


```

LL      IIIIII  BBBB8888  PPPPPPPP  000000  LL      YY      YY  DDDDDDDD
LL      IIIIII  BBBB8888  PPPPPPPP  000000  LL      YY      YY  DDDDDDDD
LL      II      BB      BB  PP      PP  00      00  LL      YY      YY  DD      DD
LL      II      BB      BB  PP      PP  00      00  LL      YY      YY  DD      DD
LL      II      BB      BB  PP      PP  00      00  LL      YY      YY  DD      DD
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LL      II      BB      BB  PP      PP  00      00  LL      YY      YY  DD      DD
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LL      II      BBBB8888  PPPPPPPP  00      00  LL      YY      YY  DD      DD
LL      II      BBBB8888  PPPPPPPP  00      00  LL      YY      YY  DD      DD
LLLLLLLLLLLL  IIIIII  BBBB8888  PP      PP  000000  LLLLLLLLLL  YY      YY  DDDDDDDD
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LL      IIIIII  SSSSSSSS
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LL      II      SS
LLLLLLLLLLLL  IIIIII  SSSSSSSS
LLLLLLLLLLLL  IIIIII  SSSSSSSS

```

| | |
|-----|----|
| (2) | 42 |
| (3) | 52 |
| (4) | 90 |

| |
|---|
| Edit History |
| DECLARATIONS |
| LIBSPOLYD - Perform floating polynomial |

```
0000 1 .TITLE LIBSPOLYD - Perform double floating polynomial calculation
0000 2 .IDENT /1-006/ ; File: LIBPOLYD.MAR Edit: SBL1006
0000 3
0000 4
0000 5 *****
0000 6 *
0000 7 * COPYRIGHT (c) 1978, 1980, 1982, 1984 BY *
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0000 19 * AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT *
0000 20 * CORPORATION. *
0000 21 *
0000 22 * DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS *
0000 23 * SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL. *
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 double precision 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: 05-Oct-78
0000 40 :
```

