



The MathWorks in Financial Services

Financial professionals worldwide use MathWorks software to reduce research and development time, improve model simulation speed, and control project costs.

With the MATLAB® product family they analyze data and create estimates, measure risk, develop optimization strategies, calculate prices, determine cash flows, and develop customized models that can be integrated within existing systems.

Data Analysis

Researchers gain insight into complex financial data using MATLAB modeling, analysis, and visualization software. Activities include:

- Financial data charting
- Technical time series analysis
- Statistical modeling
- Regression analysis and signal processing
- Estimation routines with missing data handling

Portfolio Optimization Modeling

Using MATLAB, researchers and portfolio managers develop algorithms to optimize performance, minimize risk, and analyze results. Portfolio modeling tasks include:

- Mean-variance analysis to generate optimal portfolios using quadratic programming
- Visualizing the time-evolution of optimal portfolios on the efficient frontier
- Backtesting portfolio performance

Risk Modeling

Analysts and researchers use MathWorks software to quantify and analyze market, credit, and operational risk. Activities include:

- Calculate Value at Risk (VaR)
- Perform “what if” analyses using Monte Carlo simulations
- Use extreme value theory and copulas
- Develop GARCH-type volatility models to estimate parameters, run simulations, and perform forecasts

Trading

Traders on proprietary, systematic, and algorithm trading desks in banks and hedge funds use MATLAB for optimizing and implementing strategies. Activities include:

- Prototyping and backtesting trading strategies
- Performing high-frequency analysis
- Integrating MATLAB with market feeds, databases, data warehouses, and trading environments
- Performing post-trade risk and profit-and-loss calculations

Who Uses MathWorks Products?

- **The top 15 U.S. asset management firms**, including Barclays Global Investors, Fidelity Investments, Citigroup, and Morgan Stanley
- **The top 10 U.S. commercial banks**, such as Bank of America, JPMorgan Chase, Wachovia, Wells Fargo, and State Street
- **12 of the top 15 hedge funds**, including Goldman Sachs Asset Management, Man Investments, Tudor Investment Corporation, and Campbell and Company
- **85% of all central banks in North America and Western Europe**, including the Federal Reserve Board and all 12 banks, Bank of Canada, Bank of England, and European Central Bank

MATLAB®

2006 Wilmott Award Winner
Best Quantitative Financial Software

Get details on how financial services organizations are using MathWorks products:

www.mathworks.com/finance

“MATLAB helped us transform thirty years of knowledge into one application.

It was the ideal software environment to bring a lot of people together to work on the complex and difficult tasks involved with this project.”

Gerry Lemcke, Swiss Re

"In financial analysis, everything is changing very quickly, and it would be impossible to keep up with any other software tool. With MATLAB we are developing a new solution almost every week. I've tried other tools, and I firmly believe that MATLAB is the quickest way of getting to the answers."

Martyn Dorey, PSolve Asset Solutions

Price and Valuation Modeling

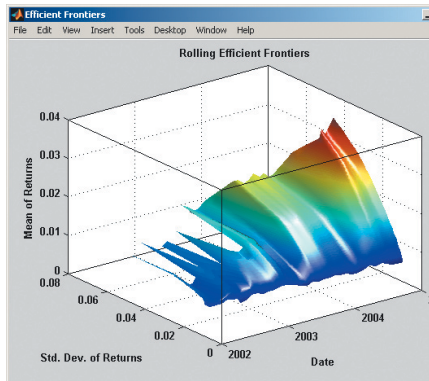
Researchers in fixed-income, equities, derivatives, and commodities groups use MATLAB to quickly prototype pricing and valuation models. Activities include:

- Cash flow and advanced term structure analysis
- Price, yield, and sensitivity analysis for fixed-income securities
- Computing prices and sensitivities and performing hedging analyses using common equity and fixed-income derivative modeling methods
- Developing strategies for minimizing the cost of hedging a portfolio given a set of target sensitivities

Rapid Application Deployment

Using the MATLAB family of products, researchers deploy software components or libraries that integrate with C and C++, Visual Basic, Microsoft® Excel®, and Java-based applications. With MathWorks products, they can develop and deploy:

- Standalone executables
- DLL or shared library files
- Microsoft .NET or COM components
- Microsoft Excel add-ins
- Java™ classes



MathWorks Products for Financial Modeling and Analysis

MATLAB is a technical computing and application development environment used by over 1,000,000 professionals and students worldwide. It's one of the core products for financial services and can be extended with specialized add-on products.

Core Products

MATLAB®
Database Toolbox™
Spreadsheet Link™ EX (for Microsoft Excel)
Financial Toolbox™
Optimization Toolbox™
Statistics Toolbox™

Specialized Add-on Toolboxes

Curve Fitting Toolbox™
Datafeed Toolbox™
Econometrics Toolbox™
Financial Derivatives Toolbox™
Fixed-Income Toolbox™
Genetic Algorithm and Direct Search Toolbox™
Neural Network Toolbox™
Parallel Computing Toolbox™
Signal Processing Toolbox™
Spline Toolbox™
Wavelet Toolbox™

Application Deployment Products

MATLAB Compiler™
MATLAB Builder™ NE (for Microsoft .NET Framework)
MATLAB Builder Ex (for Microsoft Excel)
MATLAB Builder for JA (for Java language)

The MATLAB product family enables you to create a range of interactive applications, including models for optimizing portfolios and visualizing rolling efficient frontiers.

Resources

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TECHNICAL SUPPORT

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ONLINE USER COMMUNITY

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