

Installing Matlab

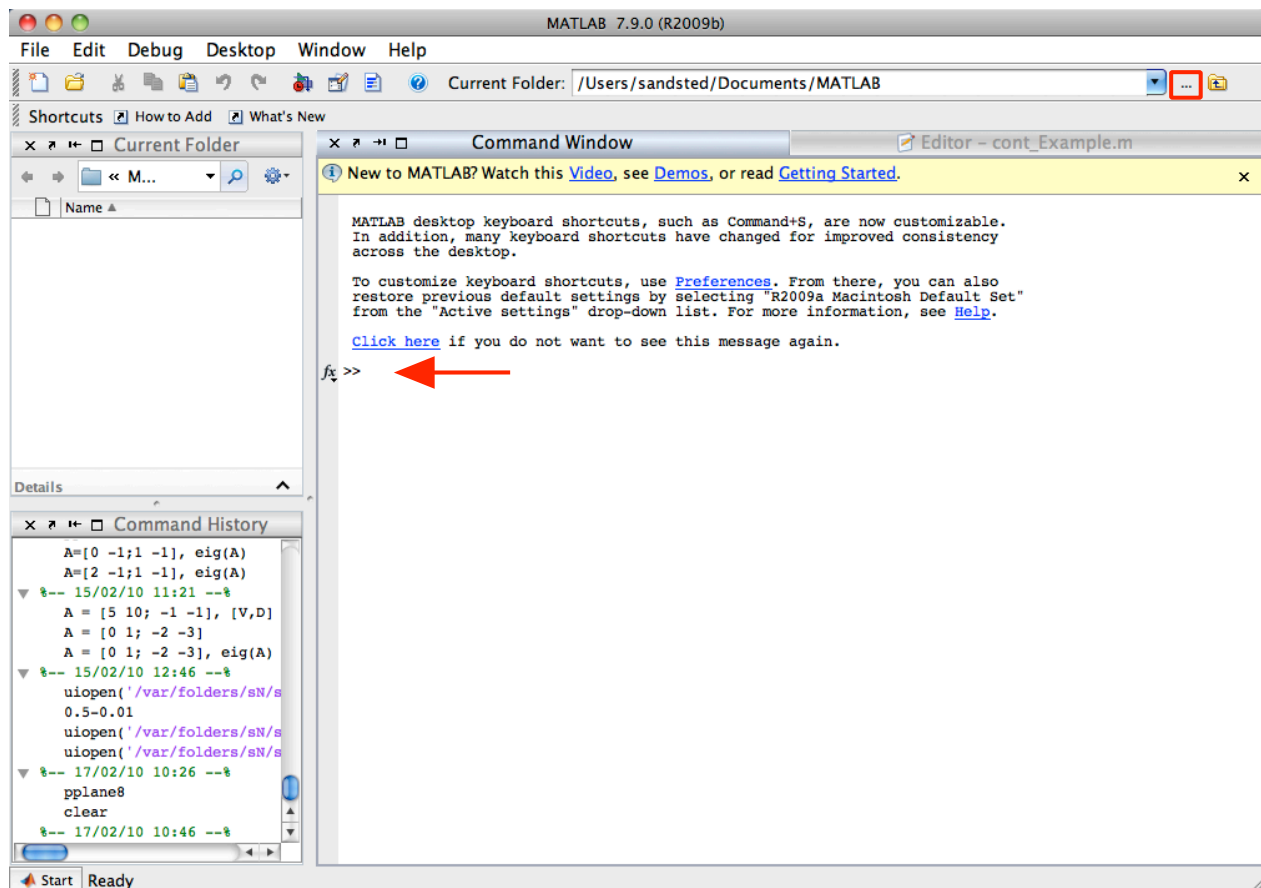
Download Matlab from

<http://software.brown.edu/dist/sw-win.html> (Windows)
<http://software.brown.edu/dist/sw-mac.html> (Mac)
<http://software.brown.edu/dist/sw-unix.html> (Unix/Linux)

and follow the instructions to install it on your personal computer.

Make a folder (directory) in which to keep all your course-related Matlab files.

After starting Matlab, you should see a screen similar to the one shown below:



Click on the “...” button indicated by the red rectangle in the picture above and navigate to the folder you created. The “Current Folder” panel on the left should now be showing the contents of this particular folder (i.e. nothing at the beginning of the course!).

The

>>

indicated by the red arrow in the picture above is the Matlab prompt; if you type a command after the prompt and press the Return (Enter) key, Matlab will execute the command.

Matlab has a very extensive and detailed Help facility, and you are encouraged to make good use of it. A pop-up Help window (Help browser) can be called up by choosing Help > Product Help from the menu bar or by clicking on the blue question-mark icon.

Some helpful demos are accessible from within Matlab: choose Help > Demos from the menu bar or, in the pop-up Help window, expand “MATLAB” in the left-hand panel and click on Demos. I suggest that you watch the first demo, “Getting Started with MATLAB”, to get a basic idea of Matlab’s functionality and how/where to find further information.

If you need help with, or want to know more about, a particular Matlab command or function, type

```
help <command>
```

or

```
doc <command>
```

at the prompt.

The up-arrow on the keyboard can be used to cycle through previous commands. An alternative way to repeat a previous command is to copy it from the “Command History” panel and then paste it after the prompt.

If, at any time, you need to interrupt Matlab because it is taking too long to execute the current command, press the Control key and the C key together (Ctrl-C).

To quit Matlab, you can

- type `exit` or `quit` at the prompt;
- choose File > Exit MATLAB from the menu bar; or
- press the Control key and the Q key together (Ctrl-Q), or Cmd-Q if you’re using a Mac.

What is scientific computing?

Scientific computing means using a computer to help find solutions to mathematical problems that arise in science and engineering.

Computers are particularly good for repetitive tasks

— try to formulate solution methods (algorithms) as processes of approximation involving iterative operations.

By nature, computers are

- digital, discrete, finite

and hence

- inexact, approximate

Representation of floating point numbers in a computer

$$\pm (1+f) \times 2^e$$

The IEEE standard uses 64 bits to represent a floating point number:

1 bit for the sign

52 bits for the fraction part f

11 bits for the exponent e

Type the following commands at the Matlab prompt to find out their values:

`realmax` the largest positive floating point number representable on your computer

`realmin` the smallest positive floating point number representable on your computer

`eps` the machine precision: the smallest positive number ε for which the computer considers $1 + \varepsilon > 1$ to be true; with the IEEE floating point representation, $\varepsilon = 2^{-52}$