

Getting Started Guide

Mathcad 15.0

June 2010

DOC-GU60528-EN-150



Copyright © 2010 Parametric Technology Corporation and/or Its Subsidiary Companies. All Rights Reserved.

User and training guides and related documentation from Parametric Technology Corporation and its subsidiary companies (collectively "PTC") are subject to the copyright laws of the United States and other countries and are provided under a license agreement that restricts copying, disclosure, and use of such documentation. PTC hereby grants to the licensed software user the right to make copies in printed form of this documentation if provided on software media, but only for internal/personal use and in accordance with the license agreement under which the applicable software is licensed. Any copy made shall include the PTC copyright notice and any other proprietary notice provided by PTC. Training materials may not be copied without the express written consent of PTC. This documentation may not be disclosed, transferred, modified, or reduced to any form, including electronic media, or transmitted or made publicly available by any means without the prior written consent of PTC and no authorization is granted to make copies for such purposes.

Information described herein is furnished for general information only, is subject to change without notice, and should not be construed as a warranty or commitment by PTC. PTC assumes no responsibility or liability for any errors or inaccuracies that may appear in this document.

The software described in this document is provided under written license agreement, contains valuable trade secrets and proprietary information, and is protected by the copyright laws of the United States and other countries. It may not be copied or distributed in any form or medium, disclosed to third parties, or used in any manner not provided for in the software licenses agreement except with written prior approval from PTC.

UNAUTHORIZED USE OF SOFTWARE OR ITS DOCUMENTATION CAN RESULT IN CIVIL DAMAGES AND CRIMINAL PROSECUTION. PTC regards software piracy as the crime it is, and we view offenders accordingly. We do not tolerate the piracy of PTC software products, and we pursue (both civilly and criminally) those who do so using all legal means available, including public and private surveillance resources. As part of these efforts, PTC uses data monitoring and scouring technologies to obtain and transmit data on users of illegal copies of our software. This data collection is not performed on users of legally licensed software from PTC and its authorized distributors. If you are using an illegal copy of our software and do not consent to the collection and transmission of such data (including to the United States), cease using the illegal version, and contact PTC to obtain a legally licensed copy.

Important Copyright, Trademark, Patent, Licensing, and Data Collection Information:

- For Windchill products, select About Windchill at the bottom of the product page.
- For CADD5, click the "i" button on the main menu.
- For InterComm products, on the Help main page, click the link for **Copyright**.
- For other products, click **Help > About** on the main menu of the product.

- For products with an Application button, click the button and then navigate to the product information.

UNITED STATES GOVERNMENT RESTRICTED RIGHTS LEGEND

This document and the software described herein are Commercial Computer Documentation and Software, pursuant to FAR 12.212(a)-(b) (OCT'95) or DFARS 227.7202-1(a) and 227.7202-3(a) (JUN'95), and are provided to the US Government under a limited commercial license only. For procurements predating the above clauses, use, duplication, or disclosure by the Government is subject to the restrictions set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software Clause at DFARS 252.227-7013 (OCT'88) or Commercial Computer Software-Restricted Rights at FAR 52.227-19(c)(1)-(2) (JUN'87), as applicable. 01012010

Parametric Technology Corporation, 140 Kendrick Street, Needham, MA 02494 USA

Contents

About This Guide	1
Other Documentation	1
Other Resources	1
1: Welcome to Mathcad	3
What Is Mathcad?	3
System Requirements	5
Installation	5
2: Getting Started with Mathcad	7
The Mathcad Workspace	7
Regions	9
A Simple Calculation	10
Definitions and Variables	11
Graphs	14
Saving, Printing, and Exiting	16
3: Online Resources	19
Mathcad Resources	19
User Forums	25
Other Resources	26

About This Guide

The *Getting Started Guide* introduces you to Mathcad and what is unique about working in its environment. Use this guide as the first step and a road map to the extensive documentation and resources that exist for Mathcad.

