWORD	Q410	(GETQ)	DISK	Q4
CREATE	W118	DISK		W1
CREATES	NONE	DISK		NONE
CREMOD	W118	DISK		W1
CREVER	W108	DISK		W1
CREVER1	NONE	DISK		NONE
CREVERS	NONE	DISK		NONE
CROS76	K503		PERMFILE	K5
CROSTXT	NONE	DISK		NONE
CRSREF	NONE	DISK		NONE
CRSREFS	NONE	DISK		NONE
CSIN	B109		DISK	B1
	NONE	DISK		NONE
CSQRT	B409	DISK	DISK	B4
	B4AA		CARDS	B4
CTX	NONE	DISK		NONE
CUBRT	B407		CARDS	B4
	NONE	DISK		NONE
CVDEL	NONE		DISK	NONE
CVRT	NONE		DISK	NONE
DABS	A108	DISK	DISK	A1
DASHL	J582		CARDS	J5
	NONE	DISK		NONE
DASHP	J583		CARDS	J5
	NONE	DISK		NONE
DAT.	NONE	DISK	DISK	NONE
DATAN	NONE	DISK	DISK	NONE
DATAN2	NONE	DISK	DISK	NONE
DATAREL	W105	DISK		W1
DATE	Q106		DISK	Q1
	Q115	DISK		Q1
DATE1	Q107		DISK	Q1
	Q115	DISK		Q1
DBADEX	NONE	DISK	DISK	NONE
DBAIEX	B313	DISK	DISK	B3
DBAREX	NONE	DISK	DISK	NONE
D.BCORD	NONE		DISK	NONE
D.BCDWR	NONE		DISK	NONE
DBLE	A105		DISK	A1

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
DBLE	A105	DISK		A1
DBPRINT	NONE	DISK		NONE
DCABS	A202		DISK	A2
	NONE	DISK		NONE
DCOS	NONE	DISK	DISK	NONE
DCPOLE	C213		CARDS	C2
	NONE	DISK		NONE
DCPOLY	C2AD		CARDS	C2
	NONE	DISK		NONE
DCPTACO	C214		CARDS	C2
DECPTD	F420	DISK	CARDS	F4
DEXP	NONE	DISK	DISK	NONE
DFILE	K306	DISK		K3
DFNAME	NONE	DISK		NONE
DGA	J528		DISK	J5
	NONE	DISK		NONE
DGLSS	F406		CARDS	F4
	NONE	DISK		NONE
DIAG	NONE		DISK	NONE
DIARY	NONE	DISK		NONE
DIARYS	NONE	DISK		NONE
DIRL	W402	DISK		W4
DIRLS	NONE	DISK		NONE
DISI94	M2AE		CARDS	M2
DISPLA	Q113		DISK	Q1
DLCH	J567		DISK	J5
	NONE	DISK		NONE
DLCV	J567		DISK	J5
	NONE	DISK		NONE
DLGLG	J530	DISK	DISK	J5
DLGLGTM	J602	DISK	CARDS	J6
DLGLN	J530	DISK	DISK	J5
DLGLNTM	J602	DISK	CARDS	J6
DLNLG	J530	DISK	DISK	J5
DLNLGTM	J602	DISK	CARDS	J6
DLNLN	J529		DISK	J5
	NONE	DISK		NONE
DLNLNTM	J601	DISK	CARDS	J6
DLNLOG	NONE	DISK	DISK	NONE
DLOG	NONE	DISK	DISK	NONE
DLOG10	NONE	DISK	DISK	NONE
DMOD	NONE	DISK	DISK	NONE
DMP	N212	DISK		N2
DMPBN	N207	DISK		N2
DMPBNS	NONE	DISK		NONE
DMPEC	NONE		DISK	NONE
DMPFS	W403	DISK		W4
DMPFSS	NONE	DISK		NONE
DMPPK	N208	DISK		N2
DMPX	N211	DISK		N2
DMPXD	NONE	DISK		NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
DMPXI	N211	DISK		N2
DMPXPG	N208	DISK		N2
DMPXX	N208	DISK		N2
DMPXS	NONE	DISK		NONE
DMP\$	NONE	DISK		NONE
DMP↑	N212	DISK		N2
DOCIX	NONE	DISK		NONE
DOCIX\$	NONE	DISK		NONE
DOMPASS	NONE	DISK		NONE
DOTPRO	F124	DISK	DISK	F1
DREADI	NONE	DISK		NONE
DREADR	NONE	DISK		NONE
DREVAL	F2AE		CARDS	F2
	NONE	DISK		NONE
DRPOLE	C212		CARDS	C2
	NONE	DISK		NONE
DRPOLY	C2AC		CARDS	C2
	NONE	DISK		NONE
DRSVAL	F2AF		CARDS	F2
	NONE	DISK		NONE
DRV	J517		DISK	J5
	NONE	DISK		NONE
DSIGN	A109	DISK	DISK	A1
DSIN	NONE	DISK	DISK	NONE
DSINCOS	NONE	DISK	DISK	NONE
DSQRT	NONE	DISK	DISK	NONE
DTANH	B206		DISK	B2
	NONE	DISK		NONE
DTRVAL	F2AJ		CARDS	F2
	NONE	DISK		NONE
DUMP	NONE		DISK	NONE
	N209	DISK		N2
DUMP↑	N209	DISK		N2
DUMPA	N204		DISK	N2
	N210	DISK		N2
DUMPL	N210	DISK		N2
DVCHK	NONE		DISK	NONE
Ei	C309		DISK	C3
	NONE	DISK		NONE
E205A	E205		CARDS	E2
ECD	NONE	DISK		NONE
ECDMPH	NONE		DISK	NONE
ECFL	NONE		DISK	NONE
ECMATPY	F134	DISK	CARDS	F1
ECMTRPY	F135	DISK	CARDS	F1
ECR	K203	DISK	CARDS	K2
ECRD	NONE	DISK	DISK	NONE
ECRFL	NONE		DISK	NONE
ECSBUFI	Q409		CARDS	Q4
ECSBUFO	Q409		CARDS	Q4
ECSGLSS	F415		CARDS	F4

