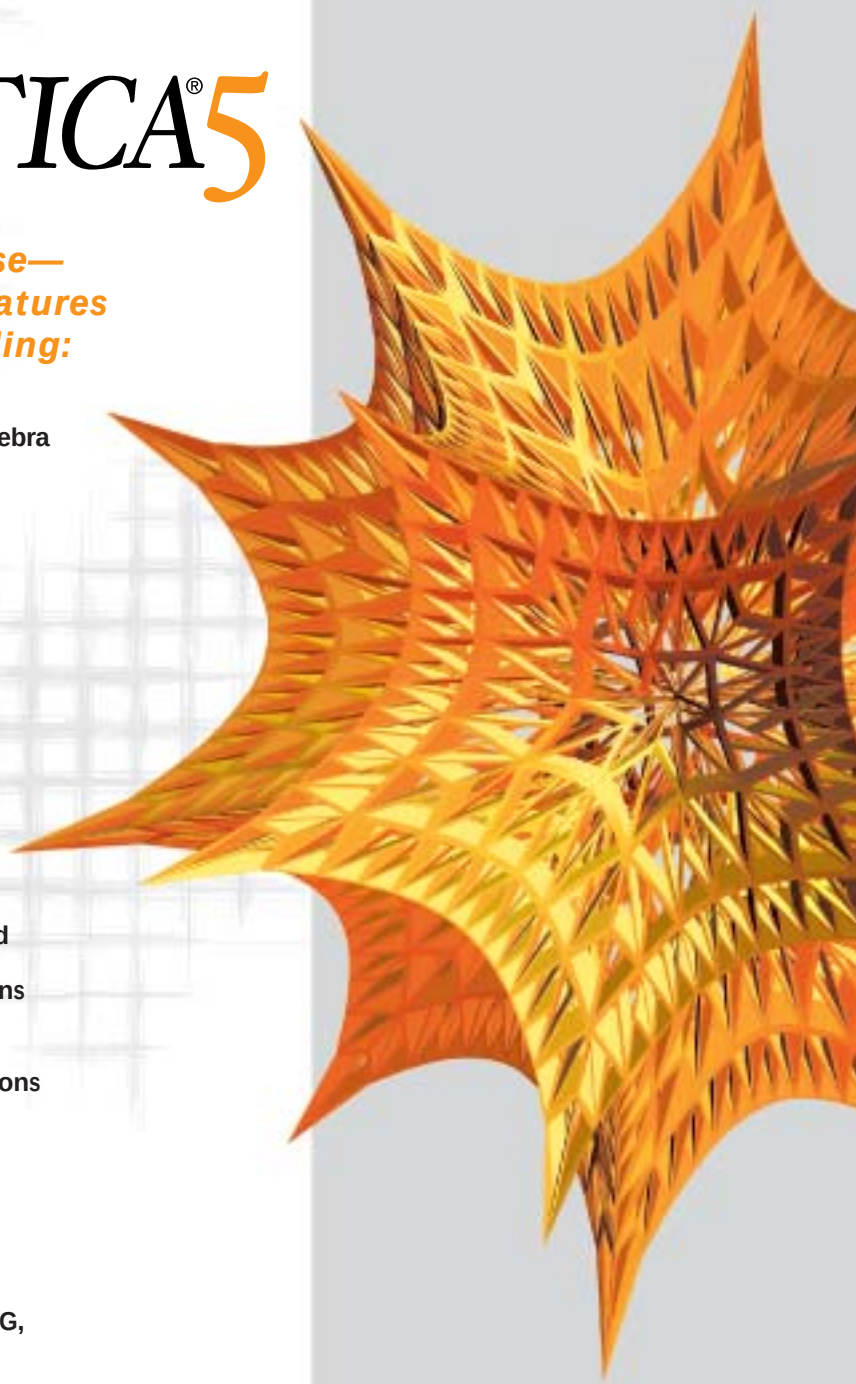
MATHEMATICA® 5



The Advanced Algorithms Release—Introducing hundreds of new features and major enhancements, including:

- Record-breaking speed for numerical linear algebra
- Wide-ranging support for fast sparse matrix operations
- New-generation optimized numerical solvers for ordinary and partial differential equations
- Major new algorithms for solving equations and inequalities symbolically over complex numbers, reals, and integers
- Fully integrated solver for differential algebraic equations
- High-performance optimization and linear programming, including interior point method
- Extensive support for vector and array functions in numeric solvers
- Ground-breaking solver for recurrence equations
- Broader support for domain specifications in symbolic computation
- *.NET/Link*™ for full integration with Microsoft .NET framework
- Flexible import and export of DICOM, PNG, SVG, and sparse matrix formats
- Optimized versions available for 64 bit hardware and operating systems
- New quick-start interactive tutorial

