```
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRR     TTTTTTTTTTTTTTT   LLL
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRRR    TTTTTTTTTTTTTTT   LLL
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRRR    TTTTTTTTTTTTTTT   LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRR           TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRRR          TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
```

```
MM      MM  TTTTTTTTTT  HH      HH  DDDDDDDD      IIIIII    MM      MM
MM      MM  TTTTTTTTTT  HH      HH  DDDDDDDD      IIIIII    MM      MM
MMMM  MMMM      TT      HH      HH  DD      DD      II      MMMM  MMMM
MMMM  MMMM      TT      HH      HH  DD      DD      II      MMMM  MMMM
MM  MM  MM      TT      HH      HH  DD      DD      II      MM  MM  MM
MM  MM  MM      TT      HH      HH  DD      DD      II      MM  MM  MM
MM      MM      TT      HHHHHHHHHH  DD      DD      II      MM      MM
MM      MM      TT      HHHHHHHHHH  DD      DD      II      MM      MM
MM      MM      TT      HH      HH  DD      DD      II      MM      MM
MM      MM      TT      HH      HH  DD      DD      II      MM      MM
MM      MM      TT      HH      HH  DD      DD      II      MM      MM      ....
MM      MM      TT      HH      HH  DD      DD      II      MM      MM      ....
MM      MM      TT      HH      HH  DDDDDDDD      IIIIII    MM      MM      ....
MM      MM      TT      HH      HH  DDDDDDDD      IIIIII    MM      MM      ....

LL              IIIIII      SSSSSSSS
LL              IIIIII      SSSSSSSS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II        SSSSSS
LL                II        SSSSSS
LL                II              SS
LL                II              SS
LL                II              SS
LL                II              SS
LLLLLLLLLL      IIIIII    SSSSSSSS
LLLLLLLLLL      IIIIII    SSSSSSSS
```

Table of contents

```
0000     1          .TITLE  MTH$DIM          possitive difference functions
0000     2          .IDENT  /1-002/          ; File: MTHDIM.MAR
0000     3
0000     4 ;
0000     5 ;*****************************************************************************
0000     6 ;*                                                                           *
0000     7 ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                  *
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0000    23 ;*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                  *
0000    24 ;*                                                                           *
0000    25 ;*                                                                           *
0000    26 ;*****************************************************************************
0000    27 ;
0000    28 ;
0000    29 ; FACILITY: MATH LIBRARY
0000    30 ;++
0000    31 ; ABSTRACT:
0000    32 ;       This module contains the positive difference routines.
0000    33 ;       Positive difference (a,b) is defined to be MAX(a-b,0)
0000    34 ;
0000    35 ;
0000    36 ;--
0000    37 ;
0000    38 ; VERSION: 1
0000    39 ;
0000    40 ; HISTORY:
0000    41 ;
0000    42 ; AUTHOR:
0000    43 ;       Jonathan M. Taylor, 14-JUL-77: Version 0
0000    44 ;
0000    45 ; MODIFIED BY:
0000    46 ;
0000    47 ;
0000    48 ;
```

```
0000     50          .SBTTL  HISTORY          ; Detailed Current Edit History
0000     51
0000     52
0000     53 ; Edit History for Version 1 of MTH$DIM
0000     54 ;
0000     55 ; 0-4    - Remove MTH$FLAG_JACKET.  TNH 5-July-78
0000     56 ; 1-001  - Update version number and copyright notice.  JBS 16-NOV-78
0000     57 ; 1-002  - Add MTH$GDIM, MTH$HDIM.  SBL 18-Jan-79
```

```
                     59          .SBTTL  DECLARATIONS
                     60
                     61 ;
                     62 ; INCLUDE FILES:
                     63 ;       NONE
                     64 ;
                     65
                     66 ;
                     67 ; EXTERNAL SYMBOLS:
                     68 ;       NONE
                     69 ;
                     70
                     71 ;
                     72 ; MACROS:
                     73 ;       NONE
                     74 ;
                     75
                     76 ;
                     77 ; PSECT DECLARATIONS:
00000000             78          .PSECT  _MTH$CODE       PIC, SHR, LONG, EXE, NOWRT
                     79
                     80 ;
                     81 ; EQUATED SYMBOLS:
                     82 ;       NONE
                     83 ;
                     84
                     85 ;
                     86 ; OWN STORAGE:
                     87 ;       NONE
                     88 ;
```

```
                                        .SBTTL  MTH$IIDIM

                                ;++
                                ; FUNCTIONAL DESCRIPTION:
                                ;       Returns, as routine value, the positive difference of two
                                ;       INTEGER*2 arguments.