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
ECSRW	NONE	DISK	DISK	NONE
ECW	K204	DISK	CARDS	K2
ECWR	NONE	DISK	DISK	NONE
EDITFF	J591		CARDS	J5
EDITLIB	NONE		DISK	NONE
EJT	NONE	DISK		NONE
ELIPS	J584		CARDS	J5
	NONE	DISK		NONE
ELLI	C304		CARDS	C3
	NONE	DISK		NONE
EMPTY	J506	DISK	DISK	J5
EMTY	J565		CARDS	J5
ENCODE	J558		CARDS	J5
	NONE	DISK		NONE
END	NONE	DISK	DISK	NONE
ENDD	N109	DISK		N1
ENDFIL	NONE	DISK	DISK	NONE
ENDH	N109	DISK		N1
ENDJ	NONE	DISK		NONE
ENDS	N109	DISK		N1
ENDTM	N109	DISK		N1
ENFIL	NONE		DISK	NONE
ENTR	N106	DISK		N1
ENTRH	N106	DISK		N1
ENTRS	N106	DISK		N1
ENTRTM	N106	DISK		N1
EOI	W202	DISK		W2
ERF	C310	DISK	DISK	C3
ERFC	C335	DISK	CARDS	C3
ERFI	C339	DISK	CARDS	C3
ERFINV	C3AD	DISK	CARDS	C3
EROBAR	J575	DISK	CARDS	J5
ERR	NONE		DISK	NONE
ERRBAR	J574	DISK	CARDS	J5
ESEARCH	M119		CARDS	M1
	NONE	DISK		NONE
ETASRCH	E4AA	TAPE		E4
ETX	NONE	DISK		NONE
EXH	J507		DISK	J5
	NONE	DISK		NONE
EXIT	NONE	DISK	DISK	NONE
EXL	J507		DISK	J5
	NONE	DISK		NONE
EXOR	M412	INLINE	INLINE	M4
EXP	B306	DISK	DISK	B3
EXP^	B306	DISK		B3
EXPAD	A103		DISK	A1
	NONE	DISK		NONE
EXPIM	J514		DISK	J5
	NONE	DISK		NONE
EXPINT	C313		CARDS	C3

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
EXPINT	NONE	DISK		NONE
EZPERT	H3AA		CARDS	H3
F006	F207		DISK	F2
	NONE	DISK		NONE
F009	F209		DISK	F2
	NONE	DISK		NONE
F66F94	M2AD		CARDS	M2
F94F66	M2AD		CARDS	M2
FACTOR	J555		CARDS	J5
	NONE	DISK		NONE
FACTTD	F418	DISK	CARDS	F4
FBUFF.	NONE	DISK		NONE
FETA.	NONE		DISK	NONE
FETCH	M403		DISK	M4
	NONE	DISK		NONE
FFT	F5AA		CARDS	F5
FFT2	F502	DISK	CARDS	F5
FI0	C342	DISK	CARDS	C3
FI1	C343	DISK	CARDS	C3
FILL	K6AA		CARDS	K6
FILMCK	J595	DISK		J5
FINDMAP	C3AA		CARDS	C3
FISHE	G403		CARDS	G4
	NONE	DISK		NONE
FIT	J585		CARDS	J5
	NONE	DISK		NONE
FIXUP	L4AA	PERMFILE		L4
FIZBAK.	NONE		DISK	NONE
FJ0	C340	DISK	CARDS	C3
FJ1	C341	DISK	CARDS	C3
FLUSHDF	NONE	DISK		NONE
FNMA.	NONE		DISK	NONE
FORMF	W208	CARDS		W2
FORQTS	W106	DISK		W1
FORWARD	NONE	DISK		NONE
FOUROT	B413	DISK	DISK	B4
FRAME	J523		DISK	J5
	NONE	DISK		NONE
FTN	U2AA		DISK	U2
FTNMSG\$	NONE		DISK	NONE
FTNX	NONE		DISK	NONE
FUN	NONE		DISK	NONE
FUN1	NONE	DISK	DISK	NONE
FUN\$	NONE	DISK		NONE
GAM1	C325		DISK	C3
	NONE	DISK		NONE
GAMMA	C302		DISK	C3
	NONE	DISK		NONE
GAUSS	D114		DISK	D1
	NONE	DISK		NONE
GAUSSQ	D126		CARDS	D1

