



Financial Solutions

IMSL Provides World Class Numerics and Positive ROI for the Financial Industry

The Finance Analysis Challenge

Business analysts in the Financial industry have a wide variety of challenges. Whether developing tools for risk or portfolio management, option pricing, or forecasting and financial modeling, analysts need a robust set of time-tested, high performance and accurate core numerics to efficiently and effectively analyze and manage financial data in a timely manner.

Typical numerical techniques used in financial analysis such as regression, optimization, non-parametric statistics, time series analysis and forecasting (GARCH, ARMA), Black-Scholes option pricing, Kalman filtering, or Monte Carlo simulations, require a broad range of algorithms to accurately analyze the data. In most cases, the analysis needs to be performed quickly and on different computer platforms, which does not afford much time to build the required code from scratch. A trusted set of industrial strength core numerics to help rapidly build data analysis applications gives financial institutions a true competitive advantage and ensures that high-in-demand analysts are maximizing their time solving complex financial problems, not programming.

The Solution: Robust, Reliable, Accurate, Trusted

The IMSL Numerical Libraries by Visual Numerics — IMSL C Numerical Library (CNL), IMSL FORTRAN 90 MP Library (F90 MP), and JMSL for Java application development — deliver quantitative analysts with the breadth and depth of core algorithms allowing for the rapid development of any application needed to analyze problems of all sizes. Whether developing code in C, C++, FORTRAN, or Java, or on UNIX, Windows or Linux, the robust IMSL Libraries provide the reliable foundation and building blocks you need. Plus, Visual Numerics' PV-WAVE Family of products can be used in conjunction with IMSL to render sophisticated visualizations of your data, whether you require 2D, 3D, OpenGL, or interactive graphics.

IMSL CNL provides C/C++ programmers with over 370 proven, accurate and thread-safe mathematical and statistical functions. In addition, the IMSL F90 MP Library offers a new generation of FORTRAN 90-based algorithms optimized for multiprocessor and other high performance systems. And, JMSL delivers pure Java numerics, a collection of mathematical, statistical and charting classes, written in 100% Java, for the development of network-centric applications such as stand alone or web-enabled applications that require reliable mathematical and statistical functionality as well as flexible 2D charting.

Bottom line — the IMSL Family delivers optimized and supported core algorithms needed to quickly build simple as well as complex analysis tools for any financial application challenge. The complete IMSL suite of high performance and time-tested numerics affords business analysts the freedom to focus on solving the hard financial problems, not building the routines. IMSL also reduces the uncertainty associated with public domain routines which can be risky in an industry where accuracy and reliability are required to maximize investments and avoid financial losses.

"The greatest strength of the IMSL Libraries is that it lets DuPont researchers perform advanced statistical analysis without having to spend time locating and manipulating their data."

Stephen J. Contrell – Contract Consultant / DuPont Pharmaceuticals Company

Value Proposition

Visual Numerics' IMSL Libraries provide the Financial industry with a robust set of core numerics for rapid development of sophisticated analysis tools. IMSL allows high-in-demand business analysts the freedom to keep focused on solving financial problems not writing code. The IMSL Libraries offer highly accurate, time-tested, multi-platform, multi-language solutions to financial analysts for significant time savings, positive project ROI, reliable and trusted results, and maximized individual productivity.

Key Benefits

Visual Numerics has been delivering numerical algorithms to the Financial industry for over 30 years. Some of the key benefits include:

- Time-tested algorithms for extreme accuracy
- Robust suite of core numerics for basic and high performance computing
- Multi-platform support; Multi-language support
- Optimized and maintained algorithms
- Pure Java numerics available with JMSL
- Advanced 2D charting capabilities in Java
- Unmatched product support

ROI Impact

The IMSL Suite provides significant ROI advantages in many ways.

- **It is fast** – allows analysts to immediately start analyzing their data, not building the routines
- **It is efficient** – reduces programming time and gives analysts the freedom to focus on solving important financial problems
- **It is accurate** – provides proven and time-tested core algorithms
- **It is reliable** – delivers 30 years of proven results



World Class Products, Services and Support

For over 30 years, Visual Numerics' IMSL product family has provided trusted numerical analysis tools to thousands of users in the Finance field.

