

# IMSL®

## Fortran Numerical Library

## Advanced Analytics for High Performance Computing

*"The flexibility provided by the IMSL Library has permitted us to build a unique and flexible post-processing system, allowing us to compete head-to-head in the global weather services market."*

BRIAN PETERS  
SENIOR DEVELOPMENT METEOROLOGIST,  
METRA

*"IMSL Fortran has always been a key component of my scientific software development, and allows me to focus on my own research rather than spending hours hunting down the right subroutines, writing interfaces, and debugging."*

PROF. THOMAS KEPLER  
DIVISIONS CHIEF,  
COMPUTATIONAL BIOLOGY  
DUKE UNIVERSITY

The first rule of high performance computing is speed. Program speed is critical for advanced applications. So users need fast, reliable, complete and convenient algorithms for their most important programming tasks. It's easy to see why the IMSL® Numerical Library is the standard for high performance computing commercial mathematics and statistics libraries:

- Superior accuracy and reliability through 35 years of refinement
- A comprehensive set of 1000+ algorithms
- Supporting parallel processing architectures since 1990
- Evolves easily with software and hardware upgrades
- Easier use of popular open source technology

### The Gold Standard for Over Three Decades

With over 1000 algorithms, the IMSL Fortran Library is the most comprehensive math and statistics library available. Highly accurate and reliable, it contains proven technology that has been thoroughly tested, well documented, continuously maintained and used by developers worldwide for more than three decades. Instead of writing, testing and documenting complex mathematical and statistical algorithms from scratch, choose the IMSL Fortran Library which offers widely used routines that significantly help accelerate development time.

### The Original, Easy-to-Use Fortran Library

The IMSL Fortran Library is the most convenient to use Fortran Library available today due to:

- **Convenient Optional Arguments:** allow users to utilize the fast, convenient optional arguments of modern Fortran syntax for all of the relevant algorithms in the library, saving significant coding time and helping to avoid errors
- **Backward Compatibility:** ensuring that legacy code can run on future releases
- **Naming Conventions:** function names resemble actual algorithm names, so users do not have to learn and remember special function names
- **Over 1000 Algorithms:** the most comprehensive math and statistics library available

### Parallel Processing Functions for Numerical Analysis

Developing applications for parallel systems can be painstaking. The IMSL Fortran Library combines the powerful and flexible interface features of the Fortran language with the performance benefits of both distributed memory and shared memory multiprocessing architectures. For example, interface modules to ScaLAPACK give users easy access to MPI-enabled algorithms, and allow them to write parallel code without needing to be experts in parallel programming. In addition, a new "SCALAPACK\_SETUP" function automatically configures MPI and ScaLAPACK and combines with other convenience routines to allow non-expert users to solve large problems on distributed systems while avoiding many of the messy details. LAPACK integration provides easy access to SMP-enabled algorithms and allows users to write parallel code without needing to know parallel programming.

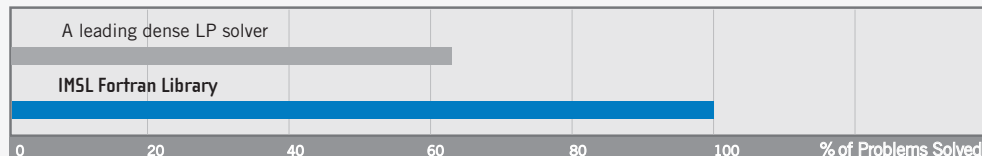
**WHAT'S NEW IN VERSION 6.0**

- **New High Performance Linear Programming Optimizer**  
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- **ScaLAPACK Integration for MPI**  
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- **LAPACK Integration for SMP**  
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- **Intel<sup>®</sup> MKL included**  
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- **Mersenne Twister random number generator**  
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- **SuperLU for Sparse Linear Algebra**  
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- **New probability density functions and inverses**  
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- **Time series and forecasting additions**  
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- **Complex Airy Functions**  
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**Linear Programming Optimization Robustness and Performance**

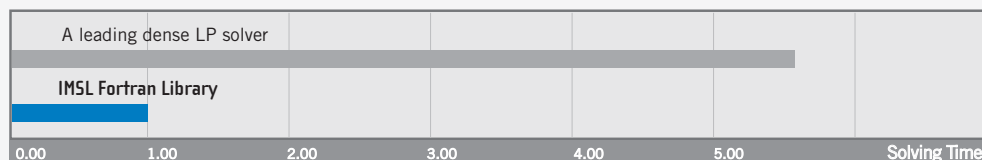
Studies using 91 dense LP problems from Netlib produced the following robustness and performance results.

**Problems Solved for Dense LP Solvers**



IMSL Fortran Library solves 100% of sample Netlib problems.

**Average Solving Time**



IMSL Fortran Library solves linear programming problems in 1/5 the time.

**Expert Professional Services**

Augment development productivity by utilizing Visual Numerics' Professional Services team to help find the best solution to any problem and deliver the support needed to ensure continued success. The highly-skilled technical experts in Visual Numerics' Professional Services organization collaborate with customers to identify specific application requirements at the initial phase of every project. Visual Numerics' consultants provide all levels of support from custom algorithm development to simply helping customers better understand their analysis and visualization needs. Customers can rely on Visual Numerics' technical expertise and dedicated, hands-on help to achieve the highest return on investment.



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