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(2)	42
(3)	48
(4)	86

Edit History
DECLARATIONS
LIB\$POLYG - Perform floating polynomial


```
0000 1 .TITLE LIBSPOLYG - Perform G floating polynomial calculation
0000 2 .IDENT /1-003/ ; File: LIBPOLYG.MAR Edit: SBL1003
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 G 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-Feb-79
0000 40 :
```

LIB\$POLYG
1-003

- Perform G floating polynomial calculat F 1 16-SEP-1984 00:16:21 VAX/VMS Macro V04-00 Page 2
Edit History 6-SEP-1984 11:09:51 [LIBRTL.SRC]LIBPOLYG.MAR;1 (2)

0000 42 .SBTTL Edit History
0000 43 : 1-001 - Original. SBL 5-Feb-1979
0000 44 : 1-002 - Fix comments. SBL 31-July-1979
0000 45 : 1-003 - Use local handler to insure that exceptions other than those documented
0000 46 : as statuses are resigalled. SBL 25-Sept-1980


```
0000 48      .SBTTL  DECLARATIONS
0000 49      :
0000 50      : INCLUDE FILES:
0000 51      :
0000 52      $CHFDEF      ; Condition handling symbols
0000 53      $SSDEF       ; System symbols
0000 54      :
0000 55      : EXTERNAL DECLARATIONS:
0000 56      :
0000 57      .EXTRN  LIB$SIG_TO_RET      ; Library routine to convert
0000 58      :                          ; a signal to an error return
0000 59      :                          ; to caller of LIB$POLYG.
0000 60      :                          ; R0 = signalled condition
0000 61      :
0000 62      :
0000 63      : MACROS:
0000 64      :
0000 65      :
0000 66      :
0000 67      : EQUATED SYMBOLS:
0000 68      :
0000 69      :
00000004 0000 70      arg = 4      ; argument
00000008 0000 71      degree = 8   ; degree of polynomial
0000000C 0000 72      coeff = 12    ; address of coefficient
00000010 0000 73      result = 16   ; result of polynomial
0000 74      :                          ; table
0000 75      :
0000 76      : OWN STORAGE:
0000 77      :
0000 78      :
0000 79      :
0000 80      : PSECT DECLARATIONS:
0000 81      :
00000000 0000 82      .PSECT _LIB$CODE PIC, USR, CON, REL, LCL, SHR, -
0000 83      EXE, RD, NOWRT, LONG
0000 84
```

```
0000 86 .SBTTL LIB$POLYG - Perform floating polynomial
0000 87 :++
0000 88 : FUNCTIONAL DESCRIPTION:
0000 89 :
0000 90 : LIB$POLYG provides the functionality of the VAX hardware
0000 91 : instruction POLYG to high level language users.
0000 92 :
0000 93 : The third operand points to a table (array) of G double
0000 94 : precision floating point coefficients. The coefficient of
0000 95 : the highest order term of the polynomial is pointed to
0000 96 : by the table address operand, i.e. the first table element.
0000 97 : The table is specified with lower order coefficients stored
0000 98 : at increasing addresses.
0000 99 :
0000 100 : The evaluation is carried out by Horner's method, and the
0000 101 : result is stored at the location pointed to by the fourth
0000 102 : operand. The result computed is:
0000 103 :
0000 104 :     if d = degree
0000 105 :     and x = arg
0000 106 :     result = C[0]+x*(C[1]+x*(C[2]+ ... x*C[d]))
0000 107 :
0000 108 : The unsigned word degree operand specifies the highest
0000 109 : numbered coefficient to participate in the evaluation.
0000 110 :
0000 111 : For further detail, refer to the VAX-11 Architecture
0000 112 : Handbook for the description of POLYx.
0000 113 :
0000 114 : CALLING SEQUENCE:
0000 115 :
0000 116 :     status.wlc.v = LIB$POLYG (arg.rg.r, degree.rw.r, coeff.rg.ra,
0000 117 :                             result.wg.r)
0000 118 :
0000 119 : INPUT PARAMETERS:
0000 120 :
0000 121 :     arg.rg.r      - argument, "x" in polynomial
0000 122 :     degree.rw.r   - degree of polynomial (GEQ 0)
0000 123 :     coeff.rg.ra   - table of coefficients, G double floating
0000 124 :
0000 125 : IMPLICIT INPUTS:
0000 126 :
0000 127 :     NONE
0000 128 :
0000 129 : OUTPUT PARAMETERS:
0000 130 :
0000 131 :     result.wg.r   - result of calculation
0000 132 :
0000 133 : IMPLICIT OUTPUTS:
0000 134 :
0000 135 :     NONE
0000 136 :
0000 137 : FUNCTION VALUE:
0000 138 :
0000 139 :     SSS_NORMAL    - successful execution
0000 140 :     SSS_FLTOVF    - floating overflow
0000 141 :     SSS_FLTUND    - floating underflow
0000 142 :     SSS_ROPRAND   - reserved operand, see VAX Architecture
```