The IMSL Family provides standardized core algorithms for fast development of high performance, cost-effective solutions for all types of problems, and delivers a positive ROI through maximizing productivity. In addition, the PV-WAVE Family of products allows you to rapidly import, manipulate, analyze, and visualize your data.

Visual Numerics partners with its customers to provide world-class products, services and support. We have unparalleled technical support that can answer the hard questions fast, and responsive consultants that can provide in-depth expertise and fast delivery of time-critical solutions.

"This application is important in my work, especially in the optimization portfolios...and for forecasting purposes. I trust IMSL Libraries in my work because they are stable and reliable."

Adam Shimrat
Quantitative Analysts
Bear, Stearns & Company

Proven Results

Visual Numerics has been providing numerical expertise and solutions to high profile financial institutions for over three decades. Some of the Finance data challenges our customers have faced include:

Bear, Stearns & Company –

The quantitative analysts at Bear Stearns needed to develop a proprietary equity trading system, allowing users to construct a market neutral portfolio. The system strategy would exploit inefficiencies in the stock market and would be driven by technical analysis, such as historical stock prices and volume patterns.

Bear Stearns turned to the Visual Numerics' IMSL C Numerical Library (CNL) statistical and optimization routines to select stocks, perform calculations and show performance over time. The optimization procedure allows users to create a portfolio with correlation analysis to be used for risk management.

GFTA (Gesellschaft Fuer Trendanalysen) – In the mid-seventies, GFTA began the painstaking exercise of archiving data from the world currency markets. This data was often in the form of daily or weekly information on exchange rates. The frequency of changes in exchange rates has increased enormously, and GFTA now adds several megabytes of market information per day.

The multidiscipline teams at GFTA developed mathematical and statistical models to analyze the trends in each market. These models are written in C and C++ using IMSL algorithms on three 36 CPU Silicon Graphics, Inc.® servers that run the models every few minutes and send the results to GFTA's desktop systems. IMSL provided traders with a competitive advantage and allows them to make better decisions.

Investment Management Firm Profile - One of the largest independent global investment management firms has developed a proprietary Java-based multifactor model of the stochastic dynamics of interest rates. This model drives the pricing, risk management, and stress testing analytics for its fixed income portfolios. The model is calibrated daily using government and agency bond prices, swap rates, and interest rate option products such as swaptions, caps and floors. The calibration process ensures that modeled prices of all other financial instruments are consistent with these benchmarks.

This prominent investment firm used Visual Numerics' JMSL, IMSL technology for Java developers, to build this high performance modeling system and intergrate with existing Java applications. With JMSL, Java programmers can rely on accurate numerical analysis for complicated non-linear least squares problems and focus on the parts of the application that they know best.



Unmatched IMSL Functionality

- **Time-to-Market** – optimize development resources by using IMSL's robust, reliable and trusted pre-built algorithms to rapidly build the application you need and save up to 95% of your development time.
- **Return on Investment** – The IMSL Libraries provide significant savings in the time and effort required to develop and maintain the numerical analysis foundation required for simple to advanced end-user applications.
- **Competitive Advantage** – IMSL's thoroughly tested, meticulously maintained, and well documented suite of core algorithms gives your organization the competitive edge it needs to quickly build, analyze and implement its business strategies.
- **Multi-Platform Support** – IMSL is available for systems ranging from PCs to supercomputers, including Windows, Unix and Linux.
- **Multi-Language Support** – IMSL algorithms can be used in applications built with standard programming languages such as C, C++, Java, and FORTRAN 90, and can also be utilized with common application development tools such as Visual Basic and Excel.
- **Pure Java Numerics** – JMSL is IMSL technology for Java developers. It delivers a suite of core algorithms, written in 100% Java, for analysis, as well as flexible 2D charting, of network-centric or standalone applications.

Visual Numerics has Offices Worldwide

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