Other Documentation

The following other sources of information may prove helpful as you use Mathcad. You can find these resources in the Mathcad Resources Window under the **Help** menu:

- *Tutorials*: Introductory material on Mathcad including basic primers and in-depth tutorials.
- *QuickSheets*: Sample Mathcad worksheets that you can revise for your own use.
- *Mathcad User's Guide*: A more complete overview of features available in Mathcad in PDF form.
- *Online Help*: The most extensive information about Mathcad with links to live Mathcad worksheets. The *Author's Reference* demonstrates how to create distributable content as Mathcad E-books or Web pages. The *Developer's Reference* shows you how to create Mathcad DLLs and components.

Other Resources

Here are some other resources for learning about Mathcad:

- Mathcad User Forums where experienced users aid and support other users:

<http://www.ptc.com/go/mathsoft/collab/>

<http://community.ptc.com/community/mathcad>

- E-books and user articles you can download from the Web site:
<http://www.ptc.com/appserver/mkt/products/resource/mathcad.jsp>
- Updates to the documentation available from the References Document section of the PTC Web site.

Technical Support

Contact PTC Technical Support if you encounter problems using the software. Contact information for PTC Technical Support is available on the PTC Customer Support Site:

<http://www.ptc.com/support/>

You must have a Service Contract Number (SCN) to receive technical support. If you do not have an SCN, contact PTC using the instructions found in the *PTC Customer Service Guide* under “Technical Support”:

http://www.ptc.com/support/cs_guide/cs_guide.pdf

Comments

We welcome your suggestions and comments on our documentation. Please submit your feedback to:

mathcad-documentation@ptc.com

When you submit feedback, remember to include the release number and name of the documentation piece with your comments.

Chapter 1

Welcome to Mathcad

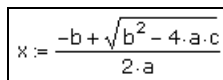
- ◆ What Is Mathcad?
- ◆ System Requirements
- ◆ Installation

What Is Mathcad?

Mathcad is the industry standard technical calculation tool for engineers worldwide. Mathcad delivers all the solving capabilities, functionality, and robustness needed for calculation, data manipulation, and engineering design work. Calculation standardization and reuse through Mathcad ensures standards compliance. By combining calculations, graphs, text, and images in one document, Mathcad enables knowledge capture and publication that aid management of large projects.

Mathcad allows you to document your calculations in the language of mathematics, because Mathcad combines a powerful computational engine, accessed through conventional math notation, with a full-featured word processor and graphing tools.

You can type equations as you're used to seeing them on paper. Simply type in your equations, then see them display


$$x := \frac{-b + \sqrt{b^2 - 4 \cdot a \cdot c}}{2 \cdot a}$$

with an instant result, along with as much text as you want to accompany the math. Mathcad makes it easy to communicate the rationale and assumptions behind your calculations enabling design quality assurance.

You can use Mathcad equations to solve both symbolical and numerical equations. You can place text anywhere on the worksheet and add two- and three-dimensional graphs to the page. You can even illustrate your work with images taken from another application. Mathcad takes full advantage of

Microsoft's OLE 2 object linking and embedding standard to work with other applications, supporting drag and drop and in-place activation as both client and server.

Mathcad lets you easily mix and convert between unit systems, catching unit mistakes by checking your worksheets for dimensional consistency. You can work in your preferred unit system or switch to another system for a particular set of equations.

Visit online Help, the *Programming* tutorial, and the *Developer's Reference* to learn how to program in Mathcad. You can also download *Inside Mathcad: Programming* from:

<http://www.ptc.com/appserver/mkt/products/resource/mathcad.jsp>

Mathcad provides online *Tutorials*; *QuickSheets* of working examples of Mathcad functions and applications; and *Reference Tables* with math, science, and engineering formulas. These live worksheets are found under the **Help** menu or from the **Resources** toolbar. Online Help includes the *Author's Reference and Developer's Reference* for more advanced usage.

Mathcad simplifies and streamlines documentation, critical to communicating and to meeting business and quality assurance standards. By combining equations, text, and graphics in a single worksheet, Mathcad makes it easy to keep track of the most complex calculations. By saving your worksheets in XML format, you can reuse the information in other text-based systems or search and report on worksheets without needing to reopen them in Mathcad.

