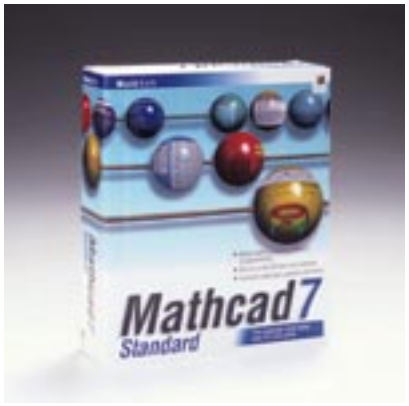
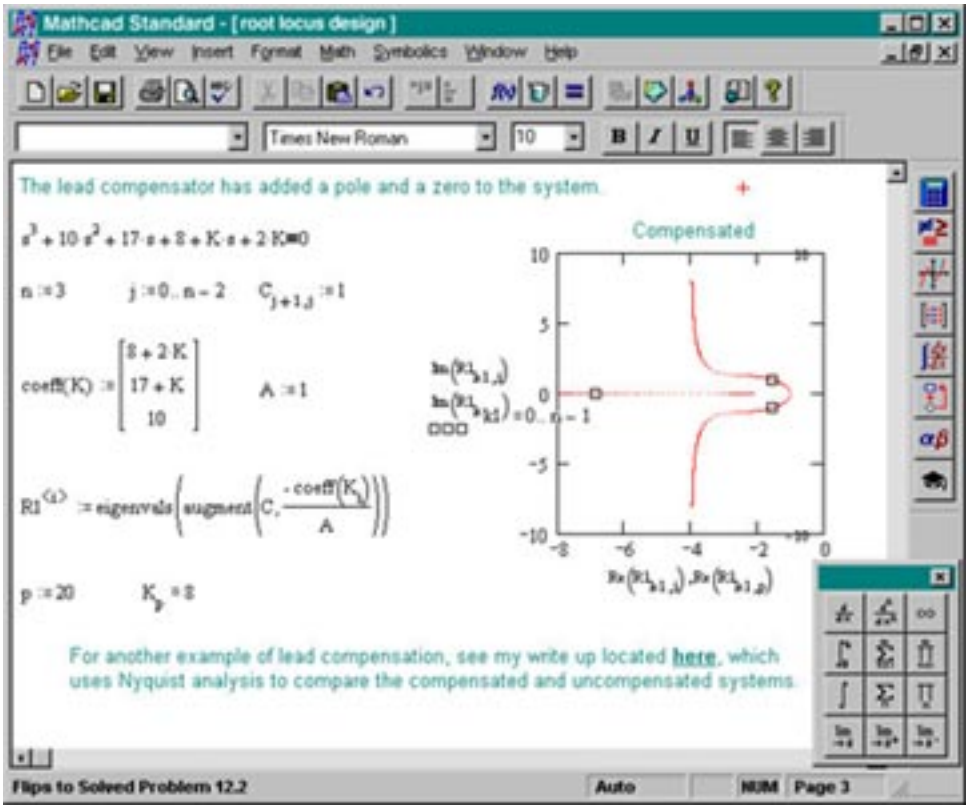
Mathcad ® 7 Standard



Platform: Windows 95/NT 3.51 or higher
Available for ground shipment

Mathcad 7 Standard gives you the power to zip through a wide range of everyday technical problems, from start to finish, all in one program. Its unique worksheet interface lets you enter equations - in real math notation - and build graphs wherever you want. And because it's live, you get instant feedback as you try different approaches. The new Windows 95/NT interface offers OLE 2 client and server support, drag-and-drop capabilities including in-place activation, insert object abilities and numerous data input/output filters. And, of course, you can annotate with text. Move data in and out of Mathcad quickly, with filters for common data file types, such as Excel, Lotus® 1-2-3, ASCII and more. Browse live math and HTML from within Mathcad using Microsoft® Internet Explorer (included FREE inside Mathcad 7) and collaborate with others on the Web or your LAN. You'll also get fast, easy access to the information you need, either in the Mathcad Resource Center or the over 250 QuickSheets. We've also included a new Mathcad overview, detailed tutorial and a two-part Treasury Guide. Mathcad 7 Standard is the perfect environment for hypothesis testing, prototyping, and exploring new problems and their solutions.