LIBSPOLYD
1-006

L 15

- Perform double floating polynomial cal 16-SEP-1984 00:15:27 VAX/VMS Macro V04-00 Page 2
Edit History 6-SEP-1984 11:09:43 [LIBRTL.SRC]LIBPOLYD.MAR;1 (2)

```
0000 42 .SBTTL Edit History
0000 43 : 1-001 - Original
0000 44 : 1-002 - Put version number in standard format, with three digits
0000 45 : in the edit number. JBS 16-NOV-78
0000 46 : 1-003 - Add "-" to the PSECT directive. JBS 21-DEC-78
0000 47 : 1-004 - Minor code improvements. SBL 05-Feb-79
0000 48 : 1-005 - Fix comments. SBL 31-July-1979
0000 49 : 1-006 - Use local handler to insure that exceptions other than the ones documented
0000 50 : as being statuses are resigalled. SBL 25-Sept-1980
```

```

      0000 52      .SBTTL  DECLARATIONS
      0000 53      :
      0000 54      : INCLUDE FILES:
      0000 55      :
      0000 56      $CHFDEF      : Condition handling symbols
      0000 57      $SSDEF      : System symbols
      0000 58      :
      0000 59      : EXTERNAL DECLARATIONS:
      0000 60      :
      0000 61      .EXTRN LIB$SIG_TO_RET      : Library routine to convert
      0000 62      :                          : a signal to an error return
      0000 63      :                          : to caller of LIB$POLYD.
      0000 64      :                          : R0 = signalled condition
      0000 65      :
      0000 66      :
      0000 67      : MACROS:
      0000 68      :
      0000 69      :
      0000 70      :
      0000 71      : EQUATED SYMBOLS:
      0000 72      :
      0000 73      :
      00000004 0000 74      arg = 4      : argument
      00000008 0000 75      degree = 8    : degree of polynomial
      0000000C 0000 76      coeff = 12    : address of coefficient
      00000010 0000 77      result = 16   : result of polynomial
      0000 78      :                          : table
      0000 79      :
      0000 80      : OWN STORAGE:
      0000 81      :
      0000 82      :
      0000 83      :
      0000 84      : PSECT DECLARATIONS:
      0000 85      :
      00000000 86      .PSECT _LIB$CODE PIC, USR, CON, REL, LCL, SHR, -
      0000 87      EXE, RD, NOWRT, LONG
      0000 88

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```
0000 90 .SBTTL LIB$POLYD - Perform floating polynomial
0000 91 :++
0000 92 : FUNCTIONAL DESCRIPTION:
0000 93 :
0000 94 : LIB$POLYD provides the functionality of the VAX hardware
0000 95 : instruction POLYD to high level language users.
0000 96 :
0000 97 : The third operand points to a table (array) of double
0000 98 : precision floating point coefficients. The coefficient of
0000 99 : the highest order term of the polynomial is pointed to
0000 100 : by the table address operand, i.e. the first table element.
0000 101 : The table is specified with lower order coefficients stored
0000 102 : at increasing addresses.
0000 103 :
0000 104 : The evaluation is carried out by Horner's method, and the
0000 105 : result is stored at the location pointed to by the fourth
0000 106 : operand. The result computed is:
0000 107 :
0000 108 :     if d = degree
0000 109 :     and x = arg
0000 110 :     result = ([0]+x*([1]+x*([2]+ ... x*[d])))
0000 111 :
0000 112 : The unsigned word degree operand specifies the highest
0000 113 : numbered coefficient to participate in the evaluation.
0000 114 :
0000 115 : For further detail, refer to the VAX-11 Architecture
0000 116 : Handbook for the description of POLYx.
0000 117 :
0000 118 : CALLING SEQUENCE:
0000 119 :
0000 120 :     status.wlc.v = LIB$POLYD (arg.rd.r, degree.rw.r, coeff.rd.ra,
0000 121 :                             result.wd.r)
0000 122 :
0000 123 : INPUT PARAMETERS:
0000 124 :
0000 125 :     arg.rd.r           - argument, 'x' in polynomial
0000 126 :     degree.rw.r        - degree of polynomial (GEQ 0)
0000 127 :     coeff.rd.ra        - table of coefficients, double floating
0000 128 :
0000 129 : IMPLICIT INPUTS:
0000 130 :
0000 131 :     NONE
0000 132 :
0000 133 : OUTPUT PARAMETERS:
0000 134 :
0000 135 :     result.wd.r        - result of calculation
0000 136 :
0000 137 : IMPLICIT OUTPUTS:
0000 138 :
0000 139 :     NONE
0000 140 :
0000 141 : FUNCTION VALUE:
0000 142 :
0000 143 :     S$$_NORMAL         - successful execution
0000 144 :     S$$_FLTOVF         - floating overflow
0000 145 :     S$$_FLTUND         - floating underflow
0000 146 :     S$$_ROPRAND        - reserved operand, see VAX Architecture
```

```

                                manual for more details
                                :
0000 147 :
0000 148 :
0000 149 : SIDE EFFECTS:
0000 150 :
0000 151 : All other exceptions are signalled.
0000 152 :
0000 153 :--
0000 154 :
403C 0000 155 .ENTRY LIB$POLYD, ^M<IV,R2,R3,R4,R5> ; Entry point, enable int. ovf.
0002 156 ; and save R2, R3, R4, R5
0002 157
6D 15'AF 9E 0002 158 MOVAB B^HANDLER, (FP) ; Enable local handler to process
0006 159 ; exceptions
0006 160
OC BC 08 BC 04 BC 75 0006 161 POLYD @arg(AP), - ; perform polynomial
000D 162 @degree(AP), - ; trap on exception to
000D 163 @coeff(AP) ; handler which will
000D 164 ; unwind a return error
000D 165 ; condition in R0 to
000D 166 ; caller of LIB$POLYD.
000D 167
10 BC 50 7D 000D 168 MOVQ R0, @result(AP) ; return value
50 01 9A 0011 169 MOVZBL #1, R0 ; success status code
0014 171
04 0014 172 RET ; return
0015 173
0015 174
0015 175 HANDLER:
0000 0015 176 .WORD 0
0017 177
0017 178 :+
0017 179 : If the exception is one of the documented exceptions for this routine,
0017 180 : call LIB$SIG_TO_RET to return it as a status. Otherwise, resignal.
0017 181 : Also, resignal if the depth is not zero.
0017 182 :-
0017 183
50 08 AC D0 0017 184 MOVL CHF$M_MCHARGLST(AP), R0 ; Get mechanism vector address
08 A0 D5 001B 185 TSTL CHF$M_MCH_DEPTH(R0) ; Is depth zero?
41 12 001E 186 BNEQ 90$ ; If not, resignal
51 04 AC D0 0020 187 MOVL CHF$M_SIGARGLST(AP), R1 ; Get signal vector address
50 04 A1 D0 0024 188 MOVL CHF$M_SIG_NAME(R1), R0 ; Get signalled condition
048C 8F 50 B1 0028 189 CMPW R0, #SS$_FLTQVF ; Compare conditions
049C 8F 50 B1 002D 190 BEQL 10$ ; If it matches, don't resignal
0454 8F 50 B1 0034 191 CMPW R0, #SS$_FLTUND
23 13 0034 192 BEQL 10$
0454 8F 50 B1 0036 193 CMPW R0, #SS$_ROPRAND
1C 13 003B 194 BEQL 10$
04C4 8F 50 B1 003D 195 CMPW R0, #SS$_FLTUND_F
08 12 0042 196 BNEQ 5$
04 A1 049C 8F 3C 0044 197 MOVZWL #SS$_FLTUND, CHF$M_SIG_NAME(R1) ; Change fault code to trap code
0D 11 004A 198 BRB 10$
04B4 8F 50 B1 004C 199 5$: CMPW R0, #SS$_FLTQVF_F
0E 12 0051 200 BNEQ 90$
04 A1 048C 8F 3C 0053 201 MOVZWL #SS$_FLTQVF, CHF$M_SIG_NAME(R1)
00000000'GF 6C FA 0059 202 10$: CALLG (AP), G^LIB$SIG_TO_RET ; Return signal as a status
04 0060 203 RET