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
-----	-----	-----	-----	-----
GAUSSQ	D126	DISK		D1
GECENT	NONE		DISK	NONE
GENDMP	NONE	DISK		NONE
GENGSQ	D123		CARDS	D1
	NONE	DISK		NONE
GENID	F117	DISK	DISK	F1
GENPDP	C107		CARDS	C1
	NONE	DISK		NONE
GENPOL	C106		CARDS	C1
	NONE	DISK		NONE
GETADD	W205	CARDS		W2
GETBA	NONE	DISK	DISK	NONE
GETDPK	Q413	DISK		Q4
GETEPK	Q413	DISK		Q4
GETEQN	Q406		DISK	Q4
GETFLD	NONE	DISK		NONE
GETHPK	Q413	DISK		Q4
GETIT	M405		CARDS	M4
	NONE	DISK		NONE
GETNPK	Q413	DISK		Q4
GETNXT	K6AA		CARDS	K6
GETPL	NONE	DISK		NONE
GETPLS	NONE	DISK		NONE
GETQ	NONE		(CPAREA)	NONE
	Q414	DISK		Q4
GETSPK	Q413	DISK		Q4
GETTMPK	Q413	DISK		Q4
GHM	F1AC		CARDS	F1
	NONE	DISK		NONE
GLINCNT	J506	DISK		J5
GLSS	E4AA(OPTIMIZ)	TAPE		E4
GLSS	F405	DISK	DISK	F4
GNCPX	C108		CARDS	C1
	NONE	DISK		NONE
GNSM	F1AA		CARDS	F1
	NONE	DISK		NONE
GOTO	NONE	DISK		NONE
GRAPH	J511		DISK	J5
	NONE	DISK		NONE
GRID	J586		CARDS	J5
	NONE	DISK		NONE
GSM	F1AB		CARDS	F1
	NONE	DISK		NONE
GXA	J518		DISK	J5
	NONE	DISK		NONE
GYA	J518		DISK	J5
	NONE	DISK		NONE
H3DVAL	F226	DISK	CARDS	F2
H3DVEV	F228	DISK	CARDS	F2
H4020	NONE	DISK		NONE
HACK	O4AA		CARDS	O4

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
-----	-----	-----	-----	-----
HEVAL	F2AC		CARDS	F2
	NONE	DISK		NONE
HEVEV	F2AD		CARDS	F2
	NONE	DISK		NONE
HMEVAL	F226	DISK	CARDS	F2
HMEVEV	F228	DISK	CARDS	F2
HMHTR	F227	DISK	CARDS	F2
HRMTE	D112		DISK	D1
	NONE	DISK		NONE
HSHLECS	E4AA	TAPE		E4
HTEVAL	F226	DISK	CARDS	F2
HTEVEV	F228	DISK	CARDS	F2
HTHHTR	F227	DISK	CARDS	F2
HUGGINS	NONE	DISK		NONE
I94DIS	M2AE		CARDS	M2
IBAIEX	NONE	DISK	DISK	NONE
ICHAR	NONE	DISK		NONE
IDINT	A106	DISK	DISK	A1
IDONE	W206	DISK		W2
IDONEQ	W206	DISK		W2
IDT	NONE	DISK		NONE
IF	NONE	DISK		NONE
IFENDF	NONE	DISK	DISK	NONE
IFNGH	J597	DISK	CARDS	J5
INDEX	Z102	DISK	DISK	Z1
INDEXS	NONE	DISK		NONE
INPUTB	NONE	DISK	DISK	NONE
INPUTC	NONE	DISK	DISK	NONE
INPUTM	NONE	DISK		NONE
INPUTN	NONE	DISK	DISK	NONE
INPUTS	NONE	DISK	DISK	NONE
INSECT	J592	DISK	CARDS	J5
INTVL	Q407		DISK	Q4
IO	NONE		DISK	NONE
IOCHEC	NONE		DISK	NONE
IOCHECK	W203	DISK		W2
IOCHEK	NONE	DISK	DISK	NONE
IOGEN	NONE	DISK		NONE
IOIO	NONE		DISK	NONE
IORANDM	NONE		DISK	NO
IOREAD	NONE		DISK	NONE
IORQTBL	NONE	DISK		NONE
IORQTND	NONE	DISK		NONE
IORR	NONE		DISK	NONE
IORW	NONE		DISK	NONE
IOSAV	NONE		DISK	NONE
IOUTIL	NONE	DISK		NONE
IOWRITE	NONE		DISK	NONE
IOZW	NONE		DISK	NONE
IOZZ	NONE		DISK	NONE
IPARITY	M411		CARDS	M4