FEATURES NEW IN MATHEMATICA 5

***Mathematica* 5 introduces important extensions to the *Mathematica* system, especially in scope and scalability of numeric and symbolic computation. Building on the core language and extensive algorithm knowledge base of *Mathematica*, Version 5 introduces a new generation of advanced algorithms for a wide range of numeric and symbolic operations.**

NUMERICAL COMPUTATION

Major optimization of dense numerical linear algebra

New optimized sparse numerical linear algebra

Support for optimized arbitrary-precision linear algebra

Generalized eigenvalues and singular value decomposition

LinearSolveFunction for repeated linear-system solving

p norms for vectors and matrices

Built-in MatrixRank for exact and approximate matrices

Support for large-scale linear programming, with interior point methods

New methods and array variable support in FindRoot and FindMinimum

FindFit for full nonlinear curve fitting

Constrained global optimization with NMinimize

Support for *n*-dimensional PDEs in NDSolve

Support for differential-algebraic equations in NDSolve

Support for vector and array-valued functions in NDSolve

Highly extensive collection of automatically-accessible algorithms in NDSolve

Finer precision and accuracy control for arbitrary-precision numbers

Higher efficiency big number arithmetic, including processor-specific optimization

Enhanced algorithms for number theoretical operations including GCD and FactorInteger

Direct support for high-performance basic statistics functions

SYMBOLIC COMPUTATION

Solutions to mixed systems of equations and inequalities in Reduce

Complete solving of polynomial systems over real or complex numbers

Solving large classes of Diophantine equations

ForAll and Exists quantifiers and quantifier elimination

Representation of discrete and continuous algebraic and transcendental solution sets

FindInstance for finding instances of solutions over different domains

Exact constrained minimization over real and integer domains

Integrated support for assumptions using Assuming and Refine

RSolve for solving recurrence equations

Support for nonlinear, partial, and *q* difference equations and systems

Full solutions to systems of rational ordinary differential equations

Support for differential-algebraic equations

CoefficientArrays for converting systems of equations to tensors

PROGRAMMING AND CORE SYSTEM

Integrated language support for sparse arrays

New list programming with Sow and Reap

EvaluationMonitor and StepMonitor for algorithm monitoring

Enhanced timing measurement, including AbsoluteTiming

Major performance enhancements for *MathLink*

Optimization for 64-bit operating systems and architectures

Support for computations in full 64-bit address spaces

INTERFACES

Support for more than 50 import and export formats

High efficiency import and export of tabular data

PNG, SVG, and DICOM graphics and imaging formats

Import and export of sparse matrix formats

MPS linear programming format

Cascading style sheets and XHTML for notebook exporting

Preview version of *.NET/Link* for integration with .NET

NOTEBOOK INTERFACE

Enhanced Help Browser design

Automatic copy/paste switching for Window

Enhanced support for slide show presentation

AuthorTools support for notebook diffs

STANDARD ADD-ON PACKAGES

Statistical plots and graphics

Algebraic number fields

NEW IN VERSIONS 4.1 AND 4.2

Enhanced pattern matching of sequence objects

Enhanced optimizer for built-in *Mathematica* compiler

Enhanced continued fraction computation

Greatly enhanced DSolve

Additional TraditionalForm formats

Efficiency increases for multivariate polynomial operations

Support for import and export of DXF, STL, FITS, and STDS data formats

Full support for CSV format import and export

Support for UTF character encodings

Extensive support for XML, including SymbolicXML subsystem and NotebookML

Native support for evaluation and formatting of Nand and Nor

High-efficiency CellularAutomaton function

J/Link's MathLink-based Java capabilities

MathMLForm and extended MathML support

Extended simplification of Floor, Erf, ProductLog, and related functions

Integration over regions defined by inequalities

Integration of piecewise functions

Standard package for visualization of regions defined by inequalities

ANOVA standard add-on package

Enhanced *Combinatorica* add-on package

AuthorTools notebook authoring environment

MATHEMATICA 5 IS AVAILABLE FOR:
Windows, Mac OS X, Linux (x86, Alpha, Itanium), Solaris, HP Tru64 Unix, HP-UX, IBM AIX

FOR MORE INFORMATION IN THE U.S. AND CANADA:
info@wolfram.com
1-800-WOLFRAM (965-3726)

FOR INQUIRIES OUTSIDE THE U.S. AND CANADA:
Contact the international reseller nearest you.

FOR RESELLER INFORMATION:
www.wolfram.com/international
+1-217-398-0700

For complete specifications and technical requirements see
www.wolfram.com/mathematica

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