System Requirements

To run Mathcad 15, the following are recommended or required:

Hardware

- Pentium-compatible 32-bit (x86) or 64-bit (x86-64, EM64T) processor, 400 MHz or higher; 700+ MHz recommended
- 256 MB of RAM; 512 MB or more recommended
- 1.1 GB of hard disk space (350 MB for Mathcad, 750 MB temporary space during installation)
- CD-ROM or DVD drive (for CD installation only)
- SVGA or higher graphics card and monitor
- Keyboard and mouse or compatible pointing device

Software

- Windows XP Home or Professional Edition, Windows XP Professional x64 Edition, Windows Vista, or Windows 7; Windows XP SP3, XP-x64 SP3, Vista, or Windows 7 recommended
- Windows Installer 3.0 or later
- Microsoft .NET Framework[®] 3.5 or later
- MSXML 4.0 SP2 Parser and SDK (this exact version of MSXML is required)
- Microsoft Data Access Components (MDAC) 2.8 or later

Internet Explorer 5.0 and Adobe Reader 5.0 or later are required for full functionality of the Help system.

Installation

Refer to the *Mathcad 15.0 Administrator's Guide* for complete installation instructions.

Chapter 2

Getting Started with Mathcad

- ◆ The Mathcad Workspace
- ◆ Regions
- ◆ A Simple Calculation
- ◆ Definitions and Variables
- ◆ Graphs
- ◆ Saving, Printing, and Exiting

The Mathcad Workspace

When you start Mathcad, you see a window like that shown in Figure 2-1.

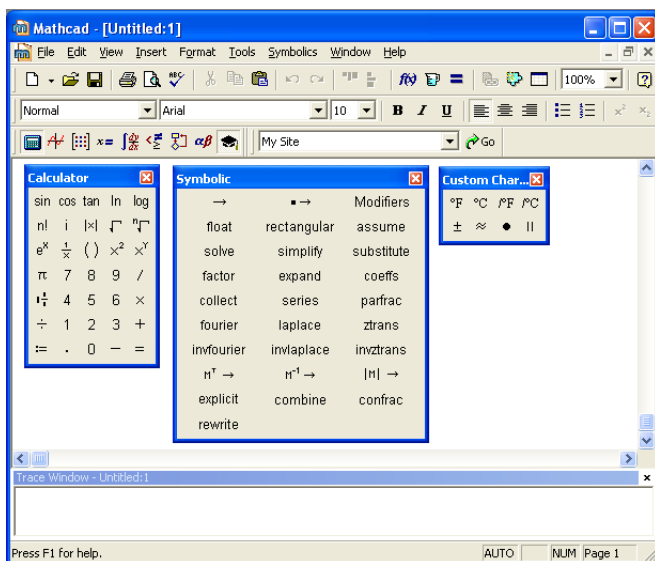


Figure 2-1: Mathcad with various toolbars displayed.

Each button in the **Math** toolbar opens another toolbar of operators or symbols. You can insert many operators, Greek letters, and plots by clicking these buttons.

Button Toolbar



Calculator: Arithmetic operators.



Graph: Two- and three-dimensional plot types and graph tools.



Matrix: Matrix and vector operators.



Evaluation: Equal signs for evaluation and definition.



Calculus: Derivatives, integrals, limits, and iterated sums and products.



Boolean: Comparative and logical operators for Boolean expression.



Programming: Programming constructs.



Greek: Greek letters.



Symbolic: Symbolic keywords and modifiers.

The **Standard** toolbar provides quick access to many menu commands.



The **Formatting** toolbar contains scrolling lists and buttons to specify font characteristics for both equations and text.



Tip To learn what a button on any toolbar does, hover the mouse over the button until a tooltip appears with a brief description.

You can choose to show or hide each toolbar from the **View** menu. To detach and drag a toolbar around your window, place your cursor on the edge of the toolbar. Then hold down the mouse button and drag. You can also click on the blue title bar and drag.

