

Product Brief

Intel Scientific Computers

IPSC-VX™ Vector Library (VecLib)

VecLib is the math library for the IPSC-VX™ vector processor. It contains a variety of functions and operations which have been organized to conform with the calling and naming conventions of the Basic Linear Algebra Subprograms (BLAS). Each of the routines in the library represent microcoded functions that reside in, and are executed by, the vector processor. In this sense, VecLib forms the access interface for the user to the vector processor. This access takes two forms: direct access using subroutine calls, and indirect access through the VAST-2™ FORTRAN vectorizer. The vectorized output of VAST-2 contains commands to execute VecLib routines on the vector processor.

VecLib is also supported in versions that can be used on standard IPSC nodes as well as a transportable FORTRAN version for use with the IPSC simulator. These versions of VecLib are intended for developing application programs and debugging programs ultimately targeted for the IPSC-VX.

The table shows a subset of the routines that make up VecLib. Performance numbers shown represent the peak performance or the performance which would be achieved if vector lengths were infinite (R_{∞}). Performance is shown for 32- and 64-bit operations with data residing both in the 1 Mbyte dynamic data memory and in the 16 KByte static (fast) memory.

V: non-systolic

Command	Description	32-Bit		64-Bit	
		Static	Dynamic	Static	Dynamic
xASUM	Sum absolute values ?	10.00 §	5.00 §	10.00	4.00
xAXPY	Constant times vector plus vector ✓	6.67 §	3.33 §	6.67	2.67
xCLIP	Clip to interval	3.33	2.00	3.33	1.67
xCOPY	Copy vector ✓				
xDOT	Dot product of two vectors ✓	10.00 §	5.00 §	6.67	3.33
xFILL	Fill vector				
xGATHR	Vector gather				
xICLIP	Invert clip	3.33	2.00	3.33	1.67
xBIDI	Solve a lower bidiagonal linear system				
xNEG	Change sign	5.00 §	2.50 §	5.00	2.00
xNRM2	Euclidean vector norm				
xRAMP	Ramp function	10.00	5.00	10.00	4.00
xROT	Apply a plane rotation				
xROTF	Construct Givens plane rotation				
xSCAL	Constant times a vector ✓	5.00	2.50	3.33	1.33
xSCATR	Vector scatter				

x = S for single precision D for double precision

§ Denotes routines which have 2x performance for consecutive data organization (32-bit only)