                                ;
                                ; CALLING SEQUENCE:
                                ;       Positive_difference.ww.v = MTH$IIDIM (a1.rw.r, a2.rw.r)
                                ;
                                ;
                                ; INPUT PARAMETERS:
                                ;       a1              adr of INTEGER*2 value
                                ;       a2              adr of INTEGER*2 value
                                ;
                                ;
                                ; IMPLICIT INPUTS:
                                ;       NONE
                                ;
                                ; OUTPUT PARAMETERS:
                                ;       NONE
                                ;
                                ; IMPLICIT OUTPUTS:
                                ;       NONE
                                ;
                                ; COMPLETION CODES:
                                ;       NONE
                                ;
                                ; SIDE EFFECTS:
                                ;       SIGNALS Integer Overflow if  a1-a2  overflows.
                                ;
                                ;
                                ;--


                        4000    0000            .ENTRY  MTH$IIDIM,      ^M<IV>  ; enable integer overflow
50  04 BC   08 BC      A3      0002            SUBW3   @8(AP), @4(AP), R0      ; R0 = difference of args
                        02      0008            BGEQ    1$                      ; return if non-negative
                        50      B4  000A        CLRW    R0                      ; else return 0
                        04      000C        1$: RET
```

```
                     000D   135          .SBTTL  MTH$JIDIM
                     000D   136
                     000D   137 ;++
                     000D   138 ; FUNCTIONAL DESCRIPTION:
                     000D   139 ;       Returns, as routine value, the positive difference of two
                     000D   140 ;       INTEGER*4 arguments.
                     000D   141 ;
                     000D   142 ;
                     000D   143 ; CALLING SEQUENCE:
                     000D   144 ;       Positive_difference.wl.v = MTH$JIDIM (a1.rl.r, a2.rl.r)
                     000D   145 ;
                     000D   146 ;
                     000D   147 ;
                     000D   148 ; INPUT PARAMETERS:
                     000D   149 ;       a1          adr of INTEGER*4 value
                     000D   150 ;       a2          adr of INTEGER*4 value
                     000D   151 ;
                     000D   152 ;
                     000D   153 ; IMPLICIT INPUTS:
                     000D   154 ;       NONE
                     000D   155 ;
                     000D   156 ; OUTPUT PARAMETERS:
                     000D   157 ;       NONE
                     000D   158 ;
                     000D   159 ; IMPLICIT OUTPUTS:
                     000D   160 ;       NONE
                     000D   161 ;
                     000D   162 ; COMPLETION CODES:
                     000D   163 ;       NONE
                     000D   164 ;
                     000D   165 ; SIDE EFFECTS:
                     000D   166 ;       SIGNALS Integer Overflow if  a1-a2  overflows.
                     000D   167 ;
                     000D   168 ;
                     000D   169 ;--
                     000D   170
                     000D   171
                4000 000D   172          .ENTRY  MTH$JIDIM,      ^M<IV>  ; enable integer overflow
50   04 BC   08 BC   C3 000F   173          SUBL3   @8(AP), @4(AP), R0      ; R0 = difference of args
                   02   18 0015   174          BGEQ    1$                      ; return if non-negative
                   50   D4 0017   175          CLRL    R0                      ; else return 0
                   04   0019   176 1$:       RET
```

```
                                        001A    178          .SBTTL  MTH$DIM
                                        001A    179
                                        001A    180 ;++
                                        001A    181 ; FUNCTIONAL DESCRIPTION:
                                        001A    182 ;       Returns, as routine value, the positive difference of two
                                        001A    183 ;       REAL*4 arguments.
                                        001A    184 ;
                                        001A    185 ;
                                        001A    186 ; CALLING SEQUENCE:
                                        001A    187 ;       Positive_difference.wf.v = MTH$DIM (a1.rf.r, a2.rf.r)
                                        001A    188 ;
                                        001A    189 ;
                                        001A    190 ;
                                        001A    191 ; INPUT PARAMETERS:
                                        001A    192 ;       a1          adr of a single-precision floating-point value
                                        001A    193 ;       a2          adr of a single-precision floating-point value
                                        001A    194 ;
                                        001A    195 ;
                                        001A    196 ; IMPLICIT INPUTS:
                                        001A    197 ;       NONE
                                        001A    198 ;
                                        001A    199 ; OUTPUT PARAMETERS:
                                        001A    200 ;       NONE
                                        001A    201 ;
                                        001A    202 ; IMPLICIT OUTPUTS:
                                        001A    203 ;       NONE
                                        001A    204 ;
                                        001A    205 ; COMPLETION CODES:
                                        001A    206 ;       NONE
                                        001A    207 ;
                                        001A    208 ; SIDE EFFECTS:
                                        001A    209 ;       Floating Overflow, Floating Underflow, and Reserved Operand
                                        001A    210 ;       exceptions can occur.