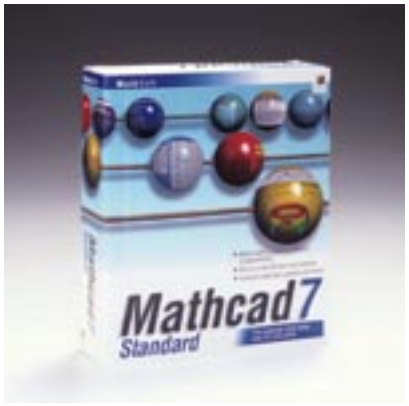
Features & Specs | Product Sample | Screen Shots | Back to Product List



Systems, like the feedback control system shown here in this root locus design, are perfectly suited for the Mathcad environment. The ability to view the input parameters, system equations, explanatory text, and system behavior plot all in a single live worksheet puts Mathcad ahead of the competition.

Mathcad 7 Standard includes broad math functionality, smart automatic unit conversion, improved usability extensive formatting and document preparation capabilities and innovative web integration. All this and more makes Mathcad 7 Standard the best-selling calculation software in the world.

Mathcad ® 7 Standard



FEATURES & SPECS (page 1 of 2)

Mathcad 7 Standard Full Feature Listing

Mathcad Standard has all functions you need for everyday technical calculations. Quickly apply them using the math palettes or keyboard.

BROAD Math Functionality

- Perform everything from basic calculations through derivatives and integrals
- Function set covers basic trigonometric, hyperbolic, exponential, and Bessel functions
- Use symbolic mathematics, to transform an expression into another expression and to generate more precise solutions. Symbolic calculations are live. Make a change, and Mathcad updates the symbolic result.
- Manipulate arrays and matrices. Find the trace, eigenvalues and eigenvectors of a matrix.
- General purpose solver for ordinary differential equations and systems of differential equations
- A wide range of statistical distributions to support hypothesis testing and data analysis
- Basic data smoothing techniques, and standard regression analysis tools for curve-fitting.
- Handle real, imaginary and complex numbers, and dimensional values

SMART Automatic Unit Conversion

- Automatically tracks & converts your units
- Complete SI unit system
- MKS, CGS, and U.S. customary units

And Mathcad is wired for today's desktop, integrating presentation and collaboration tools and the resources of the Internet into one dynamic workspace.

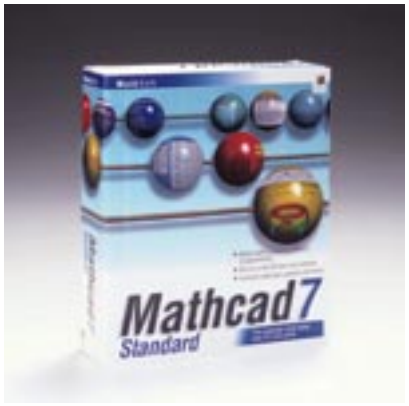
IMPROVED Usability

- New Windows NT & 95 user interface and conventions
- Easier equation entry and editing
- OLE 2 client and server support, providing in-place activation and inter-application drag-and-drop
- Right mouse button context menus
- Move data in and out of Mathcad quickly, with filters for common data file types, such as Excel files, ASCII and more

Product Sample
Screen Shots
Back to Product List

Mathcad® 7 Standard

FEATURES & SPECS (page 2 of 2)



EXTENSIVE Formatting & Document Preparation Capabilities

- Technical spell checker
- Document templates
- Style sheets
- Region formatting, including borders and shading
- Highlight equations, and include equations in text
- Page setup control and print preview

INNOVATIVE Web Integration

- Browse "live" math and HTML from within Mathcad seamlessly, using Microsoft™ Internet Explorer, (included for FREE inside)
- Define hyperlinks locally or to the Web
- MAPI-based E-mail support
- Join the Collaboratory™, a free Internet forum serving the worldwide Mathcad community

