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Newly Released *Mathematica 5* Outperforms Dedicated Numerical Systems

Version 5 Offers Unparalleled Speed, Scope, and Scalability

Mathematica 5, the new high-performance version of the award-winning technical computing software from Wolfram Research, was released on June 23, 2003, the fifteenth anniversary of the product's original release. Key new technologies enable *Mathematica 5* to outperform dedicated numerical systems in raw computational speed, while adding a host of innovative new features.

Mathematica 5 "addresses essentially every issue that previously kept [experienced users] from technical computing environment," says an *eWEEK* review. It's "[m]ore than just a must-have upgrade for current users."

Until now, users often had to make a choice between *Mathematica*'s comprehensive, mixed numeric-symbolic environment and the faster numerical routines available in Fortran libraries or specialized packages. With the release of *Mathematica 5*, this choice is no longer necessary. In some cases, *Mathematica 5* is 1000 times faster than previous versions and surpasses the speed of dedicated numerical systems too.

Mathematica 5 introduces extensive new functionality, much of which is based on algorithms that are exclusive to *Mathematica 5*. Other algorithms provide functionality that was up to now only available in custom packages costing tens of thousands of dollars. Over 100 new algorithms for symbolic and numeric computation in Version 5 are the result of a vast amount of original research by in-house developers.

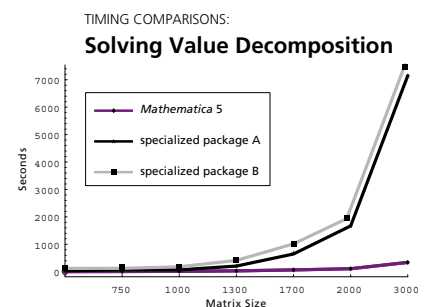
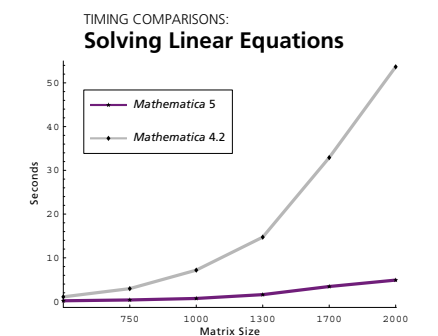
Mathematica 5 also extends Wolfram Research's position as the class leader in providing integration with other software and

standards. In addition to updated versions of *JLink*™ and *MathLink*®, *Mathematica*'s standard connections to Java and C/C++, *Mathematica 5* comes with the new *.NETLink*™, a much requested feature that allows developers to seamlessly integrate *Mathematica* into applications using Microsoft's .NET Framework.

The advances in *Mathematica 5* strengthen *Mathematica*'s position as providing not only the broadest scope of any technical computing system, but also the best performance. *Mathematica* accomplishes this by combining outstanding numeric, symbolic, and graphical capabilities with a uniquely productive programming language and interactive document system. In *Mathematica 5*, technologies such as packed arrays, automatic algorithm selection, and symbolic preprocessing have helped to deliver a unique combination of both speed and functionality.

With Version 5, Wolfram Research has enhanced and extended *Mathematica*'s overall capabilities without compromising any of its accuracy or expert nature. Says Conrad Wolfram, Director of Strategic Business Development for Wolfram Research, "*Mathematica 5*'s unique combination of speed, scope, and scalability will take you from start to finish, from prototyping to final computations, from research to presentation, in the shortest possible time."

For more information:
www.wolfram.com/mathematica/newin5



other developments

The Wolfram Research website has a new design! Visit us online to see our new look.

New Precollege Products and License Programs

Precollege institutions can now qualify for a flat discount level on Wolfram Research products and services based on school size and extent of purchase. They can then pick from all eligible products to design the program that best fits their needs, giving teachers and staff a broader range of more affordable options for school and home use. Program administrators will be amazed to learn that some products can be licensed for less than 10 dollars per copy as part of a site agreement.

www.wolfram.com/news/precollegeprograms.html

Mathematica Teacher Network

The *Mathematica* Teacher Network is a new resource sponsored by Wolfram Research for sharing knowledge among science and math teachers.

www.wolfram.com/solutions/precollege/network

Mathematica Speaker Assistance Program

This program offers resources for use in your *Mathematica*-related presentation or seminar, such as document templates, promotional materials and handouts, presentation wear, and publicity via our website. Wolfram Research is happy to provide these resources to help make your presentation as dynamic and informative as possible.

www.wolfram.com/services/speakers

Are You on a Mathematica Campus?

