

WOLFRAM RESEARCH, INC.
100 Trade Center Drive
Champaign, IL 61820-7237, USA
info@wolfram.com

WOLFRAM RESEARCH EUROPE LTD.
10 Blenheim Office Park
Lower Road, Long Hanborough
Oxfordshire OX29 8RY
UNITED KINGDOM
info@wolfram.co.uk

WOLFRAM RESEARCH ASIA LTD.
Oak Ochanomizu Building 5F
3-8 Kanda Ogawa-machi
Chiyoda-ku, Tokyo 101-0052
JAPAN
info@wolfram.co.jp

technical software news

ISSUE ONE 2004

A PUBLICATION OF WOLFRAM RESEARCH

Innovative Online Format for *Mathematica*® Courses

New Options from Wolfram Education Group

Wolfram Education Group is now offering online certified *Mathematica* training. In addition to site-based courses, customers may now take a training class from the comfort of their own home or office—almost anywhere around the globe! This is an attractive alternative for customers who prefer the familiarity of their own computer, as well as for those with financial constraints on travel.

Online training courses are identical in content to Wolfram Education Group's site-based courses and are taught by the same certified instructors. Taking an online class requires a phone line and internet connection for web conferencing. Upon registration, students are given instructions for joining the class and downloading courseware.

Since the program's inception three years ago, Wolfram Education Group has expanded to accommodate users of varying levels and interests. Additions to the catalog include courses in specialized fields such as parallel computing, image processing, and neural networks. With the new online education option, Wolfram Research brings high-quality *Mathematica* training to a growing number of users around the world.

Both M101: A First Course in *Mathematica* and M110: Working with Data Using *Mathematica* can be taken online. Additional classes will be posted to the schedule soon.

For more information: www.wolfram.com/weg

Growing Global Adoption of *Mathematica*

Mathematica has broadened its impact as the global standard for technical computing with new, government-sponsored multinational adoptions. These initiatives will educate users on *Mathematica* technology and expand current national science programs.

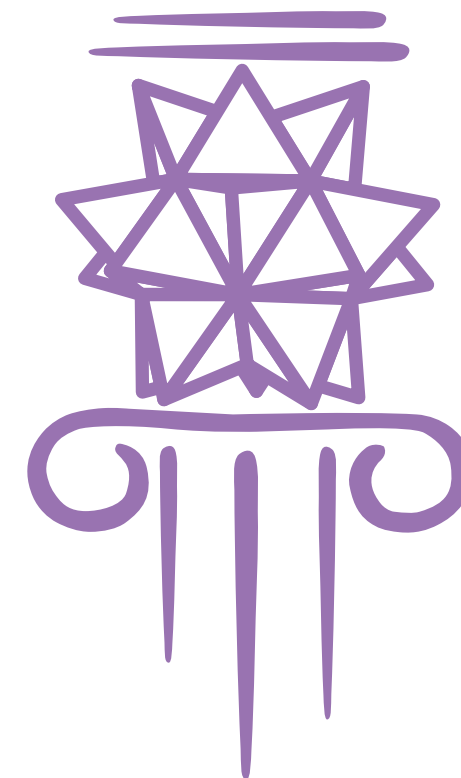
The Nordic Education Centre (NE-C)—a joint venture between Wolfram Research and UNI-C (the Danish IT Centre for Education and Research)—brings certified *Mathematica* training to Denmark, Norway, Sweden, Finland, and Iceland for the first time, with courses on complex data analysis, modeling, and symbolic calculation. As a Wolfram Research Expertise Partner, NE-C is supported with special discounts on training kits, free training for NE-C personnel, and enhanced marketing support from Wolfram Research.

Mathematica technology has also been chosen to improve programs in science and technology in the

Arab states by the United Nations Educational, Scientific, and Cultural Organizations (UNESCO). The UNESCO Cairo Office (UCO) will establish a *Mathematica* demonstration and training center for the 17 Arab states covered by the UCO. Ministers of technology and education throughout the Arab states will then be able to visit the center and learn how they can use the technology to build and improve curricula in their own countries. Similar training was presented for the first time in the Arabian Peninsula at the *Mathematica* Gulf Conference in Oman.

These collaborations are the latest in a series of large-scale developments dedicated to promoting *Mathematica* training worldwide.