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
-----	-----	-----	-----	-----
IPARITY	M411	DISK		M4
IRAN	K102	DISK		K1
IRANR	K102	DISK		K1
IRANRE	K102	DISK		K1
IRANW	K102	DISK		K1
IRANWE	K102	DISK		K1
ISTATUS	W206	DISK		W2
IUNPK	A102		CARDS	A1
	NONE	DISK		NONE
JDF	NONE	DISK		NONE
JDFS	NONE	DISK		NONE
JOBNAME	Q402		DISK	Q4
	NONE	DISK		NONE
JULIAN	Q1AA		CARDS	Q1
KEY.	NONE		DISK	NONE
KILLDF	Q117	DISK		Q1
KILLDFS	NONE	DISK		NONE
KODER	NONE	DISK	DISK	NONE
KOMPASS	NONE	DISK		NONE
KRAKER	NONE	DISK	DISK	NONE
LABRT	N103		DISK	N1
	NONE	DISK		NONE
LACENT	U1AA		DISK	U1
LAFST	NONE	DISK		NONE
LAGRE	D113		DISK	D1
	NONE	DISK		NONE
LASC1	NONE		DISK	NONE
LASC2	NONE		DISK	NONE
LCROLIN	Q306	DISK		Q3
LCROLOT	Q306	DISK		Q3
LEGVAR	NONE	DISK	DISK	NONE
LENGTH	NONE		DISK	NONE
	W204	DISK		W2
LENSDES	T4AB	TAPE		T4
LFL	NONE	DISK		NONE
LGNDR	D110		DISK	D1
	NONE	DISK		NONE
LIBMSG	NONE	DISK	DISK	NONE
LINCNT	J506	DISK	DISK	J5
LINE	J548		CARDS	J5
	NONE	DISK		NONE
LINE.	NONE		DISK	NONE
LINES	Q4AA		CARDS	Q4
LNGAM	C326		DISK	C3
	NONE	DISK		NONE
LOAD	I401		CARDS	I4
LOADER	NONE	DISK	DISK	NONE
LOADERS	NONE	DISK		NONE
LOADZZZ	NONE	DISK		NONE
LOCF	NONE	DISK		NONE
LOCF↑	NONE	DISK	DISK	NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
LODER	NONE	DISK		NONE
LODER1	NONE	DISK		NONE
LODER2	NONE	DISK		NONE
LSHIFT	M407		CARDS	M4
	NONE	DISK		NONE
LSS	F404	DISK	DISK	F4
LSSIT	F410		CARDS	F4
	NONE	DISK		NONE
LSSS	F407		DISK	F4
	NONE	DISK		NONE
LST	NONE	DISK		NONE
LSTPROA	NONE		DISK	NONE
LSTPROS	NONE		DISK	NONE
LSTUP	J597	DISK	CARDS	J5
M2C	J5AA	PERMFILE		J5
MACETXT	NONE		DISK	NONE
MACH	Q418		DISK	Q4
	NONE	DISK		NONE
MACHS	NONE	DISK		NONE
MACRO	NONE	DISK		NONE
MACROS	NONE	DISK		NONE
MACROA	NONE	DISK		NONE
MACROB	NONE	DISK		NONE
MACROC	NONE	DISK		NONE
MADOV	NONE		DISK	NONE
MATADD	NONE		DISK	NONE
MATFAC	F409	DISK	CARDS	F4
MATINV	F132	DISK	DISK	F1
MATMOV	F120	DISK	DISK	F1
MATMPY	F122		DISK	F1
	NONE	DISK		NONE
MATSUB	NONE		DISK	NONE
MATTRA	F121	DISK	DISK	F1
MATTRS	F119	DISK	DISK	F1
MATVEC	F221		CARDS	F2
	NONE	DISK		NONE
MAXAM	F116	DISK	DISK	F1
MAXAV	F115	DISK	DISK	F1
MAXM	F116	DISK	DISK	F1
MAXV	F115	DISK	DISK	F1
MEMLEN	Q305	DISK		Q3
MEMORY	Q305	DISK		Q3
MEMREL	Q305	DISK		Q3
MEMREQ	Q305	DISK		Q3
MEPBP	N105	(XIT)	DISK	N1
MESSAGE	Q116	DISK		Q1
MESSNI	G803		CARDS	G8
MGS	F128	DISK	DISK	F1
MINAM	F116	DISK	DISK	F1
MINAV	F115	DISK	DISK	F1
MINM	F116		DISK	F1