Tip You can customize the **Standard** and **Formatting** toolbars. To add and remove buttons, right-click on the toolbar and choose **Customize** from the menu.


Working with Worksheets

When you start Mathcad, you open a Mathcad *worksheet*. You can have as many worksheets open as your available system resources allow.

If you are working with a longer worksheet, use **Go to Page** from the **Edit** menu to move quickly through the worksheet.

Regions

Mathcad lets you enter equations, text, and plots anywhere in the worksheet. Each equation, piece of text, or other element is a *region*. A Mathcad worksheet is a collection of such regions. To start a new region in Mathcad:

1. Click anywhere in a blank area of the worksheet. You see a small crosshair. Anything you type appears at the crosshair. 
2. If the region you want to create is a math region, just start typing anywhere you put the crosshair. By default Mathcad understands what you type as mathematics. See “A Simple Calculation” below for an example.
3. To create a text region, choose **Text Region** from the **Insert** menu or simply press [“] and then start typing. See Chapter 6 in the online *User’s Guide* or the Tutorials under the **Help** menu for a complete description.

Tip To add a border around a region or regions, select the region(s), then right-click and choose **Properties** from the menu. Click on the Display tab and check the box next to “Show Border.”

A Simple Calculation

Although Mathcad can perform sophisticated mathematics, you can easily use it as a simple calculator. To try your first calculation, follow these steps:

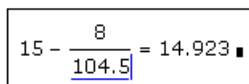
1. Click in the worksheet. You see a small crosshair.

+

2. Type **15-8/104.5=**. When you type the equal sign or click



on the **Calculator** toolbar, Mathcad computes the result.


$$15 - \frac{8}{104.5} = 14.923$$

This calculation demonstrates the way Mathcad works:

- Mathcad sizes fraction bars, brackets, and other symbols to display equations the same way you might see them in a book.
- Mathcad understands which operation to perform first. Mathcad knew to perform the division before the subtraction and displayed the equation accordingly.
- As soon as you type the equal sign, Mathcad returns the result. Mathcad processes each equation as you enter it.
- As you type each operator (in this case, – and /), Mathcad shows a small black rectangle called a *placeholder*. Placeholders hold spaces open for numbers or expressions not yet typed. If you click at the end of an equation, you see a placeholder for units and unit conversions.

Once an equation is on the screen, you can edit it by clicking in it and typing new letters, numbers, or operators. You can enter many operators and Greek letters by using the math toolbars.


See the online *User's Guide* in the Resources window and the *Tutorials* under the **Help** menu to learn how to edit Mathcad equations.

Definitions and Variables

Mathcad's power and versatility quickly become apparent once you begin to use *variables* and *functions*. By defining variables and functions, you can link equations together and use intermediate results in further calculations.

Defining Variables

These steps show you how to define a variable:

1. Type the variable name.
2. Type the colon key [:] or click  on the **Calculator** toolbar to insert the definition symbol.
3. Type the value to be assigned to the variable. The value can be a single number or a more complicated combination of numbers and previously defined variables.

If you make a mistake, click on the equation and press [**Space**] until the entire expression is between the two blue editing lines. Then delete it by choosing **Cut** from the **Edit** menu, [**Ctrl**] **X**. Or use Mathcad's **Undo**, [**Ctrl**] **Z**, command from the **Edit** menu to step back through the equation.

Variables in Mathcad worksheets are defined from top to bottom and left to right on a page. Once you have defined a variable like *t*, you can compute with it anywhere *below and to the right* of the definition.

Now enter another definition:

1. Press **[Enter]**. This moves the crosshair below the first definition.
 $t := 10$
 $acc := -9.8$
2. To define acc as -9.8 , type: **acc: -9.8.** +

Calculating Results

Now that the variables acc and t are defined, you can use them in other expressions:

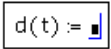
1. Click the mouse below the two definitions.
 $t := 10$
 $acc := -9.8$
2. Type **acc/2[Space]*t^2.**
3. Press the equal sign [=].
 $\frac{acc}{2} \cdot t^2 = -490$

This equation calculates the distance traveled by a falling body in time t with acceleration acc . When you press the equal sign [=], Mathcad returns the result.