                                        001A    211 ;
                                        001A    212 ;
                                        001A    213 ;--
                                        001A    214
                                        001A    215
                                  0000  001A    216          .ENTRY  MTH$DIM,        ^M<>
50    04 BC    08 BC    43          001C    217          SUBF3   @8(AP), @4(AP), R0      ; R0 = difference of args
                 02    18          0022    218          BGEQ    1$                      ; return if non-negative
                 50    D4          0024    219          CLRL    R0                      ; else return 0
                       04          0026    220 1$:      RET
```

```
                     0027   222          .SBTTL  MTH$DDIM
                     0027   223
                     0027   224 ;++
                     0027   225 ; FUNCTIONAL DESCRIPTION:
                     0027   226 ;       Returns as routine value, the positive difference of two
                     0027   227 ;       REAL*8 numbers.
                     0027   228 ;
                     0027   229 ;
                     0027   230 ; CALLING SEQUENCE:
                     0027   231 ;       Positive_difference.wd.v = MTH$DDIM (a1.rd.r, a2.rd.r)
                     0027   232 ;
                     0027   233 ;
                     0027   234 ;
                     0027   235 ; INPUT PARAMETERS:
                     0027   236 ;       a1          adr of a double-precision floating-point value
                     0027   237 ;       a2          adr of a double-precision floating-point value
                     0027   238 ;
                     0027   239 ; IMPLICIT INPUTS:
                     0027   240 ;       NONE
                     0027   241 ;
                     0027   242 ; OUTPUT PARAMETERS:
                     0027   243 ;       NONE
                     0027   244 ;
                     0027   245 ; IMPLICIT OUTPUTS:
                     0027   246 ;       NONE
                     0027   247 ;
                     0027   248 ; COMPLETION CODES:
                     0027   249 ;       NONE
                     0027   250 ;
                     0027   251 ; SIDE EFFECTS:
                     0027   252 ;       Floating Overflow, Floating Underflow, and Reserved Operand
                     0027   253 ;       exceptions can occur.
                     0027   254 ;
                     0027   255 ;
                     0027   256 ;--
                     0027   257
                0000 0027   258          .ENTRY  MTH$DDIM,       ^M<>
50   04 BC   08 BC    63 0029   259          SUBD3   @8(AP), @4(AP), R0      ; R0 = difference of args
                  02    18 002F   260          BGEQ    1$                      ; return if non-negative
                  50    7C 0031   261          CLRQ    R0                      ; else return 0
                        04 0033   262 1$:      RET
                           0034   263
                           0034   264
```

```
                                0034   266          .SBTTL  MTH$GDIM
                                0034   267
                                0034   268 ;++
                                0034   269 ; FUNCTIONAL DESCRIPTION:
                                0034   270 ;       Returns as routine value, the positive difference of two
                                0034   271 ;       G floating numbers.
                                0034   272 ;
                                0034   273 ;
                                0034   274 ; CALLING SEQUENCE:
                                0034   275 ;
                                0034   276 ;       Positive_difference.wg.v = MTH$GDIM (a1.rg.r, a2.rg.r)
                                0034   277 ;
                                0034   278 ;
                                0034   279 ; INPUT PARAMETERS:
                                0034   280 ;
                                0034   281 ;       a1      - address of a G floating value
                                0034   282 ;       a2      - address of a G floating value
                                0034   283 ;
                                0034   284 ; IMPLICIT INPUTS:
                                0034   285 ;       NONE
                                0034   286 ;
                                0034   287 ; OUTPUT PARAMETERS:
                                0034   288 ;       NONE
                                0034   289 ;
                                0034   290 ; IMPLICIT OUTPUTS:
                                0034   291 ;       NONE
                                0034   292 ;
                                0034   293 ; COMPLETION CODES:
                                0034   294 ;       NONE
                                0034   295 ;
                                0034   296 ; SIDE EFFECTS:
                                0034   297 ;       Floating Overflow, Floating Underflow and Reserved Operand
                                0034   298 ;       exceptions can occur.
