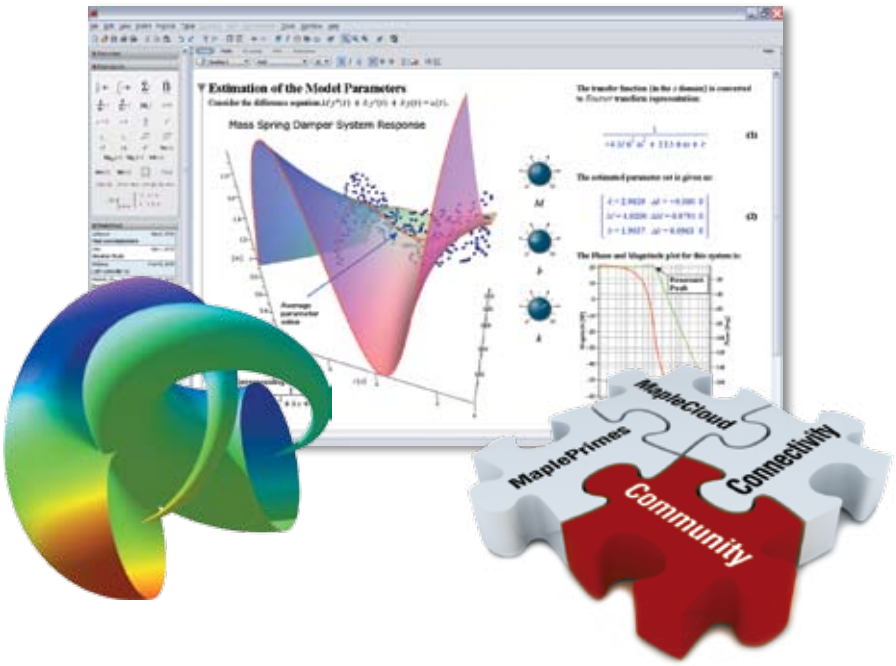
Maple™ 15

The Essential Tool for Mathematics and Modeling



Application Areas

- Differential Equations
- Calculus
- Engineering
- Matrix and Vector Computations
- Algebra
- Physics
- Statistics and Process Control
- Visualization
- Curve Fitting
- Optimization
- Special Functions
- Advanced Mathematics
- Code Generation
- CAD Connectivity
- Units and Tolerances
- Scientific Data Management
- Financial Modeling
- String Processing and Linguistic Research
- Parallel and Grid Computing
- Application Development
- Web Deployment

Key Features

Most Powerful Math Engine

- Coverage of virtually every area of mathematics, including calculus, algebra, differential equations, statistics, linear algebra, geometry, and transforms
- Symbolic, numeric, and hybrid computation algorithms
- Efficient algorithms and tools for high performance computing and large-scale problem solving
- Units, dimensions, and tolerances

Expert Connections

- Code generation (C, C#, Fortran, Visual Basic®, Java™, MATLAB®)
- Connectivity to Excel®, MATLAB®, MapleSim™, Java, Fortran, CAD systems, C, databases, web sites, and more
- Extensive import and export capabilities for data, documents, math, and plots
- MaplePrimes™, a web community dedicated to sharing experiences, techniques, and opinions
- The Application Center and the MapleCloud™ Document Exchange, featuring thousands of examples and applications contributed by the Maple community
- Training videos, webinars, social networking communities, and more
- Complementary products include specialized toolboxes and e-books

Smart Document Interface

- Advanced easy-to-use math equation editor
- Self-documenting context-sensitive menus
- Sophisticated programming language
- 2-D and 3-D plotting and animation, with extensive annotation tools
- Task templates and interactive assistants
- Extensive document creation and word-processing tools
- Interactive embedded components, including sliders, buttons, dials, gauges, and math entry boxes

Mathematics

Maple includes over 4,000 computational functions covering virtually every area of mathematics, including:

- Abstract Algebra
- Algebra
- Algebraic Curves
- Calculus
- Combinatorial Functions
- Combinatorial Structures
- Complex Arithmetic and Functions
- Curve Fitting
- Differential Algebra
- Differential Equations
- Differential Forms
- Differential Geometry
- Discrete and Integral Transforms
- Dynamic Systems
- Euclidean Geometry
- Financial Mathematics
- Gaussian Integers
- Generating Functions
- Graph Theory
- Group Theory
- Lie Symmetries
- Linear Algebra
- Linear Functional Systems of Equations
- Linear Operators
- Linear Programming
- Linear Recurrence Equations
- Logic
- Numerical Approximations
- Number Theory
- Optimization
- Orthogonal Polynomials
- P-adic Numbers
- Physics
- Polynomials
- Polynomial Systems
- Q-Difference Equations
- Rational Normal Forms
- Real Domain Computations
- Series Expansions
- Scientific Constants
- Scientific Error Analysis
- Special Functions
- Statistics
- Statistical Process Control
- Symbolic-Numeric Algorithms for Polynomials
- Tensors
- Tolerances
- Units and Dimensions
- Variational Calculus
- Vector Calculus