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
MINM	F116	DISK		F1
MINV	F115	DISK	DISK	F1
MNEMDMP	NONE	DISK		NONE
MODIFY	W118	DISK		W1
MODIFY\$	NONE	DISK		NONE
MOLL	L4AA	PERMFILE		L4
MOORE	NONE	DISK		NONE
MOVEEC	K202		CARDS	K2
MOVEMC	K201		CARDS	K2
MSG	NONE	DISK		NONE
MTMPY	F123	DISK	DISK	F1
MUXCP	NONE		DISK	NONE
MUXIDLE	NONE		DISK	NONE
N203RR	N203	DISK	DISK	N2
N203SR	N203	DISK	DISK	N2
NARG	NONE	DISK		NONE
NEWLINE	K6AA		CARDS	K6
NEWPOL	C216	DISK	CARDS	C2
NEWS	NONE	DISK		NONE
NGONS	J597	DISK	CARDS	J5
NONES	M411	DISK	CARDS	M4
NORIM	J514		DISK	J5
	NONE	DISK		NONE
NUMB.	NONE		DISK	NONE
NUMBER	J545		CARDS	J5
	NONE	DISK		NONE
NXTDAY	Q1AA		CARDS	Q1
OBF	NONE	DISK		NONE
OFFSET	J556		CARDS	J5
	NONE	DISK		NONE
OFFSWCH	Q416	DISK		Q4
OFFSWCS	NONE	DISK		NONE
ONSWCH	Q416	DISK		Q4
ONSWCH\$	NONE	DISK		NONE
OPEN	W113		CARDS	W1
	W115	DISK		W1
OPENS	NONE	DISK		NONE
OPEN.	NONE	DISK	DISK	NONE
OPERM	W109	DISK		W1
OPERM1	NONE	DISK		NONE
OPERM2	NONE	DISK		NONE
OPERM\$	NONE	DISK		NONE
OPTIMIZ	E4AA	TAPE		E4
ORDER1	M116		CARDS	M1
ORDER2	M116		CARDS	M1
OUTPTB	NONE	DISK	DISK	NONE
OUTPTC	NONE	DISK	DISK	NONE
OUTPTM	NONE	DISK		NONE
OUTPTN	NONE	DISK	DISK	NONE
OUTPTS	NONE	DISK	DISK	NONE
OVER11	NONE		DISK	NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
OVER12	NONE		DISK	NONE
OVER13	NONE		DISK	NONE
OVER14	NONE		DISK	NONE
OVER15	NONE		DISK	NONE
OVER16	NONE		DISK	NONE
OVER17	NONE		DISK	NONE
OVER18	NONE		DISK	NONE
OVER19	NONE		DISK	NONE
OVERFL	NONE		DISK	NONE
OVERLAY	NONE	DISK	DISK	NONE
OVERLOD	NONE		DISK	NONE
PACKAGE	Q413	DISK		Q4
PARITY	W210	DISK		W2
PARITYS	NONE	DISK		NONE
PARM	NONE		DISK	NONE
PASS14\$	NONE		DISK	NONE
PASS15\$	NONE		DISK	NONE
PAUSE	NONE	DISK	DISK	NONE
PBISEQ	J597	DISK	CARDS	J5
PDUMP	NONE		DISK	NONE
	N209	DISK		N2
PDUMP+	N209	DISK		N2
PFACTOR	J401	DISK	DISK	J4
PFTS	E208		CARDS	E2
	NONE	DISK		NONE
PHI	D124	DISK	CARDS	D1
PHIGRAD	E4AA	TAPE		E4
PHISTF	J598	DISK	CARDS	J5
PICTURE	J592	DISK	CARDS	J5
PLOJB	J562	DISK	DISK	J5
PLOPR	J596	DISK	CARDS	J5
PLOSB	J571	DISK	CARDS	J5
PLOT	J541		DISK	J5
	NONE	DISK		NONE
PLOTM	J599	DISK	CARDS	J5
PLOTS	J550		CARDS	J5
	NONE	DISK		NONE
PLOTZ	J544		CARDS	J5
	NONE	DISK		NONE
PLT	J516		DISK	J5
	NONE	DISK		NONE
PLT3D	J566		CARDS	J5
	NONE	DISK		NONE
PLTZ	J549		CARDS	J5
	NONE	DISK		NONE
POCKET	NONE		DISK	NONE
POLAR	J512	DISK	DISK	J5
POLAR3D	J572		CARDS	J5
	NONE	DISK		NONE
POLCC	J603	DISK	CARDS	J6
POLCON	J578		CARDS	J5

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
-----	-----	-----	-----	-----
POLCON	NONE		DISK	NONE
POL3DCC	J576		CARDS	J5
POLY	NONE	DISK		NONE
	J587		CARDS	J5
POSFIL.	NONE	DISK		NONE
PQERFC	C335	DISK	DISK	NONE
PRELDR	NONE	DISK	CARDS	C3
PRNSRD	J573			NONE
	NONE	DISK	CARDS	J5
PRODHH	F225	DISK		NONE
PROHHH	F229	DISK	CARDS	F2
PRTAB	NONE	DISK	CARDS	F2
PRUSIZE	Q408			NONE
PSCALE	J401	DISK	CARDS	Q4
PSEARCH	E4AA	TAPE	DISK	J4
PSI	C312			E4
	NONE	DISK	CARDS	C3
PSICTLA	NONE			NONE
PSICTLS	NONE		DISK	NONE
PSX	NONE	DISK	DISK	NONE
PUNCHIT	NONE			NONE
PUT	M403		DISK	M4
	NONE	DISK		NONE
PUTIT	M404	DISK	CARDS	M4
PWRSPCT	G604	DISK	CARDS	G6
Q8DIAGP	NONE			NONE
Q8DIAGS	NONE		DISK	NONE
Q8NTRY	NONE	DISK	DISK	NONE
Q9DIAGF	NONE		DISK	NONE
QABS	D122		CARDS	D1
	NONE	DISK		NONE
QBRT4	B407		CARDS	B4
	NONE	DISK		NONE
QEXCH	K2AA	CARDS		K2
QMOVE	K2AB	CARDS		K2
QNC7	D119	DISK	CARDS	D1
QUAD	D120		CARDS	D1
	NONE	DISK		NONE
RANDOM	G801	DISK	DISK	G8
RANDST	G801	DISK	DISK	G8
RANDSV	G801	DISK	DISK	G8
RANF	G802		DISK	G8
	NONE	DISK		NONE
RANGE	A104		DISK	A1
	NONE	DISK		NONE
RANR	K101	DISK		K1
RANRE	K101	DISK		K1
RANRW	K101	DISK		K1
RANVECT	G801	DISK	DISK	G8
RANW	K101	DISK		K1