For more information:
www.wolfram.com/news/unesco.html
www.wolfram.com/news/unic.html



other developments

New Application Package and Updates

Magnetica, a new tool developed by MagneticaSoft, lets you analyze, design, optimize, and simulate magnetic systems with *Mathematica*. Unlike competing products, *Magnetica* employs the faster and more precise, intuitive, and transparent DICEM method of magnetic field calculation. Combined with *Mathematica*'s computational and visualization capabilities, *Magnetica* offers an easy-to-use, powerful, and unique tool for engineers, scientists, medical researchers, MRS and MRI radiologists, educators, and students.

You can download *Magnetica* from the Wolfram Research web store. A free one-month trial version is available from MagneticaSoft.

For more information:
www.wolfram.com/applications/magnetica

These Wolfram Research application packages have been updated for *Mathematica* 5:

Advanced Numerical Methods
Finance Essentials
machine learning framework
Neural Networks
A New Kind of Science™ Explorer Mathematica Kit

Registered users can download their updates for these and other packages today.

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

Upcoming Events

april 22–25, 2004

See *A New Kind of Science* develop at the NKS 2004 Conference and Minicourse in Boston, Massachusetts. NKS 2004 provides a forum for bringing together the growing community of dynamic individuals with an interest in furthering the ideas and methods in Stephen Wolfram's *A New Kind of Science*. NKS 2004 will showcase how NKS is developing and the progress being made in both the basic science and applications of NKS.

www.wolframscience.com/conference/2004

august 2–6, 2004

The Sixth International *Mathematica* Symposium (IMS 2004) in Banff, Canada, is a conference for users of *Mathematica* in a wide variety of disciplines, such as applied and pure mathematics, natural and life sciences, social sciences and law, engineering, graphics and design, arts and music, education, and applications in industry.

www.ims2004.com

october 21–23, 2004

Follow the latest directions in technical computing at the Wolfram Technology Conference in Champaign, Illinois. The conference will offer a variety of sessions targeted to technical computing users of all levels and fields, as well as to software administrators, developers, authors, trainers, and consultants. Wolfram Research is currently accepting suggestions and recommendations for session topics and session leaders. Submit your ideas to conference-info@wolfram.com.

www.wolfram.com/news/events/techconf2004

Recent Book Releases

CalClabs with Mathematica for Stewart's Multivariable Calculus, Fifth Edition, by Selwyn Hollis

store.wolfram.com/view/book/ISBN0534393624.str

Computational Discrete Mathematics: Combinatorics and Graph Theory with Mathematica by Sriram Pemmaraju and Steven Skiena

store.wolfram.com/view/book/ISBN0521806860.str

Front-End Vision and Multi-Scale Image Analysis by Bart M. ter Haar Romeny

store.wolfram.com/view/book/ISBN1402015070.str

Mathematica by Example, Third Edition, by Martha L. Abell and James P. Braselton

store.wolfram.com/view/book/ISBN0120415631.str

Mathematica for Differential Equations: Projects, Insights, Syntax and Animations by David Calvis

store.wolfram.com/view/book/ISBN0131439766.str

Resolving Conflicts with Mathematica: Algorithms for Two-Person Games by Morton John Canty

store.wolfram.com/view/book/ISBN0121588556.str

Partial Differential Equations and Boundary Value Problems with Mathematica, Second Edition, by Prem K. Kythe, Pratap Puri, and Michael R. Schäferkotter

store.wolfram.com/view/book/ISBN1584883146.str

tech tips

Not only is the function **NDSolve** now faster and more powerful in *Mathematica* 5, it also includes a wider range of solver methods and options. Two of these new options are **StepMonitor** and **EvaluationMonitor**, for monitoring the progress of your computations. www.wolfram.com/mathematica/newin5/numeric/ndsolve.html

