Maplesoft
Mathematics • Modeling • Simulation

Enhancing the Classroom

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Director, Business Development

Agenda

Challenges for Technical Courses

Requirements for Technical Courses

Exploring Maple

Exploring MapleSim

Exploring Maple T.A.

Challenges Specific to Technical Programs

- Notation – display of mathematical symbols
- Meaning - mathematical ambiguity
- Visualization – graphs, diagrams, animations
- Exploration – concepts and processes
- Assessment – homework, help comprehension

NOTATION – display of mathematical symbols has always been one of the stumbling blocks for STEM programs. In Science, Technology, Engineering, and Mathematics, we don't just use words and numbers. We use special symbols. The challenge we face with notation is two-fold: the display doesn't look the way we want/expect and entering the expressions takes effort.

VISUALIZATION – including images in our teaching is very important to help students understand the concepts. The problem is that the images we can create are not always representative of the expressions and what if we want to make a small change in the expression. How can we talk about "What if…?"

EXPLORATION – in order to learn, students need to explore and practice, they need encouragement, and they need feedback. With the increased demands on instructors' time and increased class sizes, how can you provide the same level of interaction for your students?

ASSESSMENT – you are expected to provide learning opportunities for your students, but aren't given the support staff needed to grade assignments and work through problems with students. In addition, course management systems offer some assessment capabilities, but are not comprehensive enough for STEM programs.

Requirements for Technical Programs

Instruction

- Display capabilities
- Computerized algebra and calculus
- Visualization and animation
- Exploration tools
- Easy to use and explain
- Publishing and Web tools
- Content – e-books, worksheets, etc.

Testing and Assessment

- Intelligent assessment of mathematics
- Randomization
- CMS integration
- Content

Maplesoft Education Solutions

MapleSim

MapleT.A.

MapleNet

Maple

Precalculus Interactive Study Guide

Advanced Engineering Mathematics with Maple

The Mathematics Survival Kit Maple Edition How to Get an A+ in Math

Calculus [study guide]

GRIDComputing

Maple Global Optimization Toolbox

Our educational product stack.

Maple is the platform on which our other products are built:

- MapleSim is our physical modeling and simulation platform that connects the rigour of theory to physical systems students can understand.
- Maple T.A. is our automated testing and assessment platform.
- MapleNet lets you deploy Maple documents online and harness the full power of Maple from any typical browser.
- There are also a number of e-books and add-ons that bring value to you and your students.

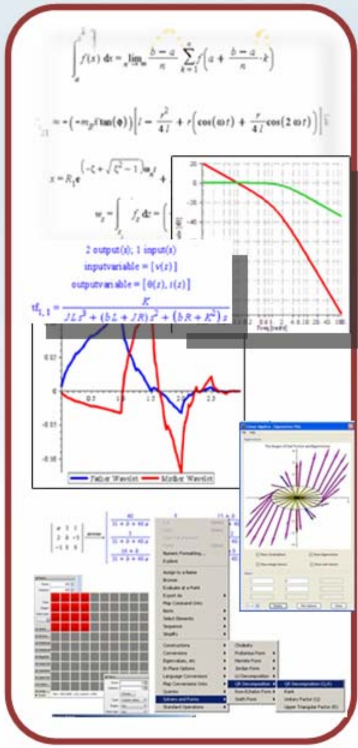
Maple:
Power Mathematics
Flexible Interface (Clickable Math, Document Interface)
Passionate User Community

MapleSim:
Powerful Modelica Platform
White-Box Modeling and Analysis
Extremely Fast Auto Generated Model Code

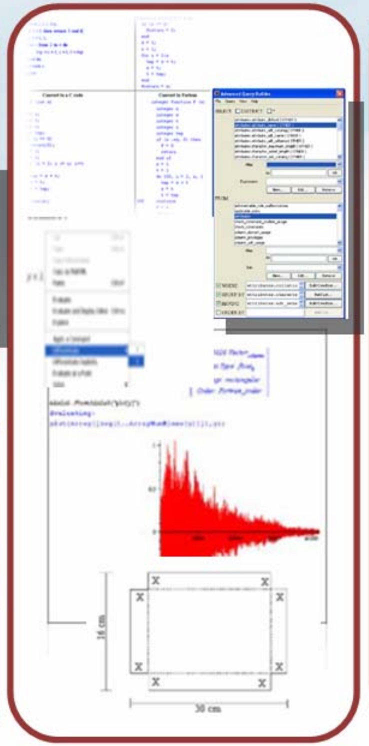
Maple T.A.
Testing and Assessment designed especially for STEM