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
RANWE	K101	DISK		K1
RAPROX	E207		CARDS	E2
	NONE	DISK		NONE
RBADEX	NONE	DISK	DISK	NONE
RBAIEX	NONE	DISK	DISK	NONE
RBAREX	NONE	DISK	DISK	NONE
RDBUF	Q411		CARDS	Q4
	Q417	DISK		Q4
RD94FBT	K502		CARDS	K5
RDNX	NONE	DISK		NONE
RDNXX	NONE	DISK		NONE
RDPRU	Q408		CARDS	Q4
RDPRU.	NONE		DISK	NONE
READ	NONE	DISK		NONE
READ94	K501		CARDS	K5
READDIR	NONE	DISK		NONE
READLD	NONE	DISK		NONE
READW	NONE	DISK		NONE
RECT	J588		CARDS	J5
	NONE	DISK		NONE
REGREF	L202	DISK		L2
REGREFS	NONE	DISK		NONE
REGRST	NONE	DISK		NONE
REGSAV	NONE	DISK		NONE
RELEASE	W111		DISK	W1
RELTAPE	NONE		DISK	NONE
REMARK	Q112		DISK	Q1
	Q116	DISK		Q1
RENAME			(SWITCH)	NONE
	W104	DISK		W1
REORDR	K402		CARDS	K4
REPLACE	K306	DISK		K3
RETN	N107	DISK		N1
RETND	N107	DISK		N1
RETNH	N107	DISK		N1
RETNS	N107	DISK		N1
RETNTM	N107	DISK		N1
REVAL	F208		DISK	F2
	NONE	DISK		NONE
REVEV	F206		DISK	F2
	NONE	DISK		NONE
REWIND	NONE		DISK	NONE
	W301	DISK		W3
REWINDS	NONE	DISK		NONE
REWINDM	NONE		DISK	NONE
	W301	DISK		W3
RFFT	F501	DISK	CARDS	F5
RFSN	F5A8		CARDS	F5
RFTI	F503	DISK	CARDS	F5
RKA	D203	DISK	DISK	D2
RKB	D203		DISK	D2

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
-----	-----	-----	-----	-----
RKB	D203	DISK		D2
RLDSR	NONE		DISK	NONE
ROLLOUS	NONE	DISK		NONE
ROLLOUT	Q118	DISK		Q1
RPOLY	C206		DISK	C2
	NONE	DISK		NONE
RQTA.	NONE	DISK		NONE
RSEVAL	F2AA		CARDS	F2
	NONE	DISK		NONE
RSEVEV	F2AB		CARDS	F2
	NONE	DISK		NONE
RUN	NONE		DISK	NONE
RUN1	NONE	DISK	DISK	NONE
RUN\$	NONE	DISK		NONE
RWBUF	Q411		CARDS	Q4
RXPLOT	J597	DISK	CARDS	J5
S3DVAL	F222	DISK	DISK	F2
S3DVEV	F224	DISK	CARDS	F2
SAFST	NONE	DISK		NONE
SBLIN	J535		DISK	J5
	NONE	DISK		NONE
SBLOG	J540	DISK	DISK	J5
SCALE	J546		CARDS	J5
	NONE	DISK		NONE
SCALED	J577		CARDS	J5
	NONE	DISK		NONE
SCOPE2B	NONE		DISK	NONE
SCP20	NONE		DISK	NONE
SCPOLE	C211		CARDS	C2
	NONE	DISK		NONE
SCPOLY	C2AB		CARDS	C2
	NONE	DISK		NONE
SCPTACO	C215	DISK	CARDS	C2
SCPTXT	NONE		DISK	NONE
SCPTXT2	NONE		DISK	NONE
SDG	B106		DISK	B1
	NONE	DISK		NONE
SDG+	NONE	DISK		NONE
SEARCH	M118		DISK	M1
	NONE	DISK		NONE
SECOND	Q110		DISK	Q1
	Q115	DISK		Q1
SECTN1	NONE		DISK	NONE
SECTN4	NONE		DISK	NONE
SEGMENT	NONE		DISK	NONE
SET	NONE		DISK	NONE
SETDPK	Q413	DISK		Q4
SETEXT	NONE	DISK		NONE
SETHPK	Q413	DISK		Q4
SETNPK	Q413	DISK		Q4
SETPLT	J506		DISK	J5