NEW Electronic Content & Guidance

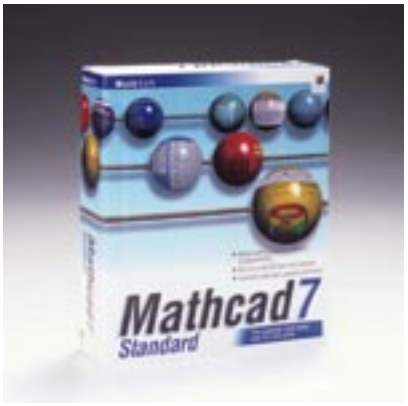
- 300 QuickSheets covering standard analyses and tasks
- Technical Reference Tables, such the standard table of physical constants and material properties
- Guides to Practical Statistics and Problem Solving in Mathcad
- Regularly-updated content through Mathcad's Web Link
- On-line help and context-sensitive help
- Tutorial
- Search-by-subject index
- Free individual technical support for registered users

INTELLIGENT Visualization Tools

- Use QuickPlot™ to instantly graph an expression
- Interactive 2D and 3D graphs, including X-Y, scatter, bar, polar, vector, contour, and parametric surface
- Trace & Zoom
- Animation
- Image viewing

Product Sample
Screen Shots
Back to Product List

Mathcad ® 7 Standard



SAMPLE PAGE (page 1 of 4)

A Physics Example with Mathcad 7

Find the escape velocity for a one-ton payload, that is, the smallest launch velocity at which a payload will escape from Earth's gravitational pull. We'll use the following constants:

Earth's Radius $r_e := 6.37814 \cdot 10^3 \cdot km$

Earth's Mass $M_e := 5.9742 \cdot 10^{24} \cdot kg$

Gravitational Constant $G := 6.672 \cdot 10^{-11} \cdot m^3 \cdot kg^{-1} \cdot sec^{-2}$

The work done in moving any mass m from the surface of Earth out to an infinite distance is

$$\int_{r_e}^{\infty} \frac{G \cdot M_e \cdot m}{r^2}\, dr$$

which yields

$$G \cdot M_e \cdot \frac{m}{r_e}$$

when we evaluate with **Mathcad's** symbolic processor.

We'll set this equal to the kinetic energy of our payload at launch

$$\frac{1}{2} \cdot m \cdot v^2 = G \cdot M_e \cdot \frac{m}{r_e}$$

and solve for v:

$$v := \sqrt{\frac{2 \cdot G \cdot M_e}{r_e}}$$

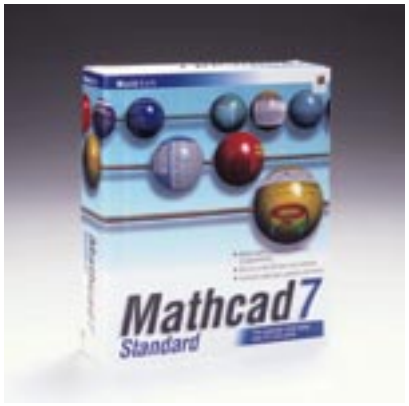
So

$$v = 11179.847 \cdot \frac{m}{sec}$$

or

$$v = 25008.606 \cdot \frac{mi}{hr}$$

or about 25000 miles per hour. Notice that the result is independent of the mass of the payload.



SAMPLE PAGE (page 2 of 4)

Escape velocities for other planets

Now we'll explore some escape velocities from other planets, using the formulas derived here. The data for planetary masses **M** and radii **R** used here (in the order Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto) are from the Mathcad Electronic Book ***Astronomical Formulas***.

Planetary Mass

$$M = \begin{bmatrix} 1.5\cdot10^{22} \\ 3.302\cdot10^{23} \\ 6.419\cdot10^{23} \\ 4.869\cdot10^{24} \\ 5.974\cdot10^{24} \\ 8.662\cdot10^{25} \\ 1.028\cdot10^{26} \\ 5.685\cdot10^{26} \\ 1.899\cdot10^{27} \end{bmatrix} \cdot kg$$