Exploring Maple – Fundamental Mathematics

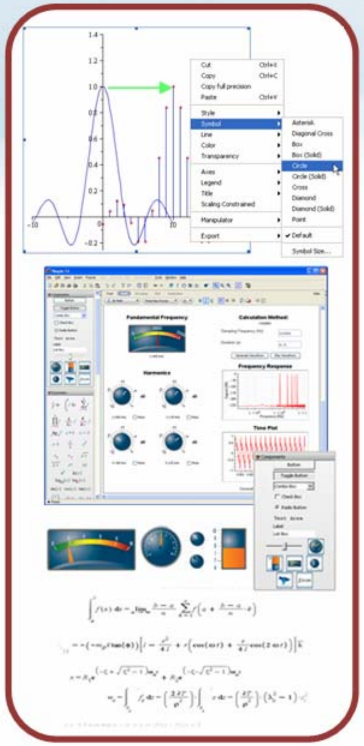
Deep Mathematics



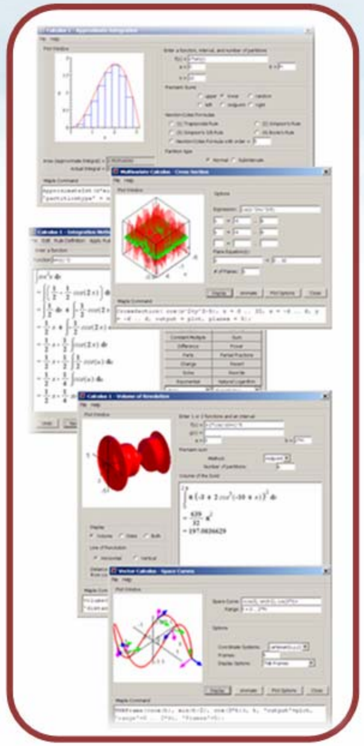
Clickable Math^{TM} Functionality



Smart Document Environment



Extensive Education Resources



All our products and solutions are based on two core technologies that are unique to Maplesoft – the world's most advanced symbolic computation engine, and Clickable Math - the conviction that math software should be so simple to use that teachers and students can focus on the mathematics, not the tool.

Deep mathematics – over 4000 mathematical functions providing numeric and symbolic solutions in a wide variety of areas from algebra and calculus to differential equations and plotting

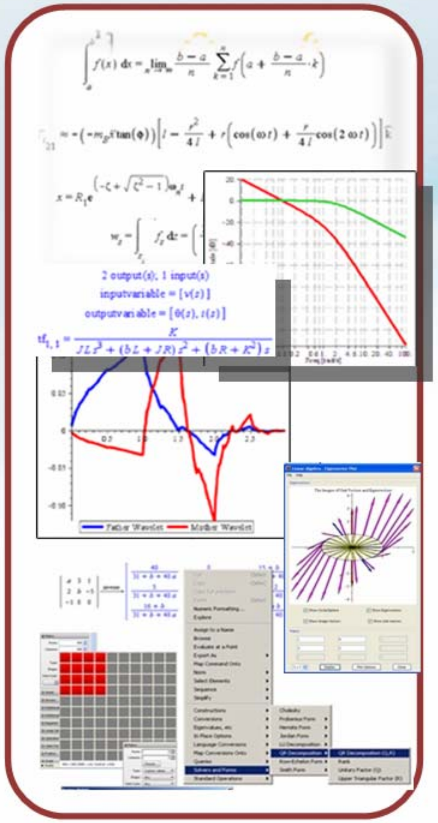
"Clickable Math" – over 100 easy-to-use commands and techniques. Allows for visual, interactive problem solving and make students instantly productive and engaged.

Smart document environment – produces rich documents that are fully interactive and as professional looking as a textbook. Combine text, math, and images together seamlessly.