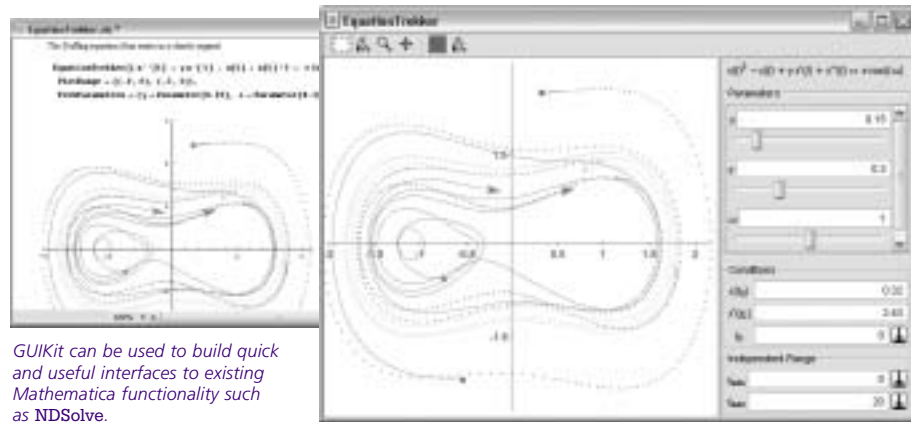
Convert to **Bitmap**, found under the Cell menu in *Mathematica*, lets you save platform-dependent cell images and files, such as Macintosh PICT or Windows WMF files, to a format that can be read on any platform. library.wolfram.com/infocenter/TechNotes/4648

Mathematica 5 supports cascading style sheets when exporting to HTML, which allows users to preserve the look of their *Mathematica* notebooks for viewing in a web browser. www.wolfram.com/mathematica/newin5/importexport/importexport.html

You can use the 3D graphics directive **SurfaceColor** to specify the way that polygons reflect light, thereby creating more complex and refined models. Surfaces can be made to appear "dull" or "shiny," with varying reflection distributions over the surface. documents.wolfram.com/v5/SurfaceColor.html

GUIKit

Try *GUIKit* Version 1.0 Beta for the Development of Graphical User Interfaces with *Mathematica*



GUIKit can be used to build quick and useful interfaces to existing Mathematica functionality such as NDSolve.

GUIKit simplifies the construction and layout of common graphical user interface (GUI) programming components while minimizing the need to know any details of the underlying Java framework. It is ideal for developing interactive GUIs that can be used to expose the full, rich functionality of *Mathematica* to beginning users through customized, targeted interfaces, or to provide transparent connectivity to systems outside of *Mathematica*.

GUIKit renders native-looking platform windows and dialogs containing text fields, sliders, and other mouse-driven utilities. It

was developed to help users enhance their existing add-on packages and create new ones, such as sophisticated demos and presentations, interactive courseware applications, and wizard designs and tools built on specific *Mathematica* functionality.

The beta release provides a high-level *Mathematica* expression syntax for defining a graphical user interface, along with a runtime environment for deployment, and includes many examples of *GUIKit* implementations.

For more information: www.wolfram.com/mathlink/guikit

Now Available

CalculationCenter 2 for Networks and Students

New editions of *CalculationCenter 2* offer more convenient and inexpensive access for a wider range of user environments.

Network CalculationCenter 2 lets sites optimize a given number of licenses over a larger group of users. Using the *MathLM* licensing manager, it simplifies system installation and maintenance and offers users the convenience of working from any networked computer.

CalculationCenter for Students is a fully functional, discounted option for students to use on their personal computers and is ideal for those enrolled in business, statistics, and other related courses.

For more information: www.wolfram.com/calculationcenter

Mathematica 5 for AMD64 Increases Speed by Up to 50%

Mathematica 5 is among the first technical computing platforms specifically designed to provide optimized performance for the AMD64 architecture. The new *Mathematica* port outperforms a regular Linux version of *Mathematica* on AMD64 systems by up to 50% in typical scientific and technical calculations. With the release of *Mathematica* 5 and *gridMathematica™* for Linux on AMD64, Wolfram Research continues to provide advanced technical computing options for the latest and most-advanced microprocessor systems.

For more information: www.wolfram.com/news/amd64.html

webMathematica 2.1 for Fast, Efficient Web Computation

webMathematica now delivers web computations with the increased speed and scope of *Mathematica* 5. Users of *webMathematica* 2.1 can spend less time building applications and waiting for results, and more time exploring the new functionality now available to them.

New 64-bit platforms and server options for *Mathematica* 5 enable the development of very intensive, robust *webMathematica* applications that can be deployed within virtually any existing infrastructure. Additionally, new graphic, web, and matrix file formats let users integrate more features into their *webMathematica* application.