Equatorial Radius

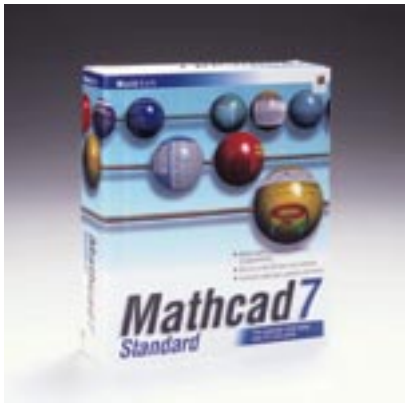
$$R = \begin{bmatrix} 1.151\cdot10^{6} \\ 2.44\cdot10^{6} \\ 3.397\cdot10^{6} \\ 6.052\cdot10^{6} \\ 6.378\cdot10^{6} \\ 2.556\cdot10^{7} \\ 2.476\cdot10^{7} \\ 6.027\cdot10^{7} \\ 7.149\cdot10^{7} \end{bmatrix} \cdot m$$

Escape velocities **V** are computed according to:

$$V_n := \sqrt{\frac{2\cdot G\cdot M_n}{R_n}}$$

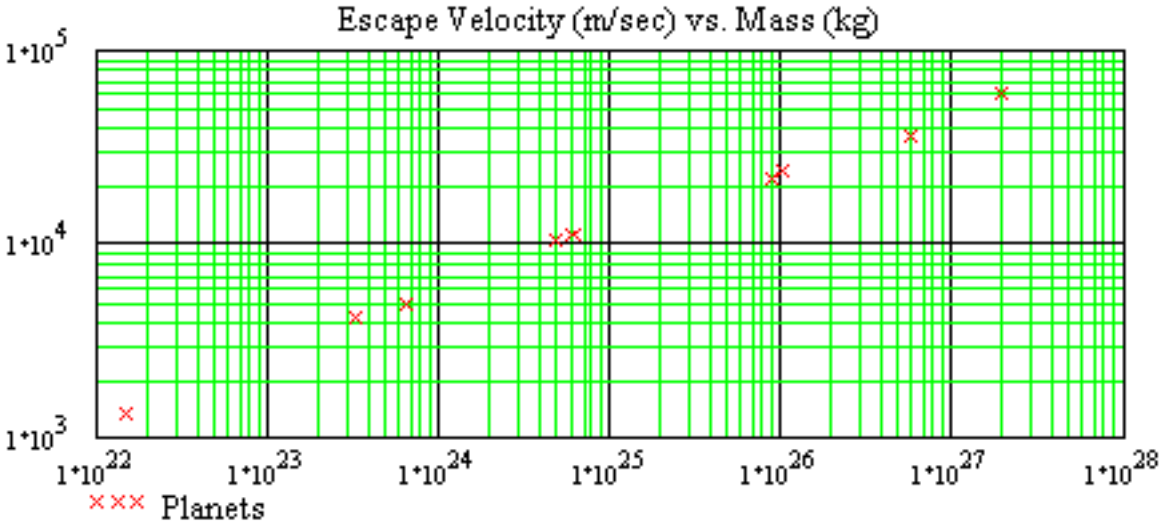
where **Mn** is the mass of planet **n** and **Rn** is its equatorial radius.

Mathcad ® 7 Standard



SAMPLE PAGE (page 3 of 4)

Below is a **log-log plot** of escape velocity vs. mass for the nine planets in our solar system.



The greatest escape velocity in our solar system is that from Jupiter,

$$\max(V) = 5.954 \cdot 10^4 \cdot \frac{m}{sec}$$

which is approximately

$$\frac{\max(V)}{v} = 5.325$$

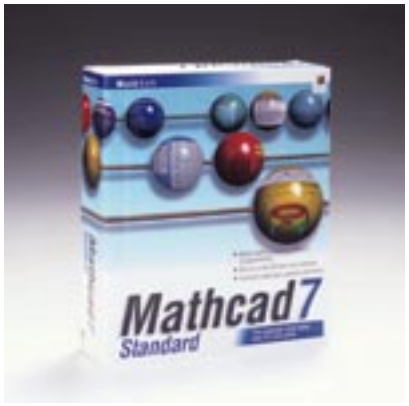
times greater than that from Earth.

