The HP Vector Math Library (HP-VML) has both C/C++ and Fortran interfaces. The C/C++ interfaces use a combination of pass-by-reference and pass-by-value for the parameters. The Fortran interfaces only use pass-by-reference for all parameters.

The HP-VML has been tested with both GNU g77 and the Intel Fortran compilers. The GNU g77 compiler requires no additional switches other than the –lvm switch to tell the linker to link to the libvm.a library. The Intel Fortran compiler requires the switch /Qlowercase in addition to the –lvm linker switch to compile successfully. The statement INCLUDE “VML.FI” should be used to include prototypes for all the HP-VML functions.

The return type of all HP-VML functions is an INTEGER*8. The integer value of the function indicates a completion status. The function will return a value of zero (0) if all calculations were completed successfully. A positive return value indicates that one or more calculations failed, either because an invalid input argument or a calculation error was detected. The function will always process every input argument. Each invalid input argument or calculation error will cause a NaN to be stored as the result in the corresponding element of the result array. The return value indicates the number of failures observed and consequently the number of NaNs stored in the result array. The function will return a value of minus one (-1) to report an invalid count if the specified count is less than one (1). No calculations will take place and no values will be stored in the result array if the count parameter is invalid.

There are three different parameter arrangements for each function precision:
1) One input argument array, one output result array
2) Two input argument arrays, one output result array
3) One input argument array, two output result arrays

The first parameters are always one or two input argument arrays followed by one are two output result arrays. The stride values follow the output result array(s) and specify the stride values for the preceding arrays in the same order. The count argument (sometimes referred to as the length argument) is always the final argument. Stride and count parameters are pass-by-reference, so an INTEGER*8 value needs to be declared, initialized, and passed as the argument. Trying to pass an immediate value as a parameter will result in undefined behavior.

Correct:
REAL X(25),Z(25)
INTEGER*8 I, J, K
......
J=1
K=25
I = VSINF(X, Z, J, J, K)

Incorrect:
REAL X(25),Z(25)
INTEGER*8 I, J
......
J=1
I = VSINF(X, Z, 1, J, 25)
EXAMPLES

Single Precision Single Argument Single Result Array

INCLUDE 'VML.FI'

REAL INPUT(25), OUTPUT(25)
INTEGER*8 RETVAL, INSTRIDE, OUTSTRIDE, CNT

..........
..........
RETVAL = VSINF(INPUT, OUTPUT, INSTRIDE, OUTSTRIDE, CNT)

Functions:
- VABSF
- VDIVF
- VRCPF
- VRSQRTF
- VSQRTF
- VEXPF
- VEXP2F
- VDIF
- VRCP
- VRSQRT
- VSQRT
- VEXP
- VEXP2
- VDIF
- VRCP
- VRSQRT
- VSQRT
- VEXP
- VEXP2

Double Precision Single Argument Single Result Array

INCLUDE 'VML.FI'

DOUBLE PRECISION INPUT(25), OUTPUT(25)
INTEGER*8 RETVAL, INSTRIDE, OUTSTRIDE, CNT

..........
..........
RETVAL = VSIN(INPUT, OUTPUT, INSTRIDE, OUTSTRIDE, CNT)

Functions:
- VABS
- VDIV
- VRCP
- VRSQRT
- VSQRT
- VEXP
- VEXP2
- VABS
- VDIV
- VRCP
- VRSQRT
- VSQRT
- VEXP
- VEXP2
Single Precision Single Argument Double Result Array

INCLUDE 'VML.FI'

REAL INPUT(25),OUTSIN(25),OUTCOS(25)
INTEGER*8 RETVAL, INSTRIDE, SINSTRIDE, COSSTRIDE, CNT

........
........
RETVAL = VSCNF(INPUT,OUTSIN,OUTCOS,INSTRIDE,SINSTRIDE,COSSTRIDE, CNT)

Functions:
VSCNF

Double Precision Single Argument Double Result Array

INCLUDE 'VML.FI'

DOUBLE PRECISION INPUT(25),OUTSIN(25),OUTCOS(25)
INTEGER*8 RETVAL, INSTRIDE, SINSTRIDE, COSSTRIDE, CNT

........
........
RETVAL = VSCN(INPUT,OUTSIN,OUTCOS,INSTRIDE,SINSTRIDE,COSSTRIDE, CNT)

Functions:
VSCN

Single Precision Double Argument Single Result Array

INCLUDE 'VML.FI'

REAL INPUTX(25),INPUTY(25),OUTPUT25
INTEGER*8 RETVAL, XSTRIDE, YSTRIDE, OUTSTRIDE, CNT

........
........
RETVAL = VPOWF(INPUTX,INPUTY,OUTPUT, XSTRIDE, YSTRIDE, OUTSTRIDE, CNT)

Functions:
VPOWF
VATAN2F
Double Precision Double Argument Single Result Array

INCLUDE 'VML.FI'

DOUBLE PRECISION INPUTX(25), INPUTY(25), OUTPUT(25)
INTEGER*8 RETVAL, XSTRIDE, YSTRIDE, OUTSTRIDE, CNT

........

RETVAL = VPOW(INPUTX, INPUTY, OUTPUT, XSTRIDE, YSTRIDE, OUTSTRIDE, CNT)

Functions:
VPOW
VATAN2

ADDITIONAL INFORMATION

For more detailed information on the HP-VML including timing information, precision information, and stride operation, please refer to HP Vector Math Library technical resource.