MTHRTL

MTHCGEXP

LIS

```
0000      1                    .TITLE  MTH$CGEXP       G COMPLEX*16 Exponential
0000      2                    .IDENT  /1-002/         ; File: MTHCGEXP.MAR  Edit: SBL1002
0000      3
0000      4
0000      5          ;****************************************************************************
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0000     24          ;*                                                                          *
0000     25          ;*                                                                          *
0000     26          ;****************************************************************************
0000     27          ;
0000     28          ;
0000     29          ; FACILITY: MATH LIBRARY
0000     30          ;++
0000     31          ; ABSTRACT:
0000     32          ;       Perform G COMPLEX*16 exponentiation: e**(r,i)
0000     33          ;
0000     34          ;
0000     35          ;--
0000     36          ;
0000     37          ; VERSION: 1
0000     38          ;
0000     39          ; HISTORY:
0000     40          ;
0000     41          ; AUTHOR:
0000     42          ;       Steven B. Lionel, 20-July-1979
0000     43          ;
0000     44          ; MODIFIED BY:
0000     45          ;
0000     46          ;
0000     47          ;
```

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HISTORY ; DetaileG Current Edit History 6-SEP-1984 11:21:03 [MTHRTL.SRC]MTHCGEXP.MAR;1   (2)

```
0000    49              .SBTTL  HISTORY          ; DetaileG Current Edit History
0000    50
0000    51
0000    52 ; Edit History
0000    53 ;
0000    54 ; 1-001 - Adapted from MTH$CEXP version 1-002.  SBL 20-July-1979
0000    55 ; 1-002 - Use MTH$GEXP_R6.  SBL 14-Dec-1979
```

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G COMPLEX*16 Exponential
DECLARATIONS

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6-SEP-1984 11:21:03   [MTHRTL.SRC]MTHCGEXP.MAR;1   (3)

```
                0000      57                .SBTTL  DECLARATIONS
                0000      58
                0000      59  ;
                0000      60  ; INCLUDE FILES:
                0000      61  ;
                0000      62
                0000      63  ;
                0000      64  ; EXTERNAL SYMBOLS:
                0000      65        .DSABL  GBL
                0000      66        .EXTRN  MTH$GSIN_R7
                0000      67        .EXTRN  MTH$GCOS_R7
                0000      68        .EXTRN  MTH$GEXP_R6
                0000      69
                0000      70  ;
                0000      71  ; MACROS:
                0000      72  ;      NONE
                0000      73
                0000      74  ;
                0000      75  ; PSECT DECLARATIONS:
            00000000      76        .PSECT  _MTH$CODE          PIC, SHR, LONG, EXE, NOWRT
                0000      77
                0000      78  ;
                0000      79  ; EQUATED SYMBOLS:
                0000      80  ;
                0000      81
                0000      82  ;
                0000      83  ; OWN STORAGE:
                0000      84  ;      NONE
```