The formula for escape velocity shows a linear relationship between the log of the escape velocity and the log of planetary mass. We'll fit the line for planets in our solar system by using **Mathcad's slope** and **intercept** functions. The fitting equation is of the form

$$\log(V) = C_0 + C_1 \cdot \log(M)$$

or alternatively

$$V = 10^{C_0} \cdot M^{C_1}$$



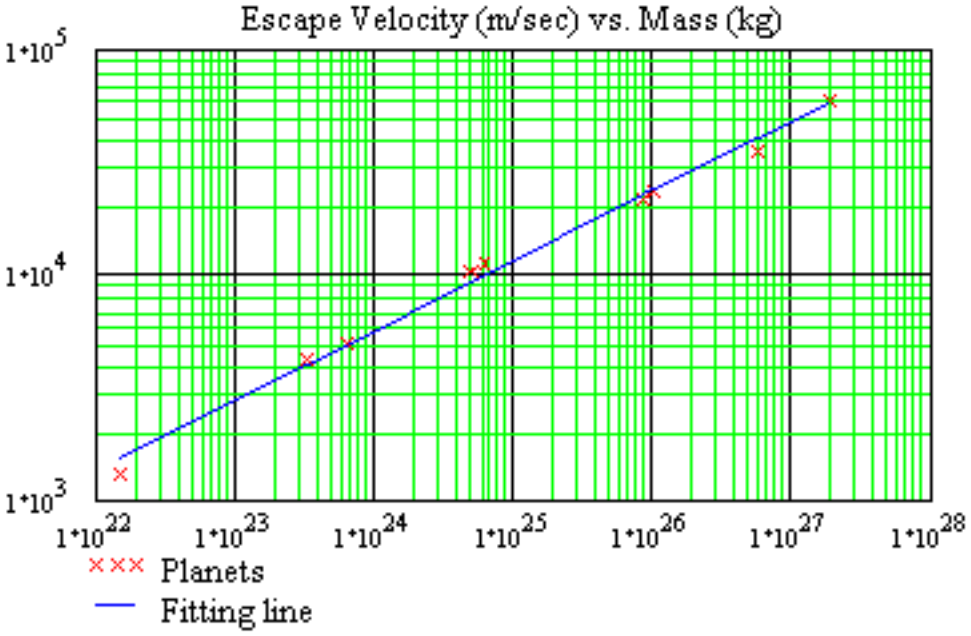
SAMPLE PAGE (page 4 of 4)

where C0 and C1 are constants. So

$$C_0 := \text{intercept}\left(\overrightarrow{\log\left(\frac{M}{kg}\right)}, \overrightarrow{\log\left(\frac{V}{m \cdot sec^{-1}}\right)}\right)$$

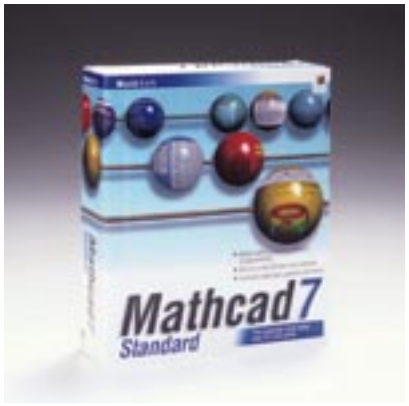
$$C_1 := \text{slope}\left(\overrightarrow{\log\left(\frac{M}{kg}\right)}, \overrightarrow{\log\left(\frac{V}{m \cdot sec^{-1}}\right)}\right)$$

