About Mathcad and its Electronic Books

Mathcad Electronic Books, together with either <u>Mathcad</u> or <u>Mathcad PLUS</u>, provide the ideal environment for illustrating and experimenting with technical or mathematical concepts because:

- All text, equations, graphs, and diagrams that you're working with appear together on a page, just as they would in a printed book.

- But unlike a printed book, you can modify all the mathematical expressions and graphs.

- And unlike a printed book, each page is "<u>live</u>."

- Since you'll work only with familiar math notation, you'll never need to know anything about programming languages to fully utilize the power of Mathcad.

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What's a "live" document?

In a page full of math, equations and results are related. If you change an equation, you have to change the result. Otherwise the whole thing is just wrong.

On a printed page, you'll have to laboriously recalculate everything that changed. On many software packages that supposedly let you type equations, it'll be even worse-you'll have to recalculate and then figure out how to rebuild your equation using obscure instructions and cryptic codes.

But in a Mathcad Electronic Book, each page is *live*. When you make a change, all you do is sit back and watch the changes percolate throughout your work. Mathcad finds everything else that needs to change and recalculates for you.

Nothing drives home technical concepts more than experimenting: changing a mass here, or an inductance there and seeing what happens. And nothing encourages experiment more than Mathcad. That's why Mathcad Electronic Books are the medium of choice for communicating technical information.

About Mathcad

Mathcad is a general purpose technical calculation software package for performing numeric and symbolic calculations documenting the results. It offers a broad base of technical professionals, educators, and students an easy-to-use alternative to calculators, spreadsheets and programming languages.

Mathcad lets you dispense with the burdensome mechanics of calculation, so you can explore and experiment free from the tedium of rote calculation.

MathSoft's proprietary Live Document Interface makes it possible to work with computers the way you would on a electronic whiteboard - but with the added advantage of automatic calculation. MathSoft also provides an extensive selection of Electronic Books that work with Mathcad, giving users instant access to a wealth of on-line technical literature.

Key features of Mathcad include:

- Live document interface

- WYSIWYG

- Windows-based Document Preparation

- Spell-Checker

- On-Line Learning Tools

- Graphics Power

- Animation

- Numeric Calculation Power

- Statistical Analysis Features

- Communication Power

- Symbolic Calculations

- DDE and OLE Live Links

About Mathcad PLUS

Mathcad PLUS is an enhanced version of <u>Mathcad</u> designed for people who need advanced math functionality. In addition to all of the features of Mathcad, Mathcad PLUS includes:

- <u>Differential equation solvers</u>

- <u>Advanced matrix functions</u>

- <u>Advanced symbolic features</u>

- <u>Advanced numerical calculation features</u>

- <u>Programmability</u>

- Ability to integrate user-defined functions using a <u>C or C++ programming interface</u>

Differential Equations

Mathcad PLUS's thirteen numeric differential equation solvers provide the functionality and power to solve ordinary and partial differential equations.

Advanced Numeric Calculations

There's a 2-D non-linear curve data fitter that picks the best-fitting function from a family of user-specified functions. For signal processing, the new PLUS edition includes a wavelet transform and its inverse, great for filtering and data compression.

Advanced Symbolics

Solve systems of equations symbolically. The solutions are *live* - you can change any equation and Mathcad PLUS automatically recalculates the answer, symbolically.

You also get three symbolic limit operators to compute bi-directional, right-handed or left- handed limits.

Take a trip to the frequency domain and back with Mathcad's six new transforms and their inverses. Choose from Laplace, Fourier, or *z*-transforms.

New Matrix Analysis Functions

Nearly two dozen new matrix algebra functions (such as singular value decomposition and generalized eigenvalues) provide you with a complete environment for matrix analysis.

C, C++ Programming Interface

Write your own routines in C or C++ and use them while you're using Mathcad. Mathcad PLUS will load DLL (Dynamic Link Library) files so you can customize it using your own 32-bit C or C++ compiler.

MathSoft also offers discipline-specific Function Packs in the areas of signal processing, data analysis, statistics, and graphics. These collections of fully tested external functions let you extend your mathematical toolkit into more specialized areas.

WYSIWYG interface

Enter and edit text or working math anywhere in your Mathcad worksheet as you would with a pencil and paper. When you print, Mathcad's text, equations and graphs look the same way they would on the screen.

Windows document preparation

Preview your Mathcad document page by page. Add headers and footers. Include page numbers. Typeset text and math in a variety of fonts.

Spell checking

Our Technical Spell Checker includes hundreds of technical math terms. You'll never again have to teach your spell-checker common math terms like *ln* or *sin* and *cos*.

On-line learning tools
These include:

- QuickSheets™, an instructive collection of Mathcad templates for performing common mathematical tasks.

- An extensive, context-sensitive help system.

- An Electronic Book using the Mathcad interface itself to demonstrate Mathcad's features.

Graphing

You'll be able to:

- Create **Cartesian** (*x-y*) and **polar** graphs with log or linear axes with a variety of line types and colors, legend labels and plot titles.

- **Zoom** in to selected areas for a close look or read points directly off the plots with a moving crosshair.

- Create **contour** plots with color or gray scaled levels.

- Create **surface plots**, **3D bar charts**, **scatter plots** and **vector field plots** of matrices, functions or solid surfaces.

- Freely **rotate** and **scale** 3D plots of all kinds.

Numeric calculation features

Almost anything you can do with math you can do in Mathcad.

- There's a full range of **operators**, including single and multiple integrals, derivatives, and summations. And with Mathcad PLUS, any operators that aren't there, you can just define yourself.

- There's a broad collection of **built-in functions** including statistical functions, trig and inverse trig, hyperbolic functions, Bessel functions, and functions for taking FFTs. And any functions that aren't there, you can just define yourself.

- There are three built-in sets of **units**. Work in any system of units. Mathcad lets you freely convert from one unit to another, performing dimension checking in the background as it does so.

- Support for **vectors and matrices** makes it easy to perform linear algebra calculations, process statistical or other data, or extract eigenvalues and eigenvectors.

Symbolic features

Simplify equations, factor and expand expressions, or perform symbolic integration and differentiation by choosing an appropriate command of the menu. Mathcad automatically keeps track of the derivation as you proceed, so you'll always have a complete step-by-step record of your work.

OLE and DDE

Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE) compatibility together with a uniquely flexible interface make Mathcad the perfect tool for easily linking together documents from other Windows applications.

Animation

Mathcad lets you create and playback Windows AVI files so you can view dynamically changing plots, equations, or anything else in your worksheet.

Communication

Mathcad enables you to:

- Open a Mathcad worksheeet stored anywhere on the Internet.

- Mail a Mathcad worksheeet without leaving Mathcad. (Requires a mail system compatible with MS-Mail™ or cc:Mail™).

- Store and retrieve Mathcad worksheets directly from a Notes™ database without leaving Mathcad.

Statistical features

- Cumulative probability distributions, density functions, and random number generators for eight of the most commonly used probability distributions (Sixteen for Mathcad PLUS).

- Data smoothing.

- Linear and non-linear regression.

Programmability

Mathcad PLUS lets you create programs containing control structures such as conditional branching, "for" loops and "while" loops, and recursive function definition.