Gaining access to *Mathematica* may be easier than you think.

www.wolfram.com/solutions/highered/mathematicacampus.cgi



The Wolfram Education Group

Wolfram Education offers *Mathematica* training courses throughout the year for all levels of users. We have added two new classes to our lineup, M310: Digital Image Processing, and M330: Neural Networks. For specific dates and locations check our online calendar:
www.wolfram.com/weg

Mathematica Developer Conference

The annual *Mathematica* Developer Conference took place in April 2003 at Wolfram Research, Inc. headquarters in Champaign, Illinois. For proceedings and presentation notebooks, including discussion of new technologies in *Mathematica 5*, visit the conference website.

www.wolfram.com/news/events/devconf2003

Recent Book Releases

A Mathematica Approach to Calculus, Second Edition
by John T. Gresser
store.wolfram.com/view/book/ISBN0130920150.str

A Mathematica Companion for Differential Equations
by Selwyn Hollis
store.wolfram.com/view/book/ISBN0130463299.str

Introduction to Chemical Engineering Analysis Using Mathematica by Henry C. Foley
store.wolfram.com/view/book/ISBN0122619129.str

Mathematical Methods in Physics and Engineering with Mathematica by Ferdinand F. Cap
store.wolfram.com/view/book/ISBN1584884029.str

Numerical and Analytical Methods for Scientists and Engineers Using Mathematica by Daniel Dubin
store.wolfram.com/view/book/ISBN0471266108.str

tech tips

You can solve 1,000,000 linear equations in 1,000,000 variables in *Mathematica* 5. A unique implementation of high-speed sparse linear algebra in Version 5 allows for arrays of any dimension (or rank) in your operations.

www.wolfram.com/mathematica/newin5/performance/sparselinear.html

With the addition of new graphic, web, and matrix file formats in Version 5, including SVG, PNG, sparse matrix, and the medical DICOM Standard, *Mathematica* now supports over 40 import/export options.

www.wolfram.com/mathematica/newin5/importexport/importexport.html

You can convert a *Mathematica* notebook into an interactive web application running on a *webMathematica* server in just four simple steps.

library.wolfram.com/howtos/makemp

gridMathematica lets you harness the power of grid computing, with a direct extension of *Mathematica*'s uniquely productive programming language.

www.wolfram.com/products/gridmathematica

New Web Services Package Beta Release from Wolfram Research

Dynamically access new data and functionality located on the network

Wolfram Research is inviting users to try the beta version of its new *Web Services Package*, a *Mathematica* application that integrates *Mathematica* and web services by letting a user call web services from *Mathematica*. *Web Services Package* gives *Mathematica* users access to additional data and processing services, such as geographical data, financial data, remote calculation, language translation, file conversion, and Wolfram Research online information services, from directly within *Mathematica*.

For more information: www.wolfram.com/solutions/mathlink/webservices

Wolfram Research Releases webMathematica 2.0

Introducing new web capabilities, simplified installation, and better integration with standard server applications

The new *webMathematica* 2.0 from Wolfram Research incorporates features that make it even easier for users to build sophisticated, interactive web applications with the full calculation and visualization power of *Mathematica* technology.

"*webMathematica* 2.0 blows everything else away," says Ed Luschei, Assistant Professor in Agronomy at the University of Wisconsin. Improvements in Version 2.0 are immediately apparent, starting with a simplified installation process that requires minimal configuration beyond the installation of the *webMathematica* web application, thereby enabling most customers to set up their websites in less than 15 minutes.

webMathematica 2.0 also provides the functionality of the *Mathematica* 4.2 computation engine, which has many features that are integral to web operations, such as XML, SVG, and MathML capabilities.

Additional new features in Version 2.0 include the following:

- Support for catching *Mathematica* **Message** and **Print** output statements, to aid in developing and debugging application content
- Support for HTTP file upload, a mechanism that enables users to submit data to a *webMathematica* web server
- Support for saving HTTP session variables on the server, which is useful for saving results from one computation to another
- New HTML formatting functions for formatting results such as tables into HTML



webMathematica-powered calculations and graphics from www.analyticcycling.com.

"With *webMathematica* 2.0, our focus was on making the product fully compatible with existing web standards. We invested a large amount of design time in implementing a more simplified architecture based on standard JSP and XML technologies. At the same time, we arrived upon a more optimal configuration of components for easier installation and development," says Tom Wickham-Jones, Director of Strategic Kernel Technology at Wolfram Research and chief developer of *webMathematica*. "The end result is a more elegant and reliable product that is also more intuitive, enabling faster construction of pages and increased performance."

For more information: www.wolfram.com/products/webmathematica

Real-Time Data Feeds for Mathematica with HyperFeed

A simple solution for finance users requiring ultrafast data feeds

HyperFeed Technologies, one of the leading providers of real-time and historical market data of various financial instruments, offers subscribers of their data a Java API that can be accessed very easily from the *Mathematica* kernel through *JLink*. The HyperFeed API and *JLink* enable the user to incorporate streaming and polling data and to use *Mathematica* kernel features to calculate various analytics instantly. In this way users can create their own custom-tailored front-office applications, trading screens, and

analytics pages with live data available to the kernel. Models and front ends are easy to maintain and modify, and additions can easily be incorporated in a building-block manner. All of these capabilities together give analysts a complete, state-of-the-art, industrial-strength front-office system powered by *Mathematica*.

