

Getting Started with Mathematica



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Section 1: Introduction

Mathematica is a powerful tool to carry out and present the results of numeric, symbolic and graphical calculations. The applications of Mathematica span all areas of science, technology, and business where quantitative methods are used. <http://stat.utexas.edu/software/software-information> for up-to-date information on where you can access this software.

Section 2: Getting Started

2.1 Running Mathematica

On a **Macintosh**, Mathematica is started either by double-clicking on the Mathematica icon, or by double-clicking on a Mathematica notebook. Mathematica documents are called notebooks. Double-clicking on the Mathematica executable launches Mathematica with an empty notebook, double-clicking on a Mathematica notebook launches Mathematica with the contents of that notebook.

On a **PC running Microsoft Windows**, Mathematica is started by double clicking on the Mathematica icon. If you want to load a previously saved notebook in an older version of Mathematica you may need to select the Open/Import... option from the File menu. This will pop up a Windows file selection box which you can use to find and open your file.

On a **Unix Machine**, the Mathematica executables are in the directory `/usr/local/mathematica/bin`. This directory is not in the default command search path. You can add this directory manually to your path, with:

```
setenv PATH /usr/local/mathematica/bin:$PATH
```

if you are using the C-shell, or, if you are using the Bourne shell use:

```
PATH=/usr/local/mathematica/bin:$PATH ; export PATH
```

The command above can be put at the end of your `.cshrc` (or `.profile`) so that it will be executed automatically for you. It is important that you issue this command only after you have set your environment variables such as your `PATH` and `MANPATH`.

If you are using the X windowing system, then, after running the the above command, set the `DISPLAY` environment variable to point to your workstation or X-terminal with:

```
setenv DISPLAY your local machine name:0
```

if you are using the C-shell, or, if you are using the Bourne shell use:

```
DISPLAY=your local machine name:0; export DISPLAY
```

To start the X version of Mathematica type:

```
mathematica
```

To start the text based version of Mathematica type:

```
math
```

2.2 Configuring Your Browser

2.2.1 All Unix Browsers

Most Unix Web browsers use .mailcap files to associate file types with particular applications. When a file is downloaded from a Web server, it has associated with it a MIME type. The .mailcap file contains a mapping from these MIME types to the applications that are used to interpret the files.

The MIME type for a Mathematica notebook is application/mathematica, the corresponding application is, of course, Mathematica. These are combined to form a line in the .mailcap file that reads:

```
application/mathematica; mathematica %s
```

The %s represents the name of the file where the downloaded information is stored. After inserting this line in the .mailcap file in your home directory, restart the browser. Now, when a Mathematica notebook is downloaded from a properly configured server, Mathematica will automatically be started with the downloaded file as its current notebook.

2.2.2 Mosaic for the Macintosh

Mosaic for the Macintosh provides a point-and-click method for customization through its **Options** pulldown menu. Below is enumerated the procedure to associate the *Mathematica* application with *Mathematica* documents served from a Web server.

1. From the **Options** pulldown menu select **Preferences...**
2. Click on the **Apps** icon on the left side of the window.
3. Click on the the **Helper Applications...** button. This brings up the **Helper configuration** dialog box.
4. Click on the **Add Document Type...** button in the **Helper configuration** dialog box.
5. Enter application/mathematica as the name of the new document type.
6. Click on **OK**. application/mathematica will now appear in the **Document Type -> Application** list.
7. Select application/mathematica from the **Document Type -> Application** list. The **Set Application...** button will become active.
8. Click on the **Set Application...** button, locate and then double click on *Mathematica*. Yet another dialog box will appear.
9. In the new dialog box, the **Ask for filename** box should not be checked, the **Launch automatically** box should be checked.

10. Click once on the **TEXT** icon in the bar across the top of the box (this is the little image of a *Mathematica* notebook).
11. Click on **OK**.
12. In the **Helper configuration** dialog box, click the **Add Extension...** button.
13. Supply `.ma` in the **Extention:** box, then select `mathematica/application` from the **MIME type:** pulldown menu.
14. Click on **OK**.

The next time **Mosaic** is launched, it will be able to launch *Mathematica* with notebooks downloaded from the Web.

2.2.3 Netscape for the Macintosh

Netscape for the Macintosh provides a point-and-click method for customization through its **Options** pulldown menu. Below is enumerated the procedure to associate the *Mathematica* application with *Mathematica* documents served from a Web server.