```


LIB\$POLYD
1-006

C 16

- Perform double floating polynomial cal 16-SEP-1984 00:15:27 VAX/VMS Macro V04-00 Page 6
LIB\$POLYD - Perform floating polynomial 6-SEP-1984 11:09:43 [LIBRTL.SRC]LIBPOLYD.MAR;1 (4)

```
50 0918 8F 3C 0061 204 90$: MOVZWL #SS$_RESIGNAL, R0 ; Resignal condition
          04 0066 205 RET
          0067 206
          0067 207 .END
```

LIBSPOLYD
Symbol table

```

ARG = 00000004
CHFSL_MCHARGLST = 00000008
CHFSL_MCH_DEPTH = 00000008
CHFSL_SIGARGLST = 00000004
CHFSL_SIG_NAME = 00000004
COEFF = 0000000C
DEGREE = 00000008
HANDLER = 00000015 R 02
LIBSPOLYD = 00000000 RG 02
LIBSIG_TO_RET ***** X 00
RESULT = 00000010
SS$FLT0VF = 0000048C
SS$FLT0VF_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 |
| \$ABSS | 00000000 (0.) | 01 (1.) | NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE |
| _LIB\$CODE | 00000067 (103.) | 02 (2.) | PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG |

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

| Phase | Page faults | CPU Time | Elapsed Time |
|------------------------|-------------|-------------|--------------|
| Initialization | 30 | 00:00:00.04 | 00:00:02.39 |
| Command processing | 104 | 00:00:00.31 | 00:00:01.53 |
| Pass 1 | 187 | 00:00:02.69 | 00:00:11.77 |
| Symbol table suit | 0 | 00:00:00.41 | 00:00:01.87 |
| Pass 2 | 52 | 00:00:00.61 | 00:00:01.19 |
| Symbol table output | 4 | 00:00:00.02 | 00:00:00.03 |
| Psect synopsis output | 2 | 00:00:00.01 | 00:00:00.01 |
| Cross-reference output | 0 | 00:00:00.00 | 00:00:00.00 |
| Assembler run totals | 381 | 00:00:04.09 | 00:00:18.79 |

The working set limit was 1200 pages.
 21703 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.
 207 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\$:LIBPOLYD/OBJ=OBJ\$:LIBPOLYD MSRC\$:LIBPOLYD/UPDATE=(ENH\$:LIBPOLYD)