For more information: www.wolfram.com/news/hyperfeed.html

A New Kind of Science Explorer: Mathematica Kit

Use *Mathematica* to extend the discoveries of *A New Kind of Science*

A year after the release of Stephen Wolfram's major bestseller, *A New Kind of Science*, there is growing evidence that a paradigm shift of historical proportions has been initiated. *A New Kind of Science Explorer: Mathematica Kit (NKS Explorer: MK)* will greatly assist those interested in researching the world of simple programs and sharing their discoveries with others. Based on the same programs that Wolfram used to create the striking graphics in his book, *NKS Explorer: MK* enables the user to take full advantage of *Mathematica*'s integrated environment.

For more information: www.wolfram.com/news/nksxmk.html

Additional Application Packages

Fuzzy Logic 2

www.wolfram.com/products/applications/fuzzylogic

Experimental Data Analyst 1.1

www.wolfram.com/products/applications/eda

Geometrica02

www.wolfram.com/products/applications/geometrica

RiskQ 4.2

www.wolfram.com/products/applications/riskq

SchematicSolver

www.wolfram.com/products/applications/schematicsolver

UnRisk Pricing Engine 1.7

www.wolfram.com/products/applications/unrisk

mathStatica 1.2

www.wolfram.com/products/applications/mathstatica

machine learning framework 1.1

www.wolfram.com/products/applications/mlf

To have the latest news and updates from Wolfram Research delivered direct to your inbox, subscribe to *MATHwire*, our email newsletter, at: www.wolfram.com/mathwire

Control System Professional Suite

Powerful, integrated tools for control based on the latest advances



Control System Professional Suite is a new extensible framework of tightly integrated *Mathematica* application packages. The core of the suite is *Control System Professional 2*, whose more than 150 functions allow users to link built-in control objects together to model their own systems. The second component of the suite is *Advanced Numerical Methods*, which offers a variety of algorithms for solving any given problem, enabling expert users to choose the most appropriate option in each instance. The suite offers an object-oriented environment for solving the common control problems that arise in engineering, science, economics, and finance.

For more information: www.wolfram.com/news/csps.html

Remember to register your application packages in order to receive notification of any updates or new versions! Most existing *Mathematica* application packages are compatible with *Mathematica* 5, but some are being updated to ensure problem-free installation and use. View a complete list of current package updates or download your updates on our website.

For more information: www.wolfram.com/products/applications/updates/available.html

user profiles

Differential Equations, Live and in Color. "A picture may be worth a thousand words, but a good animation is worth much more," says Selwyn Hollis, Professor of Mathematics at Armstrong Atlantic State University. Hollis has made many contributions to the use of advanced technology in mathematical education including his most recent book, *A Mathematica Companion for Differential Equations*. The book is designed to supplement a typical college-level differential equations course and show students how to use *Mathematica* to solve and visualize common differential equations. Hollis has also created custom differential equation packages for *Mathematica* and an interactive website to encourage students to experiment further.

www.wolfram.com/news/hollis.html

Fraunhofer-Gesellschaft Designates Mathematica as Its Strategic Technical Computing Software. A collection of over 55 highly specialized applied research institutes, Fraunhofer has been such an important force in German science and industry that a commemorative postage stamp was created in honor of its 50th anniversary. According to Dr. Michael Erben-Russ, head of Fraunhofer's software services department, "Its many strong calculation features, high-level programming environment, open architecture, and web compliance made *Mathematica* an obvious choice." *Mathematica*'s longevity and compatibility with most existing infrastructures, combined with Wolfram Research's cost-effective and flexible general license contracts, helped seal the decision.

www.wolfram.com/news/fraunhofer.html

South African National Disaster Hazard and Vulnerability Atlas Uses webMathematica Technology to Fight Catastrophic Events.

In South Africa, disasters like droughts, floods, and famines are common occurrences. Although the South African government often has adequate resources to provide relief, emergency supplies are only useful if officials can anticipate when and where disaster will strike. Dusan Sakulski, System Integrator and Coordinator of the National Disaster Management Centre of South Africa, is using *Mathematica* to help predict the time, location, and intensity of natural disasters. Sakulski calls his project the National Disaster Hazard and Vulnerability Atlas, and it is catching the attention of both the UN and NASA. The atlas is an interactive *webMathematica* program that generates maps and charts "on the fly" to illustrate historical data.

A self-taught *Mathematica* user, Sakulski chose *Mathematica* because it is "simply the best—a truly integrated technical environment."

www.wolfram.com/news/disasteratlas.html

Experience Exchange

Submit your nonproprietary journal or conference articles, papers, web links, or other *Mathematica*-related success stories to experience@wolfram.com. If we feature your work on our website, we'll send you a *Mathematica* T-shirt.

www.wolfram.com/mathematica/experience