Mathcad updates results as soon as you make changes. For example, if you click on the 10 on your screen and change it to another number, Mathcad changes the result as soon as you press **[Enter]** or click outside of the equation.

Defining a Function

To add a function definition to your worksheet:

1. First define the function $d(t)$ by typing: **d(t) :** 
2. Complete the definition by typing this expression:
1600+acc/2[Space]*t^2[Enter]
 $d(t) := 1600 + \frac{acc}{2} \cdot t^2$

The definition you just typed defines a function. The function name is d , and the argument of the function is t .

You can use this function to evaluate the expression for different values of t . To do so, simply replace t with an appropriate number. For example:

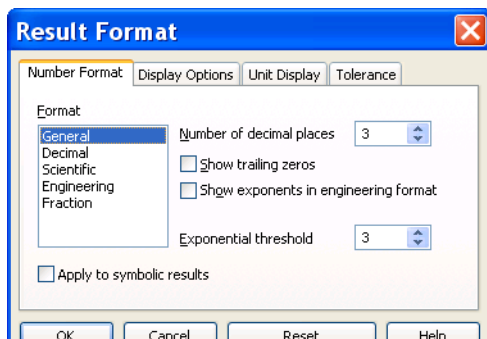
To evaluate the function at a particular value, such as 3.5, type **d(3.5)=**. $d(3.5) = 1.54 \times 10^3$
Mathcad returns the correct value as shown.

Formatting a Result

You can set the display format for any number that Mathcad calculates and displays.

In the example above, the result is in exponential notation. Here's how to change the result so it is displayed differently:

1. Click in the result.
2. Choose **Result** from the **Format** menu to open the Result Format dialog box. These dialog settings affect how results are displayed, including the number of decimal places, the use of exponential notation and trailing zeros, and so on.



3. The default format scheme is “General” with “Exponential Threshold” set to 3. Only numbers greater than or equal to 10^3 are displayed in exponential notation. Click the arrows to the right of the 3 to increase the Exponential Threshold to 6.

4. After you click “OK,” the number changes to reflect the new result format. (See Chapter 8 in the *User’s Guide* for more information.)

$$d(3.5) = 1539.975$$

Note When you format a result, only the display of the result is affected. Mathcad maintains full precision internally (up to 17 digits).

Graphs


Mathcad provides a variety of two-dimensional X-Y and polar graphs plus three-dimensional contour, scatter, and surface plots. This section describes how to create a simple two-dimensional graph showing the points calculated in the previous section.

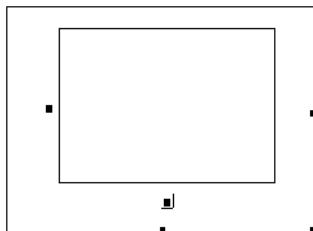
First delete the value of t in your worksheet. Since you have defined t as a single number, you can not use it as a range of numbers in a graph. You can define t as a range of values.

Creating a Basic Graph

To create an X-Y plot:

1. Click in a blank area of your worksheet.
2. Choose **Graph > X-Y Plot** from the **Insert** menu

or click  on the **Graph** toolbar. Or type [G]. Mathcad inserts a blank X-Y plot.



3. Fill in the x -axis placeholder (bottom center) with t , and the y -axis placeholder (left center) with $d(t)$. These placeholders can contain a function, an expression, or a variable name.
4. Click outside the plot or press [**Enter**].

Mathcad automatically chooses axis limits for you. To specify the axis limits yourself, click in the plot and type over the numbers in the placeholders at the ends of the axes.