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
SETPLT	J506	DISK		J5
SETQ	Q414	DISK		Q4
SETSPK	Q413	DISK		Q4
SETTMPK	Q413	DISK		Q4
SHIFN	M401		DISK	M4
	NONE	DISK		NONE
SHIFT	M401		DISK	M4
	NONE	DISK		NONE
I SHIFT	M413	INLINE	INLINE	M4
SHNK	D121		CARDS	D1
	NONE	DISK		NONE
SIGNOO	NONE		DISK	NONE
SIMPSN	D1AC		DISK	D1
	NONE	DISK		NONE
I SIMPUN	D129	DISK	CARDS	D1
SIMTAB	D128		CARDS	D1
SIN	B106		DISK	B1
	NONE	DISK		NONE
SIN↑	NONE	DISK		NONE
SINCOS	B106		DISK	B1
	NONE	DISK		NONE
I SINCOS↑	NONE	DISK		NONE
SINH	B203	DISK	DISK	B2
SIO.	NONE		DISK	NONE
SIO\$	NONE		DISK	NONE
SIOG2D	E1AA		CARDS	E1
SIP	NONE		DISK	NONE
SKFILE	W110		DISK	W1
	W302	DISK		W3
SKIPF	W302	DISK		W3
SKIPFS	NONE	DISK		NONE
SKIPI	W303	DISK		W3
SKIPI\$	NONE	DISK		NONE
SKIPR	W304	DISK		W3
SKIPR\$	NONE	DISK		NONE
SKIPX	W304	DISK		W3
SKPDAT	NONE	DISK		NONE
SKPFIL	W110		DISK	W1
	W302	DISK		W3
I SKPFIL\$	NONE	DISK		NONE
SLINCNT	J506	DISK		J5
SLITE	NONE		DISK	NONE
	Q415	DISK		Q4
SLITET	NONE		DISK	NONE
	Q415	DISK		Q4
LLIN	J533	DISK	DISK	J5
I LLLOG	J540	DISK	DISK	J5
SMEVAL	F222	DISK	DISK	F2
SMEVEV	F224	DISK	CARDS	F2
SMHTR	F223	DISK	DISK	F2
SMOOTH	E203		DISK	E2
	NONE	DISK		NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
-----	-----	-----	-----	-----
SMPS	D127		CARDS	D1
SMSPCT	NONE	DISK		NONE
SMTXT2	NONE		DISK	NONE
SNGL	A107	DISK	DISK	A1
SOFF280	NONE		DISK	NONE
SOLPTD	F421	DISK	CARDS	F4
SOLTD1	F419	DISK	CARDS	F4
SOLTDM	F419	DISK	CARDS	F4
SOLUT	J589		CARDS	J5
	NONE	DISK		NONE
SOLVE	C402	DISK	CARDS	C4
SOLVITO	C404	DISK	CARDS	C4
SON280	NONE		DISK	NONE
SORT	M1AA		CARDS	M1
SORT1	M101		DISK	M1
	NONE	DISK		NONE
SORT2	M117	CARDS	CARDS	M1
SORTECS	M115		CARDS	M1
SPAL	G101		CARDS	G1
	NONE	DISK		NONE
SPCTRL	G601	DISK	CARDS	G6
SPERLSS	F414		CARDS	F4
SPHERE	D1AB		CARDS	D1
SPL1D1	E102		DISK	E1
	NONE	DISK		NONE
SPL1D2	E103		DISK	E1
	NONE	DISK		NONE
SPL2D1	E104		DISK	E1
	NONE	DISK		NONE
SPL2D2	E105		DISK	E1
	NONE	DISK		NONE
SPL2D3	E107		DISK	E1
	NONE	DISK		NONE
SPLINT	D117		DISK	D1
	NONE	DISK		NONE
SPLINT2	D118		DISK	D1
	NONE	DISK		NONE
SPL0T	J508	DISK	DISK	J5
SQRT	B408		DISK	B4
	NONE	DISK		NONE
SQRT↑	NONE	DISK		NONE
SRLIN	J534		DISK	J5
	NONE	DISK		NONE
SRLOG	J540	DISK	DISK	J5
SRPOLE	C210		CARDS	C2
	NONE	DISK		NONE
SRPOLY	C2AA		CARDS	C2
	NONE	DISK		NONE
SSWTCH	NONE		DISK	NONE
	NONE			NONE
	Q416	DISK		Q4
START	NONE		DISK	NONE

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
STAT	NONE	DISK		NONE
STATB	NONE	DISK		NONE
STATBS	NONE	DISK		NONE
STATD	NONE	DISK		NONE
STATDS	NONE	DISK		NONE
STATQ	NONE	DISK		NONE
STATQS	NONE	DISK		NONE
STATS	NONE	DISK		NONE
STB	J524		DISK	J5
	NONE	DISK		NONE
STEREO	J513		DISK	J5
	NONE	DISK		NONE
STEVAL	F222	DISK	DISK	F2
STEVEV	F224	DISK	CARDS	F2
STHTR	F223	DISK	DISK	F2
STLIN	J535		DISK	J5
	NONE	DISK		NONE
STLOG	J540	DISK	DISK	J5
STLTJS	D125	DISK	CARDS	D1
STOP	NONE	DISK	DISK	NONE
STORE	J553		CARDS	J5
	NONE	DISK		NONE
SUBLST	K403		CARDS	K4
SUM	K306	DISK		K3
SUMVEC	F138	DISK	CARDS	F1
SUN	NONE		DISK	NONE
SUN1	NONE	DISK	DISK	NONE
SUNS	NONE	DISK		NONE
SWEEP	J570	CARDS	CARDS	J5
SWITCH	Q114	(RENAME)	DISK	Q1
SWITCHS	NONE	DISK		NONE
SYMBOL	J559		CARDS	J5
	NONE	DISK		NONE
SYSFS	W116	DISK		W1
SYSTBAC	NONE	DISK	DISK	NONE
SYSTEM	NONE	DISK	DISK	NONE
SYSTEMC	NONE	DISK	DISK	NONE
SYSTEMP	NONE	DISK	DISK	NONE
SYSTXT	NONE		DISK	NONE
SYSTXT2	NONE		DISK	NONE
TABINT	D116		DISK	D1
	NONE	DISK		NONE
TACSI	T1AB		CARDS	T1
TAN	B107	DISK	DISK	B1
TANH	B204	DISK	DISK	B2
TAPDMP	N205		CARDS	N2
TAPER	NONE	DISK		NONE
TAPMAT	NONE		DISK	NONE
TAPWRI	J552	DISK	CARDS	J5
TBPSDN	D301	DISK	CARDS	D3
TCP	J521		DISK	J5