Extensive education resources – Assistants (15+), tutors (50+), task templates (300+),
mini demonstrations (49)

Exploring Maple

Deep Mathematics



- World leading engine with the breadth and depth to handle every type of mathematics
- Over 4,000 available functions
- Uses familiar mathematical notation
- Built-in programming language

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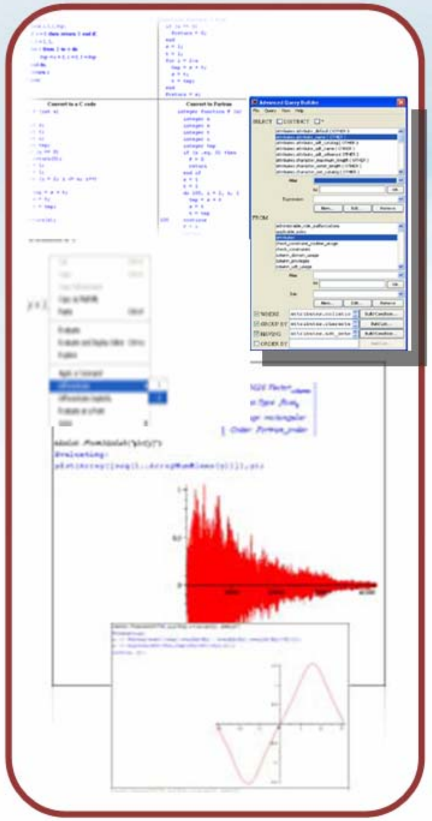
Exploring Maple

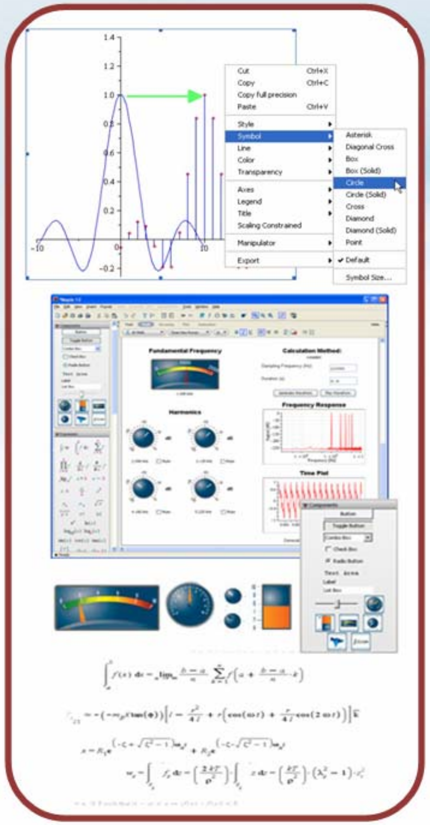
Clickable Math™ Functionality



- 100+ commands are accessible at your fingertips
- Allows for visual, interactive problem solving
- Easy to use
- Focus is on mathematics not software

Exploring Maple

Smart Document Environment



- Allows you to create fully interactive, professional looking documents or math apps
- Documents are readily shareable

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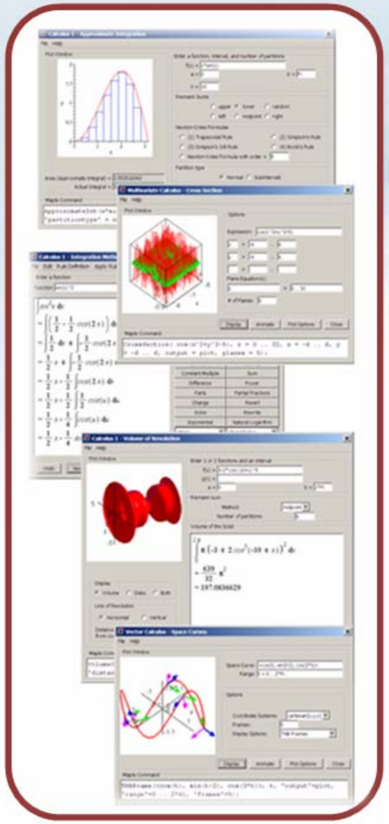
Exploring Maple