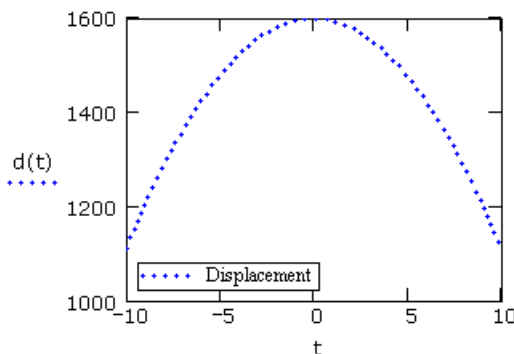
Mathcad also creates the plot over a default range. For detailed information on graphs, ranges, and expressions in plots, see Chapter 11 in the online *User's Guide* or *Help*.

Formatting a Graph

The *default* characteristics of a Mathcad graph are numbered linear axes, no grid lines, and points connected with solid lines. You can change these characteristics by *formatting* the graph. To format the graph you just created:

1. Double-click the graph to bring up the Formatting dialog box. To learn more about these settings, see Chapter 11 in the *User's Guide*.
2. Click the Traces tab.
3. Double-click “trace 1” in the table cell under “Legend Label.” Type a name for the trace, for example, **Displacement**.
4. Click the table cell in the “Line” column and choose a dotted line. Choose a line weight of 3 from the next column, and the color blue in the “Color” column.
5. Uncheck the “Hide Legend” check box, and select the “Bottom-left” position for the legend.
6. Click “OK.”

- Mathcad shows the graph as a dotted line. Note that the sample line under the $d(t)$ now reflects the new formatting, as does the legend.



- Click outside the graph to deselect it.

Saving, Printing, and Exiting

After you've created a worksheet, the next step is to save or print it.

Saving a Worksheet

To save a worksheet:


- Choose **Save** from the **File** menu, [**Ctrl**] **S**. If the file has never been saved before, the Save As dialog box appears.
- Type the name of the file in the text box provided. To save to another folder, locate the folder using the Save As dialog box.


By default Mathcad saves the file in a native Mathcad format — Mathcad XML (.XMCD) or compressed Mathcad XML (.XMCDZ). You also have the option of saving in other formats — HTML, RTF for Microsoft Word, or XMCT as templates for

new Mathcad worksheets, or in previous Mathcad versions including MCD. To save as HTML, you can also choose **Save as Web Page** under the **File** menu.

Note If you save a Mathcad file as HTML or RTF, you can not reopen the file back into Mathcad.

Printing

To print, choose **Print** from the **File** menu or click  on the **Standard** toolbar. To preview the printed page, choose **Print**

Preview from the **File** menu or click  on the **Standard** toolbar.

Exiting Mathcad

To quit Mathcad, choose **Exit** from the **File** menu. If you have moved any toolbars, Mathcad remembers their locations for the next time you open the application.

Chapter 3

Online Resources

- ◆ Mathcad Resources
- ◆ User Forums
- ◆ Other Resources

Mathcad Resources

Help Menu Resources

- **Tutorials** includes *Getting Started Primers* and *Features In-Depth*.
- **QuickSheets** are live examples that you can manipulate to see how to use Mathcad functions, graphs, and programming features.
- **Reference Tables** provide you with physical constant tables, chemical and physical data, and mathematical formulas.
- **Mathcad Help** contains complete help on every feature and function in Mathcad with links to live Mathcad examples.
- The **Author's Reference** covers creating E-books in Mathcad and exporting Mathcad files in RTF for Microsoft Word and HTML for distribution to non-Mathcad audiences.
- The **Developer's Reference** describes using and developing custom Scriptable Object components and Custom Controls. The *Developer's Reference* guides advanced users through Mathcad's Object Model, allowing access to Mathcad functionality from another application or OLE container. It also explains how to create your own functions in Mathcad in the form of DLLs.

Resources Window and E-books

If you learn best from examples, want information you can put to work immediately in your Mathcad worksheets, or wish to access any page on the Web from within Mathcad, open the **Resources** toolbar or open *Tutorials*, *QuickSheets*, or *Reference Tables* from the **Help** menu. The Resources window and Mathcad E-books appear as custom windows with their own menus and toolbar, as shown in Figure 3-1.