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
TCP	NONE	DISK		NONE
TCR	J527		DISK	J5
	NONE	DISK		NONE
THEVAL	F2AK		CARDS	F2
	NONE	DISK		NONE
THEVEV	F2AL		CARDS	F2
	NONE	DISK		NONE
TIDY	L301		DISK	L3
TIDYS	L301	DISK		L3
TIMAV	E302	CARDS	CARDS	E3
TIME	Q111		DISK	Q1
	Q116	DISK		Q1
TINT	E302	CARDS	CARDS	E3
I TLE	NONE	DISK		NONE
TLSS	F412	DISK	CARDS	F4
I TRACER	NONE	DISK		NONE
TRANS	NONE		DISK	NONE
I	F1AD	CARDS		F1
TREVAL	F2AG		CARDS	F2
	NONE	DISK		NONE
TRICJB	J564		DISK	J5
	NONE	DISK		NONE
TRICON	J561		CARDS	J5
	NONE	DISK		NONE
TRIPOL	J579		CARDS	J5
	NONE	DISK		NONE
TRSEVV	F2AH		CARDS	F2
	NONE	DISK		NONE
TSP	J520		DISK	J5
	NONE	DISK		NONE
TSPV	J522		DISK	J5
	NONE	DISK		NONE
TSUB	K5AA	CARDS		K5
I UDUMP	NONE	DISK		NONE
UEXT	NONE	DISK		NONE
ULCR	K304	DISK		K3
ULCRs	NONE	DISK		NONE
I UMTR	NONE	DISK		NONE
UNLOAD	NONE		DISK	NONE
UNLODE	W112		DISK	W1
UNPAK	A101		CARDS	A1
	NONE	DISK		NONE
I UPD2\$	NONE	DISK		NONE
UPDATE	L407		DISK	L4
	NONE	DISK		NONE
UPDATES	NONE	DISK		NONE
UT01	K6AA		CARDS	K6
UT02	K6AB		CARDS	K6
UT03	K6AC		CARDS	K6
VECPROD	F133	DISK	DISK	F1
VECSUM	F133		DISK	F1

PROGRAM NAME	PROGRAM NUMBER	7600 RESIDENCE	6600 RESIDENCE	ABSTRACT IN CATALOG SECTION
VECSUM	F133	DISK		F1
VERSION	NONE	DISK		NONE
WAITR	NONE	DISK		NONE
WEOF\$	NONE	DISK		NONE
WFH	J593		CARDS	J5
	NONE	DISK		NONE
WHEN	NONE	DISK		NONE
WHERE	J554		CARDS	J5
	NONE	DISK		NONE
WINDOW	G603	DISK	CARDS	G6
WLCH	J542	DISK	DISK	J5
WLCV	J542	DISK	DISK	J5
WOF	NONE	DISK		NONE
WR94FBT	K502		CARDS	K5
WRITE	K6AA		CARDS	K6
WRIT94	K501		CARDS	K5
WRITBUF	Q411		CARDS	Q4
WRITPRU	Q408		CARDS	Q4
WTBUF	Q417	DISK		Q4
WTNX	NONE	DISK		NONE
WTNXX	NONE	DISK		NONE
WS	NONE	DISK		NONE
XCLOSE	NONE	DISK		NONE
XHATCH	J594	DISK	CARDS	J5
XIT	N108	DISK		N1
XITFIX	N108	DISK		N1
XITSAVE	N108	DISK		N1
XJDFSC	NONE	DISK		NONE
XJDFSC\$	NONE	DISK		NONE
XLOCF	NONE	DISK	DISK	NONE
XLOCF↑	NONE	DISK		NONE
XOPEN	NONE	DISK		NONE
XQUAD	NONE	DISK		NONE
XRCL	NONE		DISK	NONE
XREAD	NONE	DISK		NONE
XREADER	NONE	DISK		NONE
XWRITE	NONE	DISK		NONE
XWRITER	NONE	DISK		NONE
XXXDMPQ	NONE		DISK	NONE
XXXRESQ	NONE		DISK	NONE
ZEROIN	C403	CARDS	CARDS	C4
ZETABAS	J1AA		CARDS	J1
ZNAME	NONE	DISK		NONE
ZZZZZ	NONE	DISK		NONE
ZZZZZ\$	NONE	DISK		NONE

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Copies of current PIM-2 newsletters may be obtained from the Program Library.

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Current Newsletters thru CCF:PIM-2:030: 18, 27, 30.

Disposition of Cancelled Newsletters:

1. See CØLØR (J569)
- 2 thru 9. See Catalog of Programs
10. See CCF:PIM-2:011
11. See Catalog of Programs
12. See CCF:PIM-2:023
- 13 thru 17. See Catalog of Programs
- 19 thru 21. See Catalog of Programs
22. See CCF:PIM-2:029
23. See CCF:PIM-2:026
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- 28 thru 29. See Catalog of Programs

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correct wording _____

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