1. From the **Options** pulldown menu select **Preferences...** This brings up a **Preferences** dialog box.
2. From the pulldown menu at the top of the **Preferences** dialog box select **Helper Applications**.
3. Click on the **New...** button in the **Preferences** dialog box. This open a **Create New Mime Type** window.
4. Type `application` in the **MIME type:** field, and `mathematica` in the **MIME sub-type:** field. Click on **OK**. This closes the window.
5. In the the **Preferences** dialog box, type `.ma` in the **Extensions** field.
6. From the **Action** options, select **Launch Application**.
7. Click on the **Browse...** button, this will bring up a standard Macintosh file dialog box.
8. Find and select *Mathematica*, then click on **Open**.
9. Click on **OK** in the **Preferences** dialog box. The dialog box will close.
10. From the **Options** pulldown menu select **Save Options**. This makes the changes permanent.

2.2.4 Netscape for the Windows

Netscape provides a point-and-click method for customization through its **Options** pulldown menu. Below is enumerated the procedure to associate the *Mathematica* application with *Mathematica* documents served from a Web server.

1. From the **Options** pulldown menu select **Preferences...** This opens a **Preferences** dialog box.
2. From the pull down list near the top of the **Preferences** dialog box select **Helper Applications**.
3. Click on the **New Type...** button in the **Preferences** dialog box. This opens a **Configure New Mime Type** window.
4. Type `application` the **MIME type:** field, and `mathematica` in the **MIME sub-type:** field. Click on **OK**. This closes the window.
5. In the the **Preferences** dialog box, type `.ma` in the **Extensions** field.

6. From the **Action** options, select **Launch Application:**
7. Click on the **Browse...** button, this will bring up a file browser box.
8. Find and select the *Mathematica* application, then click on **Open**. On Microsoft Windows systems the Mathematica application is called math.exe
9. Click on **OK** in the **Preferences** dialog box. The dialog box will close.
10. From the **Options** pulldown menu select **Save Options**. This makes the changes permanent.

2.3 Saving Your Work

The File pull-down menu contains three options for saving Mathematica notebooks.

Save

writes the new notebook over the previous version.

Save As...

brings up a file dialog box allowing you to select a new directory (or folder) and name for your notebook.

Save As Special

allows the saving of Mathematica notebooks in a variety of formats. Selecting this option brings up the file format submenu which lists the formats in which you can save your work.

Remember that any files you wish to save when you leave a computer at the SMF must be loaded onto your own media (e.g., a USB memory stick or writeable CD) and taken with you. If you are unsure about how to copy a file to external media, see the SMF proctors for help.

2.4 Reloading Your Saved Work

The File pull-down menu has several options for loading files into Mathematica

Open...

brings up a File Browser that is used to locate and load notebooks.

Open Special...

is used to read text into the front end. Choosing this option brings up the Open Special dialog box. In this box select options telling Mathematica how to interpret the file, then click OK. The Open Special dialog box will close and a File Browser will appear. Select and open your file.

Import...

Allows the importing of files into Mathematica. Choosing this option brings up a File Browser. Select the file to be imported into Mathematica.

2.5 Printing Your Work

As with most features described here, the print commands are located in the File pull-down menu.

Printing Settings

This is actually another menu that contains:

Page Setup

Printing Options

Headers and Footers

Print...

brings up a Print dialog box allowing the selection of the range of pages to print, the magnification, page size, and where (printer or file) to send the output. Note: under the Microsoft Windows version of Mathematica this is merged with the Print Selection... option.

Print Selection...

prints the currently selected text or graphic. Under the Microsoft Windows version, use the Print option. If a graphic object is selected, it can be resized before printing by dragging the black boxes, or handles, along the frame that is drawn around the graphic.

Section 3: Documentation

Mathematica is an extensive program and has several sources of online help. The most useful of these for a new user are:

- The Help menu

Documentation Center - Gives a short introduction to some of the features of Mathematica, as well as a few sample calculations.

Function Navigator - Brings up a large dialog box with a list of general topics in the upper left corner. Select one of these topics, and then Mathematica will display a list of related (sub) topics in the next window. Once one of these is chosen, Mathematica will display a list of functions. Clicking on one of these functions causes Mathematica to display a brief explanation of the function, a list of options to the function and an example of its use.

Why the Beep? - Brings up a box containing a short explanation of the last error Mathematica encountered.

- The ? operator - The ? operator is used to get information about any Mathematica object. The ? must be the first character on the line. A double question mark will provide more detailed information. For example ?Plot will return a description of the Plot function and its arguments. ??Plot will return the same description along with some additional information including a list of optional arguments used to create more sophisticated plots. The * character is used as a wildcard so that ?Plot* will list all the objects in Mathematica whose names start with Plot.

For links to FAQs and other sources of documentation, please visit

<http://stat.utexas.edu/software/software-information>