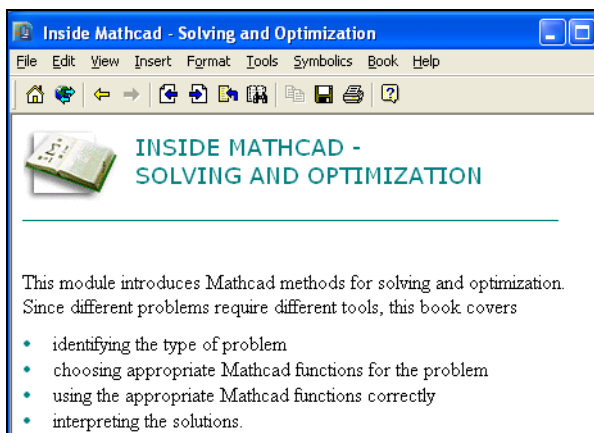


Figure 3-1: E-book window and toolbar.











Note A number of Mathcad E-books and articles, which you can download and use, are available in the Books section on <http://www.ptc.com/go/mathsoft/mathcad/>.

E-books install to a Handbook folder within the Mathcad program folder. Once you have restarted Mathcad, they will be listed under E-books in the **Help** menu, or you can browse to

find unlisted E-books (HBK). If you create your own E-books, you may have to create a Handbook folder.

Finding Information in an E-book

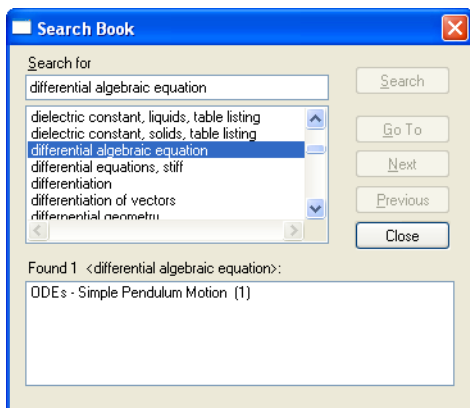
As in other hypertext systems, you move around a Mathcad E-book simply by clicking on icons or underlined text. You can also use the buttons on the toolbar at the top of the E-book and Resources window to navigate within the E-book:

Button	Function
	Links to the home page or welcome page for the E-book.
	Opens a toolbar for entering a Web address.
	Backtracks to the document last viewed or reverses backtrack.
	Goes backward or forward one section.
	Displays a list of documents most recently viewed.
	Searches the E-book.
	Copies selected regions.
	Saves current section of the E-book.
	Prints current section of the E-book.
	Displays Help for the current function, dialog, or command.

E-book Search

In addition to using hypertext links to find topics in an E-book, you can search for topics or phrases. To do so:

1. Click  to open the Search Book dialog box.



2. Type a word or phrase in the “Search for” text box. Select a word or phrase and click “Search” to see a list of topics containing that entry and the number of times it occurs in each topic.
3. Choose a topic and click “Go To.” Mathcad opens the section containing the entry. Click “Next” or “Previous” to see other occurrences of the entry.

Annotating an E-book

A Mathcad E-book is made up of fully interactive Mathcad worksheets. You can freely edit any math region in an E-book to see the effects of changing a parameter or modifying an equation. You can also enter text, math, or graphics as *annotations* in any section of your E-book.

Saving Annotations

Changes you make to an E-book are temporary: your edits disappear when you close the E-book. To save your edits, first check **Annotate Book** on the **Book** menu, then choose to save changes to the current section, save all changes, or restore the original E-book section.

Copying Information from an E-book

There are two ways to copy information from an E-book into your Mathcad worksheet:


- You can select text or equations, then copy and paste them into your worksheet.
- You can drag regions from the E-book window into your worksheet. Select the regions, click and hold down the mouse button over one of the regions while you drag the group into your worksheet, then release the mouse button.

Web Browsing

You can also use the Resources window to browse to any location on the Web and open Web pages, in addition to Mathcad worksheets and E-books posted on the Web. Mathcad Web Resources contains hundreds of useful worksheets and E-books.