Extensive Education Resources



- 15+ Assistants
- 50+ Tutors
- 300+ Task Templates
- 49 Mini-Demonstrations

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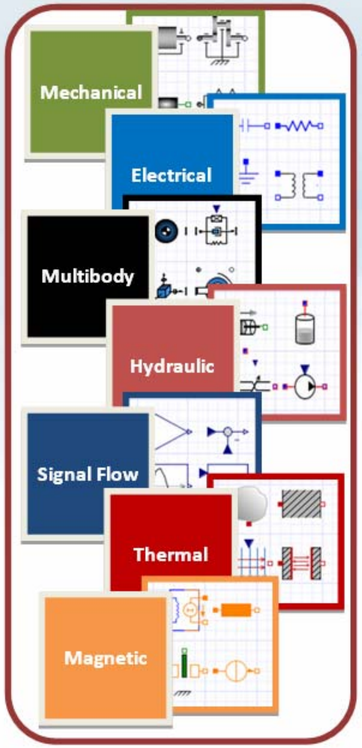
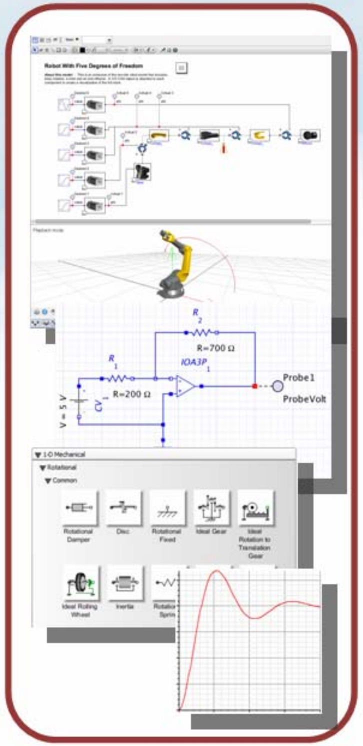
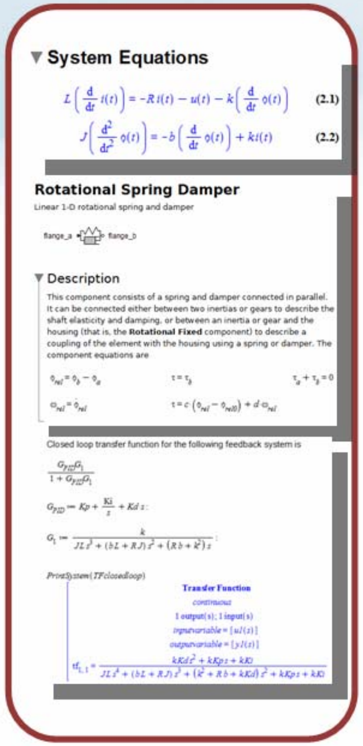
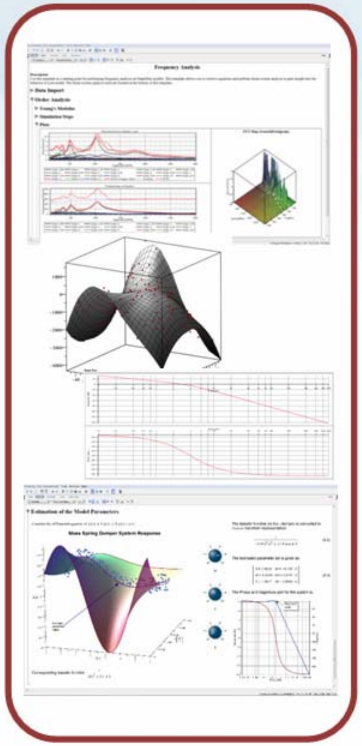
Exploring MapleSim – System Level Modeling

Multidomain Environment	Easy to Use Schematic Interface	Symbolic Representation	Optimization and Analysis









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Exploring MapleSim – System Level Modeling

Multidomain and multibody systems, plant modeling, control design – in one environment

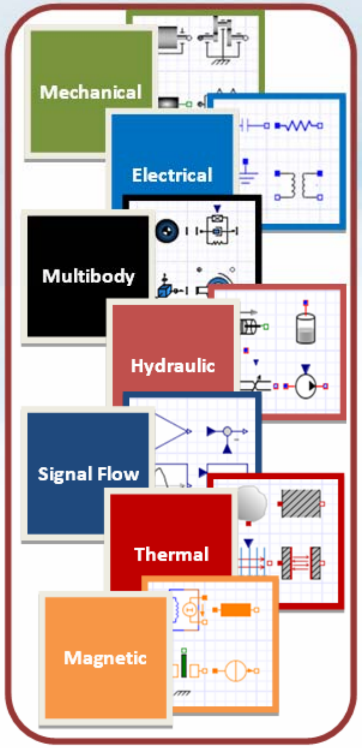
Easy to use, schematic diagram interface for rapid model development