0000 143 : manual for more details
0000 144 :
0000 145 : SIDE EFFECTS:
0000 146 :
0000 147 : All other exceptions are signalled.
0000 148 :
0000 149 :--
0000 150 :
403C 0000 151 .ENTRY LIB\$POLYG, ^M<IV,R2,R3,R4,R5> ; Entry point, enable int. ovf.
0002 152 ; and save R2, R3, R4, R5
0002 153 :
6D 16'AF 9E 0002 154 MOVAB B^HANDLER, (FP) ; Set up handler to process
0006 155 ; exceptions
0006 156 :
0C BC 08 BC 04 BC 55FD 0006 157 POLYG @arg(AP), - ; perform polynomial
000E 158 @degree(AP), - ; trap on exception to
000E 159 @coeff(AP) ; handler which will
000E 160 ; unwind a return error
000E 161 ; condition in R0 to
000E 162 ; caller of LIB\$POLYD.
000E 163 :
10 BC 50 7D 000E 164 MOVQ R0, @result(AP) ; return value
0012 165 :
50 01 9A 0012 166 MOVZBL #1, R0 ; success status code
0015 167 :
04 0015 168 RET ; return
0016 169 :
0016 170 :
0016 171 HANDLER:
0000 0016 172 .WORD 0
0018 173 :
0018 174 :+
0018 175 : If the exception is one of the documented exceptions for this routine,
0018 176 : call LIB\$SIG_TO_RET to return it as a status. Otherwise, resignal.
0018 177 : Also, resignal if the depth is not zero.
0018 178 :-
0018 179 :
50 08 AC D0 0018 180 MOVL CHF\$MCHARGLIST(AP), R0 ; Get mechanism vector address
08 A0 D5 001C 181 TSTL CHF\$MCH_DEPTH(R0) ; Is depth zero?
41 12 001F 182 BNEQ 90\$; If not, resignal
51 04 AC D0 0021 183 MOVL CHF\$SIGARGLIST(AP), R1 ; Get signal vector address
50 04 A1 D0 0025 184 MOVL CHF\$SIG_NAME(R1), R0 ; Get signalled condition
048C 8F 50 B1 0029 185 CMPW R0, #\$\$\$_FLT0VF ; Compare conditions
2A 13 002E 186 BEQL 10\$; If it matches, don't resignal
049C 8F 50 B1 0030 187 CMPW R0, #\$\$\$_FLTUND
23 13 0035 188 BEQL 10\$
0454 8F 50 B1 0037 189 CMPW R0, #\$\$\$_ROPRAND
1C 13 003C 190 BEQL 10\$
04C4 8F 50 B1 003E 191 CMPW R0, #\$\$\$_FLTUND_F
08 12 0043 192 BNEQ 5\$
04 A1 049C 8F 3C 0045 193 MOVZWL #\$\$\$_FLTUND, CHF\$SIG_NAME(R1) ; Change fault code to trap code
0D 11 004B 194 BRB 1^\$
04B4 8F 50 B1 004D 195 5\$: CMPW R0, #\$\$\$_FLT0VF_F
0E 12 0052 196 BNEQ 90\$
04 A1 048C 8F 3C 0054 197 MOVZWL #\$\$\$_FLT0VF, CHF\$SIG_NAME(R1)
00000000'GF 6C FA 005A 198 10\$: CALLG (AP), G^LIB\$SIG_TO_RET ; Return signal as a status
04 0061 199 RET

LIB\$POLYG
1-003

J 1
- Perform G floating polynomial calculat 16-SEP-1984 00:16:21
LIB\$POLYG - Perform floating polynomial 6-SEP-1984 11:09:51

VAX/VMS Macro V04-00
[LIBRTL.SRC]LIBPOLYG.MAR;1

Page 6
(4)

50 0918 8F 3C 0062 200 90\$: MOVZWL #SS\$_RESIGNAL, R0
04 0067 201 RET
0068 202
0068 203 .END

; Resignal condition

**I

LIB\$POLYG
Symbol table

ARG = 00000004
CH\$SL_MCHARGLST = 00000008
CH\$SL_MCH_DEPTH = 00000008
CH\$SL_SIGARGLST = 00000004
CH\$SL_SIG_NAME = 00000004
COEFF = 0000000C
DEGREE = 00000008
HANDLER 00000016 R 02
LIB\$POLYG 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
\$AB\$\$	00000000 (0.)	01 (1.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
_LIB\$CODE	00000068 (104.)	02 (2.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG

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

Phase	Page faults	CPU Time	Elapsed Time
Initialization	29	00:00:00.05	00:00:00.94
Command processing	111	00:00:00.33	00:00:02.78
Pass 1	190	00:00:02.72	00:00:12.36
Symbol table sort	0	00:00:00.43	00:00:01.54
Pass 2	52	00:00:00.56	00:00:03.09
Symbol table output	4	00:00:00.02	00:00:00.02
Psect synopsis output	2	00:00:00.01	00:00:00.02
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	390	00:00:04.12	00:00:20.75

The working set limit was 1050 pages.
21671 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.
203 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

_S255\$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\$:LIBPOLYG/OBJ=OBJ\$:LIBPOLYG MSRC\$:LIBPOLYG/UPDATE=(ENH\$:LIBPOLYG)

0209

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