Note When the Resources window is in Web-browsing mode, Mathcad is using a Web-browsing OLE control provided by Microsoft Internet Explorer.

To browse to any Web page from within the Resources window:

1. Click  on the **Resources** toolbar. An additional toolbar with an “Address” box appears below the **Resources** toolbar.
2. In the “Address” box type a *Uniform Resource Locator* (URL) for a document on the Web. To visit the Mathcad Web Resources, for example, type **http://www.ptc.com/go/mathsoft/mathcad_resources/**

then press **[Enter]**. If you do not have a supported version of Microsoft Internet Explorer installed, you must launch a Web browser.

The remaining buttons on the Web toolbar have the following functions:

Button	Function
--------	----------




Bookmark submenu: add or edit bookmarks or open a bookmarked page.




Reload the current page.



Interrupt the current file transfer.

Note When you are in Web-browsing mode and right-click on the Resources window, Mathcad displays a menu with commands appropriate for viewing Web pages. Many of the buttons on the **Resources** toolbar remain active when you are in Web-browsing mode, so that you can copy, save, or print material you locate on the Web, or backtrack to pages you previously viewed. When you click , you return to the Home page for the Resources window or E-book.

Help

Mathcad provides several ways to get support on product features through an extensive online Help system. To see Mathcad's online Help at any time, choose **Mathcad Help** from the **Help** menu, click  on the **Standard** toolbar, or press **[F1]**. To run Help, you must have Internet Explorer 5.0 or higher installed. However, IE does not need to be set as your default browser.

To know what Mathcad menu commands do, hover over the command and read the status bar at the bottom of your window. For toolbar buttons, hold the pointer over the button momentarily to see a tool tip.

You can also get more detailed help on menu commands, toolbars, built-in functions and operators, and error messages. To do so:

1. Click an error message, a built-in function or variable, or an operator.
2. Press [**F1**] to bring up the relevant Help screen.

To get help on menu commands, dialogs, or on any of the toolbar buttons:

1. Press [**Shift**] [**F1**]. Mathcad changes the pointer into a question mark.
2. Click a command from a menu. Mathcad opens the relevant Help screen.
3. Click any toolbar button. Mathcad displays the operator's name and a keyboard shortcut in the status bar.

To resume editing, press [**Esc**]. The pointer turns back into an arrow.

User Forums

The Mathcad User Forums allow you to post messages, and to download files and read messages contributed by other Mathcad users. You can search the User Forums for messages containing a key word or phrase, be notified of new messages in specific forums, and view messages posted since your last visit. The User Forums combine some of the best features of an online news group with the convenience of sharing Mathcad worksheets. The User Forums are available in the following URLs:

<http://www.ptc.com/go/mathsoft/collab>

<http://community.ptc.com/community/mathcad>

Other Resources

Web Resources

Mathcad Web Resources, accessible at

<http://www.ptc.com/appserver/mkt/products/resource/mathcad/>,

contain user-contributed worksheets, past issues of the *Mathcad Advisor Newsletter*, E-books, printed books, Web sites, and graphics and animations created in Mathcad. Files are categorized as application files, education files, graphics, and animations. You can choose a listing by discipline from Mathcad files, or you can search for files by keyword, author, or title.

If you wish to contribute files to the resources, please email:

mathcad-author@ptc.com.

Read This First

Read This First is available through the Resources Window. It contains the latest information on Mathcad, updates to the documentation, and troubleshooting instructions. The most up-to-date Read This First is posted at:

<http://www.ptc.com/appserver/cs/doc/refdoc.jsp>

Technical Support

The Technical Support Knowledge Base contains frequently asked questions, sample files, and support resources. These are posted at:

<http://www.ptc.com/support/mathcad.htm>

Mathcad Downloads on the PTC Web Site

Registered users can download updates to software, Mathcad modules, E-books and other useful tools from:

<http://www.ptc.com/appserver/mkt/products/resource/mathcad/>

Look for *Inside Mathcad: Programming* and *Inside Mathcad: Solving*, our newest Mathcad E-books.