                                0034   299 ;
                                0034   300 ;
                                0034   301 ;--
                                0034   302
                          0000  0034   303          .ENTRY  MTH$GDIM, ^M<>
50    04 BC    08 BC  43FD    0036   304          SUBG3   @8(AP), @4(AP), R0      ; R0 = difference of args
                    02    18  003D   305          BGEQ    1$                      ; return if non-negative
                    50    7C  003F   306          CLRQ    R0
                          04  0041   307 1$:      RET                             ; return
```

```
                                0042   309          .SBTTL  MTH$HDIM
                                0042   310
                                0042   311 ;++
                                0042   312 ; FUNCTIONAL DESCRIPTION:
                                0042   313 ;       Returns the positive difference of two H floating numbers.
                                0042   314 ;       Because an H floating number can not be represented in
                                0042   315 ;       64 bits, it is returned to the first argument; the input
                                0042   316 ;       parameters being shifted to the second and third arguments,
                                0042   317 ;       as per system convention.
                                0042   318 ;
                                0042   319 ;
                                0042   320 ; CALLING SEQUENCE:
                                0042   321 ;
                                0042   322 ;       CALL MTH$HDIM (Positive_difference.wh.r, a1.rh.r, a2.rh.r)
                                0042   323 ;
                                0042   324 ;
                                0042   325 ; INPUT PARAMETERS:
                                0042   326 ;
                                0042   327 ;       a1      - address of a H floating value
                                0042   328 ;       a2      - address of a H floating value
                                0042   329 ;
                                0042   330 ; IMPLICIT INPUTS:
                                0042   331 ;       NONE
                                0042   332 ;
                                0042   333 ; OUTPUT PARAMETERS:
                                0042   334 ;       Positive_difference     - H floating result by reference
                                0042   335 ;
                                0042   336 ; IMPLICIT OUTPUTS:
                                0042   337 ;       NONE
                                0042   338 ;
                                0042   339 ; COMPLETION CODES:
                                0042   340 ;       NONE
                                0042   341 ;
                                0042   342 ; SIDE EFFECTS:
                                0042   343 ;       Floating Overflow, Floating Underflow and Reserved Operand
                                0042   344 ;       exceptions can occur.
                                0042   345 ;
                                0042   346 ;
                                0042   347 ;--
                                0042   348
                          0000  0042   349          .ENTRY  MTH$HDIM, ^M<>
04 BC    08 BC    0C BC 63FD  0044   350          SUBH3   @12(AP), @8(AP), @4(AP) ; @4(AP) = difference of args
                       04  18  004C   351          BGEQ    1$                      ; return if non-negative
                    04 BC 7CFD  004E   352          CLRH    @4(AP)
                          04    0052   353 1$:      RET                             ; return
                                0053   354
                                0053   355
                                0053   356          .END
```

```
MTH$DDIM        00000027 RG    01
MTH$DIM         0000001A RG    01
MTH$GDIM        00000034 RG    01
MTH$HDIM        00000042 RG    01
MTH$IIDIM       00000000 RG    01
MTH$JIDIM       0000000D RG    01
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
_MTH$CODE	00000053 (83.)	01 (1.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	32	00:00:00.11	00:00:00.66
Command processing	117	00:00:00.47	00:00:02.85
Pass 1	78	00:00:00.61	00:00:03.27
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	70	00:00:00.72	00:00:02.60
Symbol table output	2	00:00:00.01	00:00:00.01
Psect synopsis output	2	00:00:00.02	00:00:00.13
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	303	00:00:01.95	00:00:09.52

```
The working set limit was 900 pages.
3561 bytes (7 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 6 non-local and 6 local symbols.
356 source lines were read in Pass 1, producing 25 object records in Pass 2.
0 pages of virtual memory were used to define 0 macros.
```

Macro library statistics

Macro library name	Macros defined
_255DUA28:[SYSLIB]STARLET.MLB;2	0

```
0 GETS were required to define 0 macros.

There were no errors, warnings or information messages.

MACRO/ENABLE=SUPPRESSION/DISABLE=(GLOBAL,TRACEBACK)/LIS=LIS$:MTHDIM/OBJ=OBJ$:MTHDIM MSRC$:MTHDIM/UPDATE=(ENH$:MTHDIM)
```

MTHDCOSH LIS

MTHDMIN LIS

MTHDLOG LIS

MTHDSINCO LIS

MTHDATANH LIS

MTHDNINT LIS

MTHDSQRT LIS

MTHDCONJG LIS

MTHDINT LIS

MTHDMAX1 LIS

MTHDSIGN LIS

MTHDIM LIS

MTHDMOD LIS

MTHDSINH LIS

MTHDEXP LIS

MTHDFLOOR LIS

MTHDPROD LIS