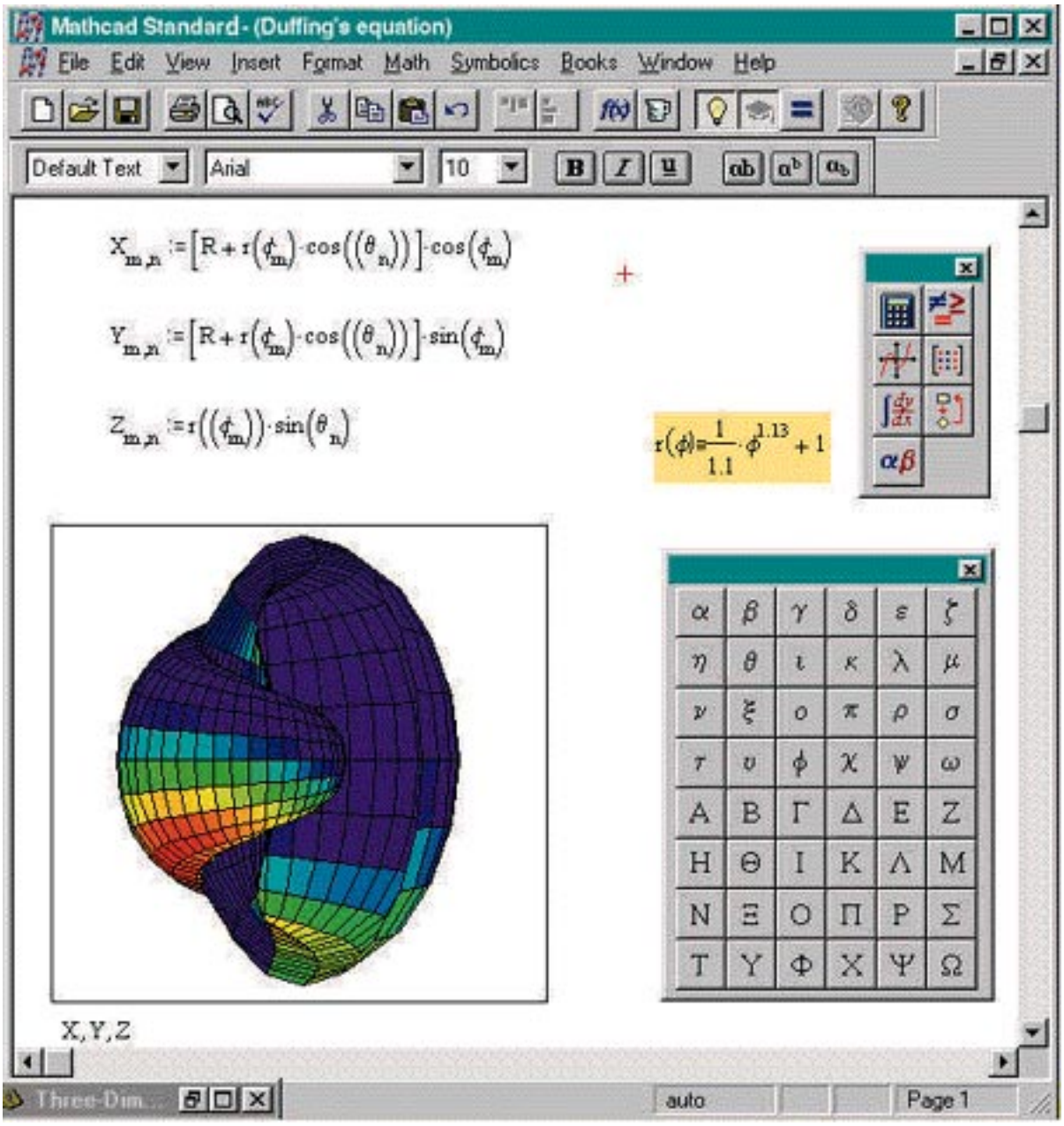
$$fit(x) := 10^{C_0} \cdot \left(\frac{x}{kg}\right)^{C_1}$$



Mathcad ® 7 Standard

SCREEN SHOTS (page 1 of 2)





Whether you are illustrating solutions or phase plots of differential equations, or visualizing surfaces of rotation about an axis, Mathcad is the perfect application. Make a change to an input parameter and watch the effect of your change instantly as Mathcad updates the entire worksheet automatically.