Symbolic and Numeric Computations

- Work with exact quantities such as fractions, radicals, and symbols, eliminating accumulated round-off errors
- Choose from a variety of exact and approximate techniques, as best suits your needs
- Approximations can be computed at any precision that is required, and are not restricted by hardware limitations
- Solvers use a combination of symbolic and numeric techniques, allowing them to solve problems for which either approach alone would be insufficient

Visualization

- 2-D and 3-D graphs and animations, created through menus, commands, and interactive assistants
- Over 150 plot types and options, including implicit, contour, complex, polar, vector field, conformal, density, ODE, PDE, engineering, and statistical plots
- Light modeling, legends, axis control, titles, glossiness, gridlines, and transparency
- Display typeset text and mathematical expressions in plot titles, labels, legends, tickmark labels, and axis labels
- International (non-English) characters in titles, legends, and labels
- Plot annotations for 2-D and 3-D plots include arrows, shapes, and drawing tools
- Scale and pan 2-D and 3-D plots and animations
- Real-time rotation of 3-D plots
- Fly-through animations of 3-D plots using user-defined camera paths
- Interactive control of parameters through sliders
- Standard geometric objects, regular solids, and polyhedra, including ellipses, hyperbolae, polygons, cones, spheres, torii, dodecahedra, icosahedra, and tetrahedra
- Layering of graphics and animations of different types
- Wide variety of coordinate systems

User Interface

- Easy problem entry with Clickable Math features, including a math equation editor, palettes, and self-documenting context menus
- Technical document environment with comprehensive word processing tools, including a spell-checker that understands math terminology
- Hundreds of task templates for fill-in-the-blank problem solving
- Interactive assistants for many tasks, including equation manipulation, analyzing ODEs and ODE systems, creating plots and matrices, converting units, and exploring parameters in expressions
- Command completion
- Tables, symbolic spreadsheets, code regions, drawing canvas, and interactive components such as buttons, sliders, and dials
- Maple Portal provides a starting point for any Maple user, with tutorials, interactive assistants, task templates, and links to specialized content for students, math educators, and engineers
- MapleCloud for easy exchange of documents with colleagues and students

Programming

- Full featured programming language for scripts, programs, and full applications
- Interpreted language supports easy exploration and fast prototyping
- Procedural and functional programming
- Advanced features include operator overloading, assumptions on variables, and exception handling
- Debugging, profiling, security, and library management tools
- Source code of most routines available for viewing
- Create and manipulate many kinds of data structures, including sets, strings, lists, arrays, stacks, queues, records, and modules
- Tools for manipulating mathematical objects, including polynomials, integrals, and sums
- Powerful type system, including ability to extend existing types
- Generate and manipulate Maple worksheets through their XML representation
- User-level routines for multi-threaded and multiprocess programming on multi-core computers
- Compiler package, CUDA™ support, parallel algorithms, and optimization tools promote highly efficient user code for numeric computations
- External function interface for transparent access to dynamic libraries
- Interactive embedded components include buttons, sliders, plots, check boxes, list boxes, toggle buttons, radio button, dials, gauges, data tables, and mathematical expression boxes for entering and displaying 2-D math
- Customizable context-sensitive menus
- Maplet™ applications can be built programmatically or through a point-and-click Maplet builder

Connectivity

- Code generation for Visual Basic, MATLAB®, Java, C, C#, and Fortran code
- Internet connectivity
- MATLAB® connectivity includes two way integration and code translation
- Mathematica® Notebook conversion and command translation tools
- OpenMaple™ API for C, C#, Java, and Visual Basic programs
- External calling to Java, C, C#, and Fortran
- Connect with Microsoft® Excel®, databases, and CAD systems
- MathML 2.0 presentation and content support
- Import and export of XML documents
- Export documents to HTML, XML, MathML, LaTeX, RTF, and PDF
- Export plots to BMP, DAE, DXF, EPS, GIF, HPGL, JPEG, PCX, POV, TEK, WMF, and X3D
- Import, manipulate, and export data from WAV, JPEG, and TIFF files
- Import data from Microsoft Excel, ASCII, CSV, Matrix Market, MATLAB®, and more

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