

# grid**MATHEMATICA**<sup>TM</sup>2.1

*The premier software environment for supercomputing*

## Get immediate access to cutting-edge technologies and the full power of modern grid-computing systems.

*Mathematica*<sup>®</sup> is the tool of science and technology leaders at Fortune 500 companies, national research labs, and top universities. It has defined technical computing for a decade and a half—and many scientific breakthroughs have been made using *Mathematica*. Now *gridMathematica* 2.1 delivers an optimized parallel *Mathematica* environment for modern multiprocessor machines, clusters, grids, and supercomputers.

## Take advantage of the world's largest algorithm collection—in one integrated system.

- Integrates thousands of algorithms for numeric and symbolic computation, discrete mathematics, statistics and data analysis, graphics, visualization, and general programming
- Automatic algorithm selection and arbitrary-precision control
- Sustained performance equal to specialized numeric libraries
- Just added: Industrial-strength string manipulation, universal database connectivity, web services support, cluster analysis capabilities, and high-speed binary data I/O

## Develop on any PC. Deploy immediately on any grid or supercomputer.

- Combines the only high-level advanced symbolic programming language with a uniquely productive development environment for parallel applications
- Replaces thousands of lines of Fortran or other legacy code with single commands
- Optimized for all major high-performance 32-bit and 64-bit CPUs
- Machine independent—your code runs on all available platforms
- APIs for C, Java, .NET, Python, and other scripting languages

## Application areas include:

Simulation ▪ Modeling ▪ Numeric and Algebraic Computations ▪ Visualization ▪ Large-Scale Data Analysis ▪ Cryptography

## Fields of use include:

Aeronautics ▪ Astronomy ▪ Bioinformatics  
 ▪ Chemistry ▪ Drug Research ▪ Engineering ▪ Finance  
 ▪ Mathematics ▪ Physics ▪ Statistics

## *gridMathematica* users include:

Aerospace Corp ▪ Argonne National Laboratory  
 ▪ Columbia University ▪ Dow Chemical ▪ Istituto Nazionale di Fisica Nucleare ▪ Kyoto University  
 ▪ Los Alamos National Laboratory ▪ MIT  
 ▪ NASA Langley ▪ Queen's University ▪ RAND Corporation ▪ Saint Jude Children's Research Hospital ▪ Seagate Technology ▪ Silicon Graphics  
 ▪ Space Telescope Science Institute ▪ Thomson Multimedia ▪ University of California, Berkeley  
 ▪ University of North Carolina ▪ University of Tokyo  
 ▪ Yale University ▪ and many more

For more information, visit [www.wolfram.com/gridmathematica](http://www.wolfram.com/gridmathematica).

# grid**MATHEMATICA**<sup>™</sup>2.1

## grid**Mathematica** Features

- Parallelization at the *Mathematica* language level
- Support for multiprocessor machines, clusters, and grids
- Machine independent—user code completely portable
- High-performance *MathLink*<sup>®</sup> communication protocol optimized for all common configurations
- Efficient, adaptive load balancing
- Scheduling takes processor speed and communication latency into account
- User-programmable scheduling for problem-specific adaptation
- Automatic failure recovery and reassignment of stranded processes
- Support for tracing and debugging
- Speculative parallelization for nondeterministic problems
- Parallel applications can be simulated and tested on a PC
- Support for Microsoft Windows Compute Cluster Server 2003 and Sun Grid Engine

## General *Mathematica* Features

- Over 1900 built-in functions, including the world's largest collection of advanced algorithms for numeric and symbolic computation, discrete mathematics, statistics, data analysis, graphics, visualization, and general programming
- Multi-paradigm symbolic programming language with support for procedural, functional, list-based, object-oriented, and symbolic programming constructs
- Automatic precision control and support for exact integers of arbitrary length, rationals, floating-point real and complex numbers, and arbitrary-precision real and complex numbers
- User-defined or automatic algorithm selection for optimal performance
- Fully programmable 2D and 3D visualization with over 50 built-in plot types
- High-speed numerical linear algebra with performance equal to specialized numeric libraries
- High-performance optimization and linear programming functions
- Wide-ranging support for sparse matrices
- Flexible import and export of over 70 data, image, and sparse matrix formats
- Highly optimized binary data I/O
- Industrial-strength string manipulation
- Built-in universal database connectivity
- Language bindings to C, Java, .NET, Python, and scripting languages
- All-platform support for 64-bit addressing
- Vector-based performance enhancements
- Support for multi-core processors
- *MathematicaMark*<sup>™</sup> benchmark now covering grids and clusters
- Toolkit for creating graphical user interfaces

## Operating Systems

- Linux (32 and 64-bit)
- All common Unix systems (64-bit)
- Mac OS X (G4, G5, and Intel)
- Windows (32 and 64-bit)

## Examples of Hardware for grid**Mathematica**

- Intel or AMD x64 cluster
- Apple Xserve
- HP AlphaServer
- HP Integrity
- HP 9000
- IBM eServer p5
- Infiniband interconnect
- SGI Altix
- SGI Origin
- Sun Fire

grid**Mathematica** also supports heterogeneous and mixed Windows, Linux, Unix, and Mac OS X clusters.

For more information, visit [www.wolfram.com/gridmathematica](http://www.wolfram.com/gridmathematica).

**WOLFRAMRESEARCH**

WOLFRAM RESEARCH, INC.  
info@wolfram.com ■ +1-217-398-0700

WOLFRAM RESEARCH EUROPE LTD.  
info@wolfram.co.uk ■ +44-(0)1993-883400

WOLFRAM RESEARCH ASIA LTD.  
www.wolfram.co.jp ■ info@wolfram.co.jp  
Reseller support only