```
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
```

```
LL              IIIIII    BBBBBBBB    PPPPPPPP      000000    LL          YY      YY  HH      HH
LL              IIIIII    BBBBBBBB    PPPPPPPP      000000    LL          YY      YY  HH      HH
LL                II      BB      BB  PP      PP  00      00  LL          YY      YY  HH      HH
LL                II      BB      BB  PP      PP  00      00  LL          YY      YY  HH      HH
LL                II      BB      BB  PP      PP  00      00  LL            YY  YY    HH      HH
LL                II      BB      BB  PP      PP  00      00  LL            YY  YY    HH      HH
LL                II      BBBBBBBB    PPPPPPPP    00      00  LL              YY      HHHHHHHHHH
LL                II      BBBBBBBB    PPPPPPPP    00      00  LL              YY      HHHHHHHHHH
LL                II      BB      BB  PP          00      00  LL              YY      HH      HH
LL                II      BB      BB  PP          00      00  LL              YY      HH      HH
LL                II      BB      BB  PP          00      00  LL              YY      HH      HH      ....
LL                II      BB      BB  PP          00      00  LL              YY      HH      HH      ....
LLLLLLLLLL      IIIIII    BBBBBBBB    PP            000000    LLLLLLLLLL      YY      HH      HH      ....
LLLLLLLLLL      IIIIII    BBBBBBBB    PP            000000    LLLLLLLLLL      YY      HH      HH      ....

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  LIB$POLYH - Perform H floating polynomial calculation
0000     2          .IDENT  /1-002/         ; File: LIBPOLYH.MAR  Edit: SBL1002
0000     3
0000     4 ;
0000     5 ;*****************************************************************************
0000     6 ;*                                                                           *
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0000    24 ;*                                                                           *
0000    25 ;*                                                                           *
0000    26 ;*****************************************************************************
0000    27 ;
0000    28
0000    29 ;++
0000    30 ; FACILITY: General Utility Library
0000    31 ;
0000    32 ; ABSTRACT:
0000    33 ;
0000    34 ;       Perform H floating point polynomial calculation.
0000    35 ;
0000    36 ; ENVIRONMENT: User Mode, AST Reentrant
0000    37 ;
0000    38 ;--
0000    39 ; AUTHOR: Steven B. Lionel, CREATION DATE: 31-July-1979
0000    40 ;
0000    41 ; MODIFIED BY:
0000    42 ;
```

```
0000     44          .SBTTL  Edit History
0000     45 ; 1-001 - Original.  SBL 31-July-1979
0000     46 ; 1-002 - Use local handler to insure that exceptions other than those documented
0000     47 ;         as statuses are resignalled.  SBL 25-Sept-1980
```

```
                     0000     49          .SBTTL  DECLARATIONS
                     0000     50 ;
                     0000     51 ; INCLUDE FILES:
                     0000     52 ;
                     0000     53          $CHFDEF                         ; Condition handling symbols
                     0000     54          $SSDEF                          ; System symbols
                     0000     55 ;
                     0000     56 ; EXTERNAL DECLARATIONS:
                     0000     57 ;
                     0000     58          .EXTRN  LIB$SIG_TO_RET          ; Library routine to convert
                     0000     59                                          ; a signal to an error return
                     0000     60                                          ; to caller of LIB$POLYH.
                     0000     61                                          ; R0 = signalled condition
                     0000     62
                     0000     63 ;
                     0000     64 ; MACROS:
                     0000     65 ;
                     0000     66
                     0000     67 ;
                     0000     68 ; EQUATED SYMBOLS:
                     0000     69 ;
                     0000     70
00000004             0000     71          arg = 4                         ; argument
00000008             0000     72          degree = 8                      ; degree of polynomial
0000000C             0000     73          coeff = 12                      ; address of coefficient
00000010             0000     74          result = 16                     ; result of polynomial
                     0000     75                                          ; table
                     0000     76 ;
                     0000     77 ; OWN STORAGE:
                     0000     78 ;
                     0000     79
                     0000     80 ;
                     0000     81 ; PSECT DECLARATIONS:
                     0000     82 ;
00000000             0000     83          .PSECT _LIB$CODE PIC, USR, CON, REL, LCL, SHR, -