Symbolic foundation provides highly concise, numerically efficient model formulation

Leverages the power of Maple for extensive optimization and analysis capabilities

Exploring MapleSim

Multidomain Environment



- Multidomain and multibody systems in one environment
- Enables introducing and exploring multidisciplinary concepts
- Build realistic designs
- Investigate system-level interactions

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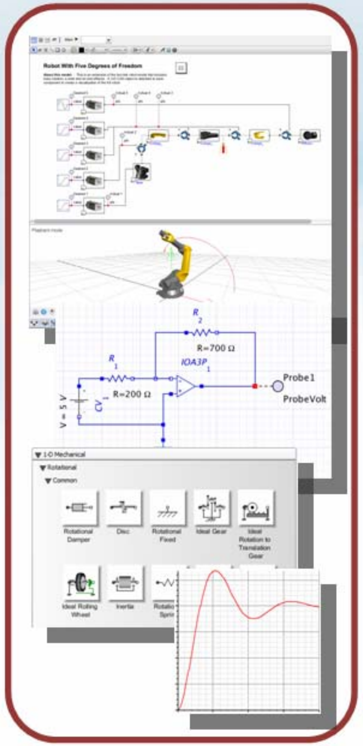
Exploring MapleSim

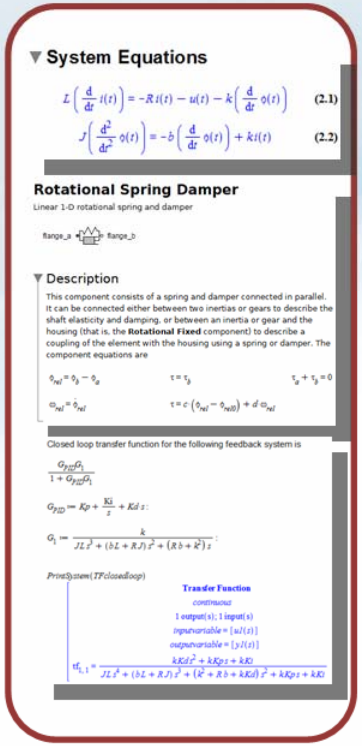
Easy to Use
Schematic Interface



- Schematic diagram interface
- Drag and drop elements – over 400 components available
- Connect physically meaningful elements, like motors and gears
- Provides rapid model development

Exploring MapleSim

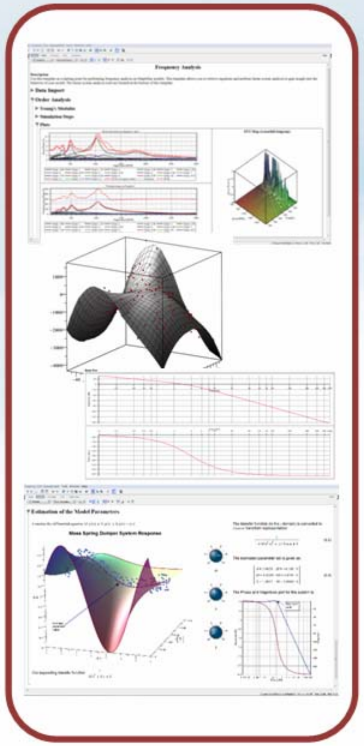
Symbolic Representation



- Based on symbolic foundation, which provides highly concise, numerically efficient model formulation
- Access to system equations
- Build custom components from mathematical equations

Exploring MapleSim

Optimization and Analysis



- Access to the power of Maple
- Optimization and analysis of design
- Demonstrate concepts such as parameter optimization, sensitivity analysis, and control design