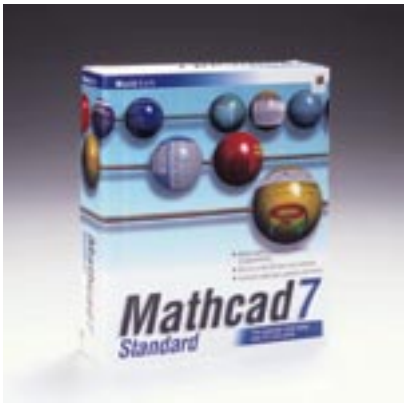
Features & Specs

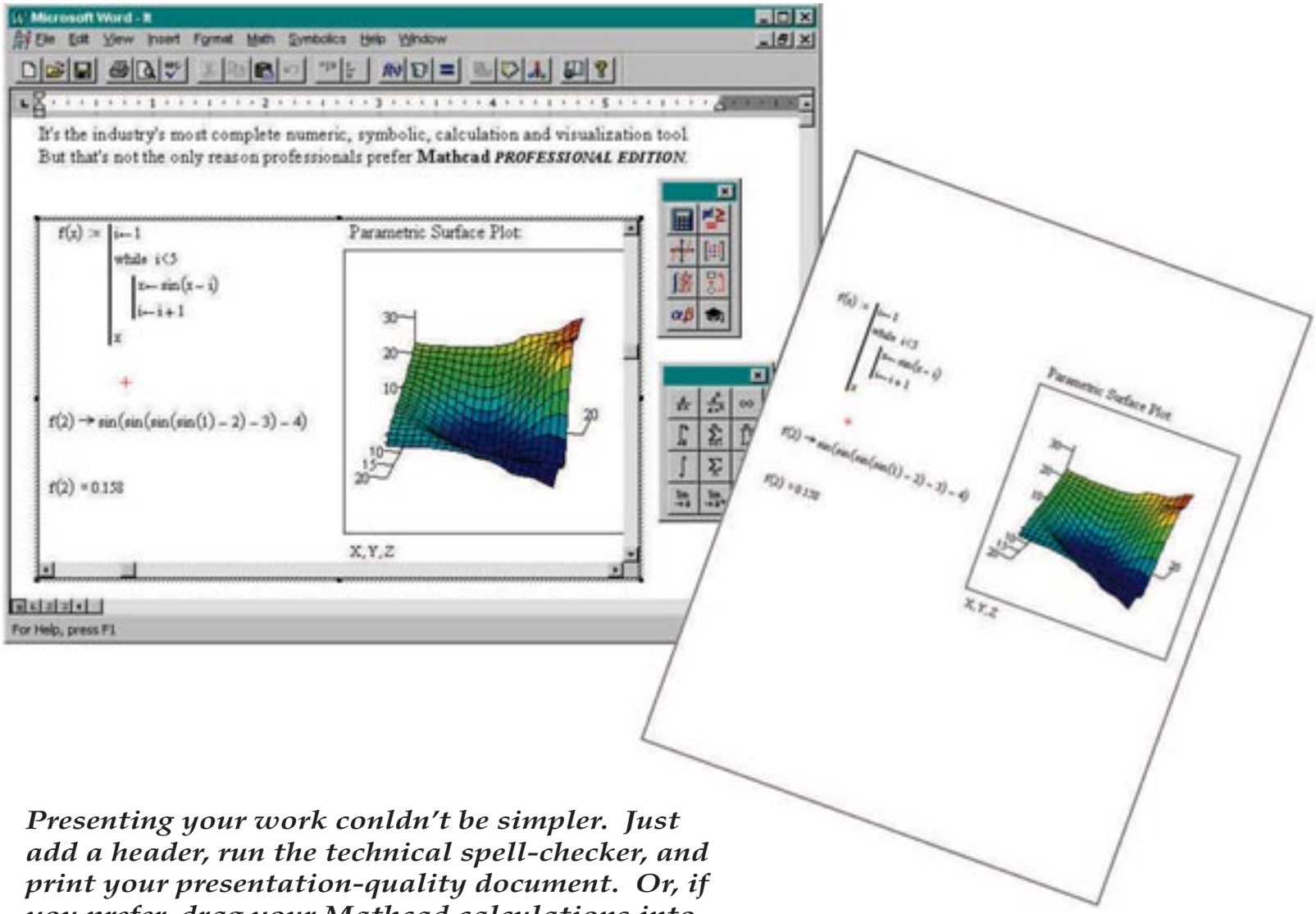
Product Sample

Back to Product List

Mathcad ® 7 Standard

SCREEN SHOTS (page 2 of 2)





Presenting your work conldn't be simpler. Just add a header, run the technical spell-checker, and print your presentation-quality document. Or, if you prefer, drag your Mathcad calculations into Microsoft Word or any other OLE2 application.

Features & Specs

Product Sample

Back to Product List