For more information: www.wolfram.com/webmathematica

World's Largest Collection of Mathematical Functions Now Online

87,160 Formulas and 10,828 Graphics about Mathematical Functions Are Available Free at The Wolfram Functions Site



Special functions—with names like Bessel functions, hypergeometric functions, and totient functions—define focal points of mathematical knowledge. The Wolfram Functions Site provides the most comprehensive collection of such knowledge in a readily accessible way, making it an important resource for mathematicians, scientists, engineers, and students.

Several widely used handbooks of mathematical functions have been published, the largest of which contained only 15,000 formulas. Traditional handbooks also included a limited amount of graphics illustrating the properties of functions. With *Mathematica*, a huge number of new visualizations of functions have become possible. The Wolfram Functions Site, with partial support from the National Science Foundation,

assembles over 10,000 of these, and many more are being planned.

Material in The Wolfram Functions Site can be downloaded in several standard formats, including *Mathematica InputForm* and *StandardForm*, MathML, and PDF. Formulas can be copied from the site and immediately used as input to a computer system. For ease of citation, each formula has been assigned a unique, permanent ID.

While having already far surpassed previous knowledge bases for mathematical functions, continued growth is projected for The Wolfram Functions Site, with new searching capabilities, external contributions, and new classes of graphics and information.

Visit the site at: functions.wolfram.com

Also New Online

A New Kind of Science, Stephen Wolfram's groundbreaking book, is now online with complete text and images, full searchability, 30,000+ links, and many other enhanced features.

"Many in the sciences believe that what Wolfram's laid out in the print version's 1197 pages will fundamentally reorganize the way we view the universe, and some folks have criticized him for not making such a significant text more freely available. Now he has. This is probably the most rigorous reading you'll do all year, and—if you're willing to work—extraordinarily rewarding."

USA Today, February 2004

www.wolframscience.com/nksonline

mathworld.wolfram.com, the most visited math site on the web, has a new look! Many *MathWorld™* notebooks and packages can also be downloaded for use in *Mathematica*. Check back often for the latest updates. mathworld.wolfram.com

Contributed Mathematica Packages in the Mathematica Information Center

The 536 solutions for the world's oldest puzzle, the Loculus of Archimedes, are given in this *Mathematica* notebook.

library.wolfram.com/infocenter/MathSource/5108

A coding theory package was developed for the course Error-Correcting Codes with *Mathematica*.

library.wolfram.com/infocenter/MathSource/5085

AELink is an application that allows Mac OS X users to send AppleEvents from *Mathematica*.

library.wolfram.com/infocenter/MathSource/5114

See how to construct zonotiles, a generalization of Penrose tilings, in which rhombs, hexagons, and other shapes arise.

library.wolfram.com/infocenter/MathSource/1197

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

user profiles

Intel Talent Search Finalist Researches Enzymes with Mathematica.

As a senior at Stuyvesant High School, 17-year-old Varun Narendra placed among 40 finalists in the 2003 Intel Science Talent Search, a competition often referred to as the Junior Nobel Prize. Narendra used *Mathematica* to create a model that could help treat Gaucher's Disease, a genetic disorder. Patients with Gaucher's Disease need enzyme replacement therapy to properly metabolize fat cells. The therapy is effective in most cases, but it is not a cure. Because the cost of the lifelong treatments can exceed \$300,000 per year, Narendra researched a way to determine each person's optimal enzyme dosage by testing enzymatic reactions within the blood cells. He then created a mathematical representation of these reactions using *Mathematica* and projected them over time by coding loops in his program.

www.wolfram.com/news/narendra.html

Mathematica Adopted as Exclusive Curriculum Tool in India High Schools.

The State Government of Gujarat has introduced *Mathematica* into the upper-level math and science curriculum for the 12th Standard under their Classroom Project for High Schools. Gujarat, one of the largest, most prosperous states in India, recently passed a resolution making *Mathematica* a regular part of the syllabus.

To facilitate the implementation, local teachers with *Mathematica* expertise have published a computer science textbook in accordance with the syllabus. Entitled *Introduction to Computer Science (Science Stream) of Standard XII*, this textbook explains how to use *Mathematica* by providing examples of useful constructs and functions, as well as illustrative problem sets and solutions.

www.wolfram.com/news/gujarat.html