

MLIB V4.0.0.1
Exemplar S-Class Field Trial Edition
Release Notice
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MLIB 4.0.0.1 Release Notice

1 Purpose

This document describes the release of MLIB that is shipped with Hewlett-Packard Exemplar S-Class field trial servers. This document is intended to provide MLIB users with information not readily available in the ConvexMLIB User's Guides provided with this release. Always refer to this release notice before reporting questions or problems with MLIB; your questions may be answered here.

This document contains the following sections:

- Introduction
- Installation Notes
- New features
- Using MLIB
- Parallelized subprograms
- Functionality not available in this release

2 Introduction

MLIB is a collection of highly optimized Fortran-callable subprograms, providing basic mathematical software and computational kernels for applications involving arrays. Two libraries are available in this release of MLIB:

- VECLIB (*libveclib.a*)
- LAPACK (*liblapack.a*)

These two libraries have functionality identical to their counterparts in ConvexMLIB: C-Series V9.0 and ConvexMLIB: Exemplar Edition V3.0, with a few minor exceptions noted in the "Functionality not available in this release" section on page 5. This version has been re-engineered for the Exemplar S-Class architecture, which is based on Hewlett-Packard's PA2.0 RISC technology.

Subprograms that take advantage of Exemplar's parallel features are listed in Tables 1 and 2 on page 4.

3 Installation Notes

This version of MLIB comes preinstalled on Exemplar S-Class field trial servers in the */opt/mlib* directory.

The field trial release includes two library files, *libveclib.a* and *liblapack.a*, which are installed in */opt/mlib/lib/sppa2.0*. To access them with the *-l* option on an *f77* command line, you must precede the *-l* option with *-Wl,-L/opt/mlib/lib/sppa2.0* or add */opt/mlib/lib/sppa2.0* to the *LPATH* shell environment variable in your login script.

Two header files, *veclib.h* and *lapack.h*, for use with a C compiler, are installed in */opt/mlib/include*.

Man pages for MLIB are located in section *3m* of the online Programmer's Reference Manual; they are installed in the */opt/mlib/share/man* directory. Man pages are available for each chapter introduction and every subprogram documented in the following books, shipped with this release:

- *ConvexMLIB User's Guide: VECLIB*
- *ConvexMLIB User's Guide: LAPACK*

The directory */opt/mlib/share/man* must be added to your *MANPATH* shell environment variable to access the associated man pages.

An online copy of this release notice is installed in */opt/mlib/newconfig/RelNotes*.

4 New Functionality

The sparse linear equation solver, described in Chapter 6 of the *ConvexMLIB User's Guide: VECLIB* and the *sparse-solver(3m)* man page, has been parallelized, and several new subprograms have been added to give the user additional control over the package or additional output from it. These are documented in the following new man pages: *dsleff(3m)*, *dslemp(3m)*, *dsleop(3m)*, and *dslerd(3m)*.

This MLIB release includes subprograms that compute tapered convolutions. These are documented in the *stconv(3m)* and *dtconv(3m)* man pages.

5 Using MLIB

MLIB subprograms must be loaded by the Fortran compiler, and the resulting executable must be executed under the SPP-UX 5.1 field trial operating system.

MLIB libraries are accessible by using one or both of the *-lveclib* and *-llapack* Fortran compiler command line switches. You must precede the *-l* option with *-Wl,-L/opt/mlib/lib/sppa2.0* or add */opt/mlib/lib/sppa2.0* to the *LPATH* shell environment variable in your login script.

6 Parallelized Subprograms

Table 1 and Table 2 list the name, chapter of the user's guide, and purpose of various subroutines in *libveclib.a* and *liblapack.a* that have been parallelized to improve performance on Exemplar servers.

Table 1: Parallelized Subprograms in VECLIB

Subroutine name	Chapter	Description
{S,D,C,Z}GEMM	3	General Matrix-Matrix Multiply
{S,D,C,Z}GEMV	3	General Matrix-Vector Multiply
{S,D}GER	3	General Rank-1 Update
{C,Z}GERC	3	General Rank-1 Update
{C,Z}GERU	3	General Rank-1 Update
{S,D,C,Z}GBFA	4	Factor a General Band Matrix
{S,D}GEFA	4	Factor a General Matrix
{S,D}GESL	4	Solve General Linear Equations
DSLEFA	6	Numeric Factor Sparse Matrix
DSLEFS	6	Solve Sparse Linear Equations
DSKYFA	8	Numeric Factor Skyline Matrix
DSKYFS	8	Solve Skyline Linear Equations
DSKYFX	8	Solve Skyline Linear Equations
{S,D,C,Z}1DFFT	9	One-dimensional FFT
{S,D,C,Z}2DFFT	9	Two-dimensional FFT
{S,D,C,Z}3DFFT	9	Three-dimensional FFT
{S,D,C,Z}FFTS	9	Simultaneous FFTs
{S,D,C,Z}RC2FT	9	Real-to-Complex Two-Dimensional FFT
{S,D,C,Z}RC3FT	9	Real-to-Complex Three-Dimensional FFT
{S,D,C,Z}RCFTS	9	Real-to-Complex Simultaneous FFTs
{S,D}CONV	10	Correlation/Convolution

Table 2: Parallelized Subprograms in LAPACK

Subroutine name	Chapter	Description
{S,D,C,Z}GBTRF	4	Factor a General Band Matrix
{S,D,C,Z}GETRF	4	Factor a General Full Matrix
{S,D,C,Z}GETRI	4	Invert General Matrix
{S,D,C,Z}GETRS	4	Solve a General Full Linear System
{S,D,C,Z}GEMM	BLAS	General Matrix-Matrix Multiply
{S,D,C,Z}GEMV	BLAS	General Matrix-Vector Multiply
{S,D}GER	BLAS	General Rank-1 Update
{C,Z}GERC	BLAS	General Rank-1 Update
{C,Z}GERU	BLAS	General Rank-1 Update

7 Functionality Not Available in This Release

Several subprograms which are documented in *ConvexMLIB User's Guide: VECLIB* are not available in MLIB for Exemplar servers. These are listed in Table 3.

Table 3: *ConvexMLIB User's Guide: VECLIB* subroutines not available

Subroutine Name	Manual (chapter)	Description
DYNAMIC	VECLIB (12)	Allocate dynamic memory
MALLOC	VECLIB (12)	Allocate dynamic memory
SC2IBM	VECLIB (12)	Convert Convex C-Series floating-point numbers to IBM floating-point numbers
SIBM2C	VECLIB (12)	Convert IBM floating-point numbers to Convex C-Series floating-point numbers

The VECLIB8, SCILIB, and LAPACK8 libraries also are not included in this MLIB field trial release.