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G COMPLEX*16 Exponential   16-SEP-1984 01:08:57 VAX/VMS Macro V04-00   Page 4
MTH$CGEXP - perform G COMPLEX*16 exponen 6-SEP-1984 11:21:03 [MTHRTL.SRC]MTHCGEXP.MAR;1 (4)

```
                        0000      86                   .SBTTL  MTH$CGEXP - perform G COMPLEX*16 exponentiation
                        0000      87
                        0000      88     ;++
                        0000      89     ; FUNCTIONAL DESCRIPTION:
                        0000      90     ;
                        0000      91     ;       The result of the operation e ** (r, i) is computed
                        0000      92     ;       by:
                        0000      93     ;
                        0000      94     ;       result = (EXP(r) * COS(i), EXP(r) * SIN(i))
                        0000      95     ;
                        0000      96     ; CALLING SEQUENCE:
                        0000      97     ;       CALL MTH$CGEXP (result.wgc.r, arg.rgc.r)
                        0000      98     ;
                        0000      99     ;
                        0000     100     ; INPUT PARAMETERS:
              00000008  0000     101     ;       arg      = 8                    ; G COMPLEX*16 argument by reference
                        0000     102     ;
                        0000     103     ; IMPLICIT INPUTS:
                        0000     104     ;       NONE
                        0000     105     ;
                        0000     106     ; OUTPUT PARAMETERS:
              00000004  0000     107     ;       result   = 4                    ; G COMPLEX*16 result by reference
                        0000     108     ;
                        0000     109     ; IMPLICIT OUTPUTS:
                        0000     110     ;       NONE
                        0000     111     ;
                        0000     112     ; COMPLETION CODES:
                        0000     113     ;       NONE
                        0000     114     ;
                        0000     115     ; SIDE EFFECTS:
                        0000     116     ;       Signals:        MTH$_SINSIGLOS  if |i| > 2*PI*2**31.
                        0000     117     ;                       Floating Overflow if r > 88.028
                        0000     118     ;
                        0000     119     ;--
                        0000     120
                        0000     121
                  00FC  0000     122             .ENTRY  MTH$CGEXP,      ^M<R2,R3,R4,R5,R6,R7>
                        0002     123     MTH$FLAG_JACKET                         ; resignal
   6D    00000000'GF  9E  0002           MOVAB   G^MTH$$JACKET_HND, (FP)
                        0009                                                     ; set handler address to jacket
                        0009                                                     ; handler
                        0009
                        0009
                        0009     124
      50    08 BC  7D  0009     125             MOVQ    @arg(AP), R0            ; R0-R1 = real part
      00000000'EF  16  000D     126             JSB     MTH$GEXP_R6            ; R0-R1 = EXP(r)
           7E   50  7D  0013     127             MOVQ    R0, -(SP)             ; Save it on the stack
                        0016     128
      50    08 AC  D0  0016     129             MOVL    arg(AP), R0            ; R0 is address of arg
                        001A     130
      50    08 A0  7D  001A     131             MOVQ    8(R0), R0             ; R0-R1 = imaginary part
           7E   50  7D  001E     132             MOVQ    R0,-(SP)             ; Save imaginary part
      00000000'EF  16  0021     133             JSB     MTH$GCOS_R7          ; R0-R1 = COS(i)
04 BC 08 AE 50 45FD  0027     134             MULG3   R0, 8(SP), @result(AP) ; Store real part
           50   8E  7D  002E     135             MOVQ    (SP)+, R0            ; Get imaginary part again
      00000000'EF  16  0031     136             JSB     MTH$GSIN_R7          ; R0-R1 = SIN(i)
      52    04 AC  D0  0037     137             MOVL    result(AP), R2        ; Address of result
```

```
08 A2   8E   50 45FD   003B   138          MULG3   R0, (SP)+, 8(R2)        ; Store imaginary part
             04         0041   139          RET
                        0042   140
                        0042   141
                        0042   142          .END
```

```
ARG                 = 00000008
MTH$$JACKET_HND       ********   X   01
MTH$CGEXP             00000000 RG    01
MTH$GCOS_R7           ********   X   00
MTH$GEXP_R6           ********   X   00
MTH$GSIN_R7           ********   X   00
RESULT              = 00000004
```

```
                              +------------------+
                              ! 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                     00000042 (    66.)   01 ( 1.)     PIC  USR   CON  REL   LCL    SHR    EXE   RD    NOWRT  NOVEC  LONG
```

```
                          +------------------------------+
                          !  Performance indicators  !
                          +------------------------------+


Phase                 Page faults   CPU Time      Elapsed Time
-----                 -----------   --------      ------------
Initialization            29        00:00:00.07   00:00:01.02
Command processing       135        00:00:00.68   00:00:05.80
Pass 1                    77        00:00:00.69   00:00:04.38
Symbol table sort          0        00:00:00.00   00:00:00.00
Pass 2                    40        00:00:00.48   00:00:01.93
Symbol table output        2        00:00:00.01   00:00:00.01
Psect synopsis output      2        00:00:00.02   00:00:00.02
Cross-reference output     0        00:00:00.00   00:00:00.00
Assembler run totals     287        00:00:01.97   00:00:13.18
```

The working set limit was 900 pages.
2344 bytes (5 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 7 non-local and 0 local symbols.
202 source lines were read in Pass 1, producing 11 object records in Pass 2.
1 page of virtual memory was used to define 1 macro.

```
                          +------------------------------+
                          ! Macro library statistics !
                          +------------------------------+


Macro library name                      Macros defined
------------------                      --------------
_$255$DUA28:[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$:MTHCGEXP/OBJ=OBJ$:MTHCGEXP MSRC$:MTHJACKET/UPDATE=(ENH$:MTHJACKET)+MSRC

MTHCVTDG
LIS

MTHDACOS
LIS

MTHCGABS
LIS

MTHCDSINC
LIS

MTHCLOG
LIS

MTHDASIN
LIS

MTHCGLOG
LIS

MTHCONVER
LIS

MTHDATAN
LIS

MTHCSQRT
LIS

MTHCEXP
LIS

MTHCGSQRT
LIS

MTHCGEXP
LIS

MTHCSINCO
LIS

MTHCONJG
LIS

MTHCVTDG
LIS

MTHCDSQRT
LIS

MTHCGSINC
LIS

MTHCOSH
LIS

MTHDACOS
LIS