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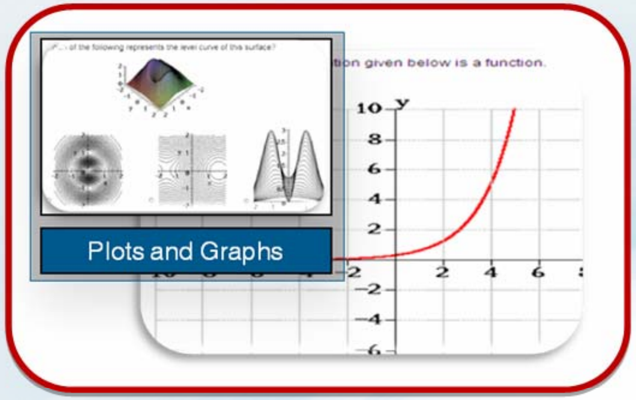
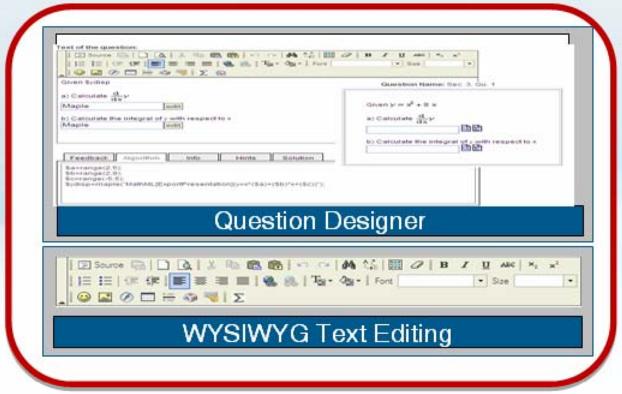
Exploring Maple T.A. – Testing and Assessment

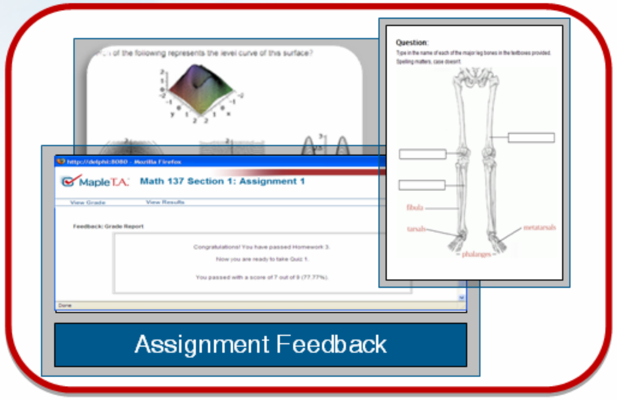
Access power of Maple



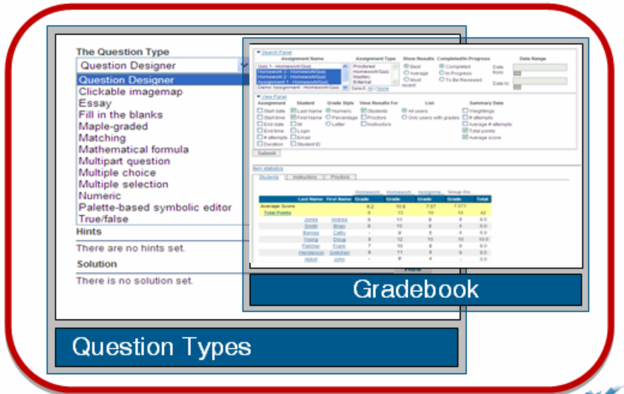
Intuitive authoring environment



Flexible assignments



Monitor students performance



Maple T.A. is an online testing and assessment system that is designed for any course that involves mathematics. It supports mathematical notation, plots, intelligent grading of free-response questions, and flexible algorithmic question generation.

Access power of Maple – you can use the power of Maple to create variables, plots, and grade student responses based on true mathematical equivalence

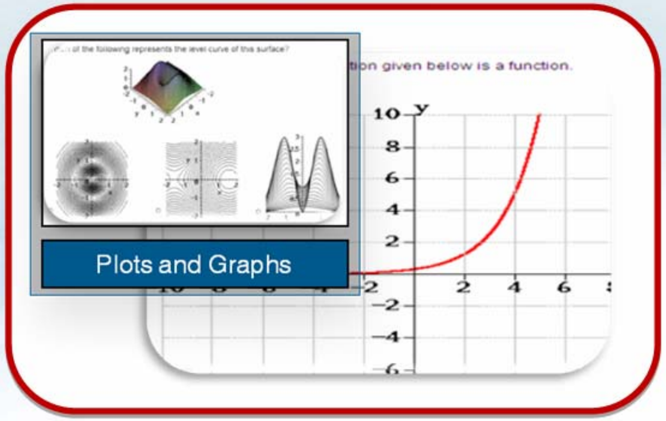
Intuitive authoring environment – not only does Maple T.A. provide all the question types available in standard testing systems (like multiple choice and fill-in-the-blank), but it also provides an authoring environment where you can build your own questions your way.