                     0000     84                      EXE, RD, NOWRT, LONG
                     0000     85
```

```
0000     87          .SBTTL  LIB$POLYH - Perform floating polynomial
0000     88 ;++
0000     89 ; FUNCTIONAL DESCRIPTION:
0000     90 ;
0000     91 ;       LIB$POLYH provides the functionality of the VAX hardware
0000     92 ;       instruction POLYH to high level language users.
0000     93 ;
0000     94 ;       The third operand points to a table (array) of H_floating
0000     95 ;       coefficients.  The coefficient of
0000     96 ;       the highest order term of the polynomial is pointed to
0000     97 ;       by the table address operand, i.e. the first table element.
0000     98 ;       The table is specified with lower order coefficients stored
0000     99 ;       at increasing addresses.
0000    100 ;
0000    101 ;       The evaluation is carried out by Horner's method, and the
0000    102 ;       result is stored at the location pointed to by the fourth
0000    103 ;       operand.  The result computed is:
0000    104 ;
0000    105 ;               if d = degree
0000    106 ;               and x = arg
0000    107 ;               result = C[0]+x*(C[1]+x*(C[2]+ ... x*C[d]))
0000    108 ;
0000    109 ;       The unsigned word degree operand specifies the highest
0000    110 ;       numbered coefficient to participate in the evaluation.
0000    111 ;
0000    112 ;       For further detail, refer to the VAX-11 Architecture
0000    113 ;       Handbook for the description of POLYx.
0000    114 ;
0000    115 ; CALLING SEQUENCE:
0000    116 ;
0000    117 ;       status.wlc.v = LIB$POLYH (arg.rh.r, degree.rw.r, coeff.rh.ra,
0000    118 ;                                 result.wh.r)
0000    119 ;
0000    120 ; INPUT PARAMETERS:
0000    121 ;
0000    122 ;       arh.rh.r        - argument, "x" in polynomial
0000    123 ;       degree.rw.r     - degree of polynomial (GEQ 0)
0000    124 ;       coeff.rh.ra     - table of coefficients, H_floating
0000    125 ;
0000    126 ; IMPLICIT INPUTS:
0000    127 ;
0000    128 ;       NONE
0000    129 ;
0000    130 ; OUTPUT PARAMETERS:
0000    131 ;
0000    132 ;       result.wh.r     - result of calculation
0000    133 ;
0000    134 ; IMPLICIT OUTPUTS:
0000    135 ;
0000    136 ;       NONE
0000    137 ;
0000    138 ; FUNCTION VALUE:
0000    139 ;
0000    140 ;       SS$_NORMAL      - successful execution
0000    141 ;       SS$_FLTOVF      - floating overflow
0000    142 ;       SS$_FLTUND      - floating underflow
0000    143 ;       SS$_ROPRAND     - reserved operand, see VAX Architecture
```

```
                                0000   144 ;                           manual for more details
                                0000   145 ;
                                0000   146 ; SIDE EFFECTS:
                                0000   147 ;
                                0000   148 ;       All other exceptions are resignalled.
                                0000   149 ;
                                0000   150 ;--
                                0000   151
                         403C   0000   152          .ENTRY  LIB$POLYH, ^M<IV,R2,R3,R4,R5>   ; Entry point, enable int. ovf.
                                0002   153                                                  ; and save R2, R3, R4, R5
                                0002   154
                   6D   17'AF   9E   0002   155          MOVAB   B^HANDLER, (FP)                 ; Enable local handler to process
                                0006   156                                                  ; exceptions
                                0006   157
          0C BC    08 BC   04 BC 75FD   0006   158          POLYH   @arg(AP), -                     ; perform polynomial
                                000E   159                  @degree(AP), -                  ; trap on exception to
                                000E   160                  @coeff(AP)                      ; handler which will
                                000E   161                                                  ; unwind a return error
                                000E   162                                                  ; condition in R0 to
                                000E   163                                                  ; caller of LIB$POLYD.
                                000E   164
                10 BC    50 7DFD   000E   165          MOVQ    R0, @result(AP)                 ; return value
                                0013   166
                   50    01   9A   0013   167          MOVZBL  #1, R0                          ; success status code
                                0016   168
                         04     0016   169          RET                                     ; return
                                0017   170
                                0017   171
                                0017   172 HANDLER:
                         0000   0017   173          .WORD   0
                                0019   174
                                0019   175 ;+
                                0019   176 ;   If the exception is one of the documented exceptions for this routine,
                                0019   177 ;   call LIB$SIG_TO_RET to return it as a status.  Otherwise, resignal.
                                0019   178 ;   Also, resignal if the depth is not zero.
                                0019   179 ;-
                                0019   180
                   50    08 AC   D0   0019   181          MOVL    CHF$L_MCHARGLST(AP), R0         ; Get mechanism vector address
                         08 A0   D5   001D   182          TSTL    CHF$L_MCH_DEPTH(R0)             ; Is depth zero?
                                 12   0020   183          BNEQ    90$                             ; If not, resignal
                   51    04 AC   D0   0022   184          MOVL    CHF$L_SIGARGLST(AP), R1         ; Get signal vector address
                   50    04 A1   D0   0026   185          MOVL    CHF$L_SIG_NAME(R1), R0          ; Get signalled condition
              048C 8F    50   B1   002A   186          CMPW    R0, #SS$_FLTOVF                 ; Compare conditions
                         2A   13   002F   187          BEQL    10$                             ; If it matches, don't resignal
              049C 8F    50   B1   0031   188          CMPW    R0, #SS$_FLTUND
                         23   13   0036   189          BEQL    10$
              0454 8F    50   B1   0038   190          CMPW    R0, #SS$_ROPRAND
                         1C   13   003D   191          BEQL    10$
              04C4 8F    50   B1   003F   192          CMPW    R0, #SS$_FLTUND_F
                         08   12   0044   193          BNEQ    5$
          04 A1    049C 8F   3C   0046   194          MOVZWL  #SS$_FLTUND, CHF$L_SIG_NAME(R1) ; Change fault code to trap code
                         0D   11   004C   195          BRB     10$
              04B4 8F    50   B1   004E   196 5$:      CMPW    R0, #SS$_FLTOVF_F
                         0E   12   0053   197          BNEQ    90$
          04 A1    048C 8F   3C   0055   198          MOVZWL  #SS$_FLTOVF, CHF$L_SIG_NAME(R1)
00000000'GF    6C   FA   005B   199 10$:      CALLG   (AP), G^LIB$SIG_TO_RET          ; Return signal as a status
                         04   0062   200          RET
```

```
                50   0918 8F   3C  0063   201 90$:    MOVZWL  #SS$_RESIGNAL, R0           ; Resignal condition
                               04  0068   202          RET
                                   0069   203
                                   0069   204          .END
```

```
ARG                             = 00000004
CHF$L_MCHARGLST                 = 00000008
CHF$L_MCH_DEPTH                 = 00000008
CHF$L_SIGARGLST                 = 00000004
CHF$L_SIG_NAME                  = 00000004
COEFF                           = 0000000C
DEGREE                          = 00000008
HANDLER                           00000017 R      02
LIB$POLYH                         00000000 RG     02
LIB$SIG_TO_RET                    ******** *X     00
RESULT                          = 00000010
SS$_FLTOVF                      = 0000048C
SS$_FLTOVF_F                    = 000004B4
SS$_FLTUND                      = 0000049C
SS$_FLTUND_F                    = 000004C4
SS$_RESIGNAL                    = 00000918
SS$_ROPRAND                     = 00000454
```

+----------------+
! Psect synopsis !
+----------------+

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ABS	00000000 (0.)	01 (1.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
_LIB$CODE	00000069 (105.)	02 (2.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG

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

Phase	Page faults	CPU Time	Elapsed Time
Initialization	30	00:00:00.07	00:00:01.31
Command processing	106	00:00:00.33	00:00:02.57
Pass 1	187	00:00:02.73	00:00:13.35
Symbol table sort	0	00:00:00.39	00:00:02.08
Pass 2	54	00:00:00.57	00:00:03.20
Symbol table output	4	00:00:00.02	00:00:00.02
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	385	00:00:04.14	00:00:22.55

```
The working set limit was 1050 pages.
21679 bytes (43 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 427 non-local and 3 local symbols.
204 source lines were read in Pass 1, producing 13 object records in Pass 2.
9 pages of virtual memory were used to define 8 macros.
```

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

Macro library name                        Macros defined
------------------                        --------------
_$255$DUA28:[SYSLIB]STARLET.MLB;2                  5

486 GETS were required to define 5 macros.

There were no errors, warnings or information messages.

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

0209 AH-BT13A-SE
VAX/VMS V4.0

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