IMSL® Fortran Numerical Library

Release Notes

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IMSL® Fortran Numerical Library, Version 7.1.0
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This document contains release notes for IMSL Fortran Numerical Library, Version 7.1.0.

This document has the following parts:

1. Introduction
2. General Modifications
3. Code Fixes and Improvements for IMSL Fortran Numerical Library 7.1.0
4. Customer Support

Part 1: Introduction

This file contains information on improvements made with IMSL Fortran Numerical Library, Version 7.1.0.

Part 2: General Modifications

- The product is no longer license-managed for users who have purchased the product.
- FLEXlm is no longer used in the license-managed version of the product.

  Users who have purchased the product receive a non-license-managed version of the product.
- The benchmark and mpi_benchmark programs are no longer supplied as part of the Numerical Library Examples installation option.
- CUDA Toolkit Libraries 6.0 is now supported.
- The internally used ScaLAPACK mapping functions were improved.

Part 3: Code Fixes and Improvements for IMSL Fortran Numerical Library 7.1.0

MATH Library

Chapter 1: Linear Systems

- **LCLSQ** - The matrix columns for fixed variables are not used any longer in computing a matrix norm.
- **LFSXG** - Updated permutation test to avoid overflow.
- **LFSZG** - Updated permutation test to avoid overflow.
- **LOFCF** - Corrected the returned pvalue argument.
- **LSACG** - Made computation of the condition number the default when used with the default values of Integer Option 17.
- **LSLCG** - Made computation of the condition number the default when used with the default values of Integer Option 17.
- **LSLXG/L2LXG** - Improved workspace documentation.
- **LSVCR** - Improved Fortran 90 interface.
- **LSVRR** - Improved Fortran 90 interface.

  Corrected LSVRR ScaLAPACK implementation so that it can handle a wider rang of problems. Updated associated documentation.
- **PARALLEL_BOUNDED_LSQ** - Updated example 1 and associated documentation.

Added example 2 output to documentation.

- **RNKSM** - Use of a correction term has been modified so that negative p-values do not occur.

Chapter 5: Differential Equations

- **IVOAM** - Modified the default initial stepsize to avoid an "initial step length too small" error message.

  Changed definition of optional argument EQNERR when a value of zero is specified.

- **IVPAG** - Corrected a typographical error in manual example 4.

Chapter 6: Transforms

- **c_fast_dft** - Added High Performance icons to the documentation. These icons specify that the routines leverage vendor-supplied libraries.

- **c_fast_2dft** - Added High Performance icons to the documentation. These icons specify that the routines leverage vendor-supplied libraries.

- **c_fast_3dft** - Added High Performance icons to the documentation. These icons specify that the routines leverage vendor-supplied libraries.

Chapter 8: Optimization

- **BCONF** - Initialized the elements of an array to 0.

- **DENSE_LP** - Initialized an internally used variable.

  Corrected the size of internally used arrays.

- **NNLPF** - Modified so that infeasible initial guesses are projected into the set of bound constraints.

- **NNLPG** - Correct the optional argument order in the documentation.

  Modified so that infeasible initial guesses are projected into the set of bound constraints.

- **QPROG** - Avoided infinite loops by not allowing iterative refinement to proceed if the objective function could not be improved upon because of numerical issues.

- **READ_MPS** - Computation of upper bounds for type "G" (Greater than or equal) constraints with entries in the RANGES section was corrected.

- **SLPRS** - Corrected documentation of workspace arguments IPARAM(7), IPARAM(8), LW, and LIW.

Chapter 10: Linear Algebra Operators and Generic Functions

- **DET** - Improve the displayed error messages.

Chapter 11: Utilities

- **RAND_GEN** - Removed manual example 4.

Stat Library

Chapter 8: Time Series Analysis and Forecasting

- **MAX_ARMA** - Added tests to check if the gradient of the current iterate is numerically zero.

- **NSBJF** - Corrected an error in the documentation example.

- **REG_ARIMA** - Corrected the size requirement for the optional argument XLEAD.

Chapter 10: Discriminant Analysis

- **DSCRM** - Use of optional arguments PRIOR, NI, XMEAN is now mandatory for certain IDO values.

  Corrected result when IDO=6.

  Added an example to the documentation to demonstrate the use of the routine when IDO=4.

  Clarified the description of output argument COEF.

  Corrected the XMEAN description.

Chapter 17: Probability Distribution Functions and Inverses

- **MLE** - Swapped the starting value assignments and corrected the ratio calculation.

- **CHIDF** - Corrected the example output.

Math/Library Special Functions

Chapter 6: Bessel Functions

- **CBYS** - Modified to implement the Yousif and Melka (Y&M) approximation of Bessel Function Y(xnu,z=x+i*y) when x or y has an absolute value which is near zero and generalized to allow argument properties:
  xnu > 1 and output array size < (order + 1);
  xnu real > -1.; (3) x and/or y can be negative.

  Implementation of Y&M algorithm insures that Im(Y(xnu,z)) = 0 when Im(z) = 0 and Re(z) > 0.

- **CBJS** - Modified to implement the Yousif and Melka (Y&M) approximation of Bessel Function J(xnu,z=x+i*y) when either x or y has an absolute value which is near zero and generalized to allow argument properties:
  xnu > 1 and output array size < (order + 1);
  xnu real > -1.; (3) x and/or y can be negative.