Flexible assignments – there are 5 distinct assignment types and you can provide feedback immediately, while the questions and concepts are fresh in students' minds.

Monitor student performance – the gradebook allows you to see the results of your class on an assignment basis, a question-by-question basis, or even a final mark based on weightings of specific assignments.

Exploring Maple T.A.

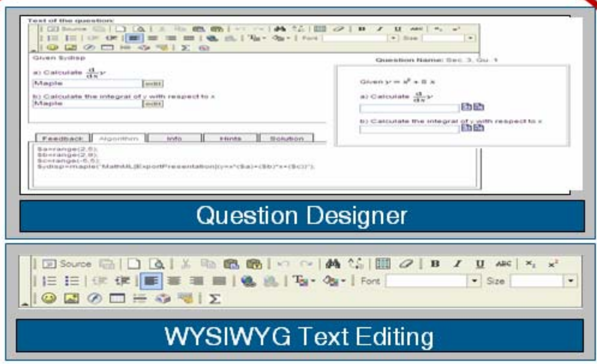
Access power of Maple



- Intelligent assessment of free-form responses and open-ended questions
- Mathematical notation
- Support for plots – 2D, 3D, and animations
- Algorithmic variable creation

Exploring Maple T.A.

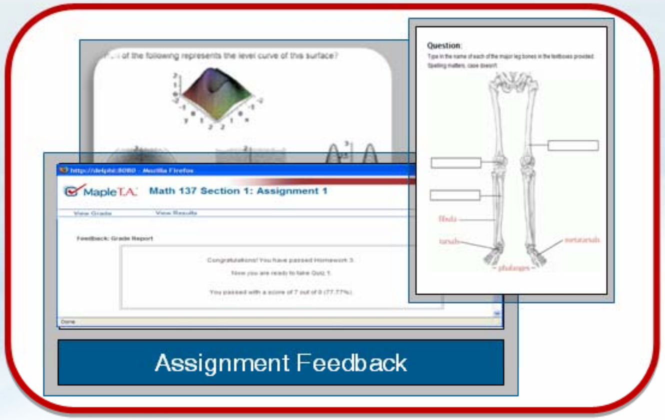
Intuitive authoring environment



- Variety of question types
- Include fonts, formatting, and images
- Algorithmic question capability
- Question sharing between instructors

Exploring Maple T.A.

Flexible assignments



- Assignment types for practice, homework, quizzes
- Customizable feedback options
- Question grouping
- Flexible scheduling
- Secure assessments

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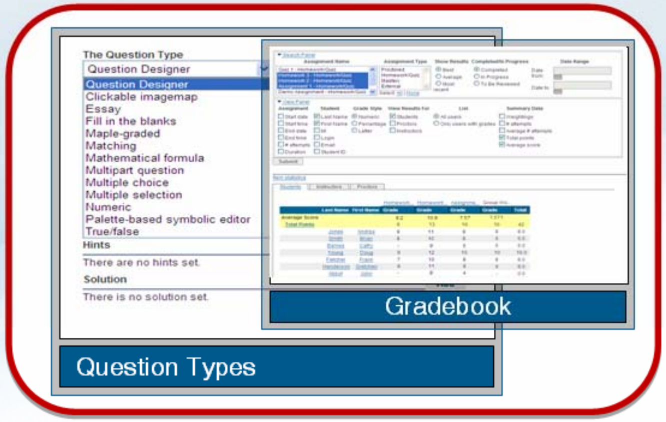
Exploring Maple T.A.

Monitor students performance



- Automatic grading and immediate feedback
- Access to individual results
- Analysis of results
- Report generation and export

Explore some of the academic user case studies on our website – various universities and schools around the world and how they are using our technology.

Benefits of Technology

- Create an engaging, interactive classroom environment
- Increase student comprehension
- Link education to real-world examples
- Deepen understanding and develop analysis skills
- Minimize preparation time
- Provide immediate feedback
- Facilitate learning

Conclusion

- Technical (or STEM) courses have unique challenges but there are effective tools and techniques to overcome them
- The Maplesoft experience integrates fundamental math, state-of-the-art physical modeling, and online testing and assessment

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A CYBERNET group company