




Matlab Quick Sheet¹

What is Matlab?

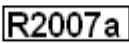

Matlab (short for MATrix LABoratory) is a language for technical computing, developed by The Mathworks, Inc. (A matrix is a rectangular array or table of *usually* numerical values.) Matlab provides a single platform for computation, visualization, programming and software development.

Starting Matlab Logon at MSRC using desktop icon . To logon onto a Temple workstation at the Tech Center, follow the directions below.

Click  then Click  You will see a dropdown menu with lots of programs listed.

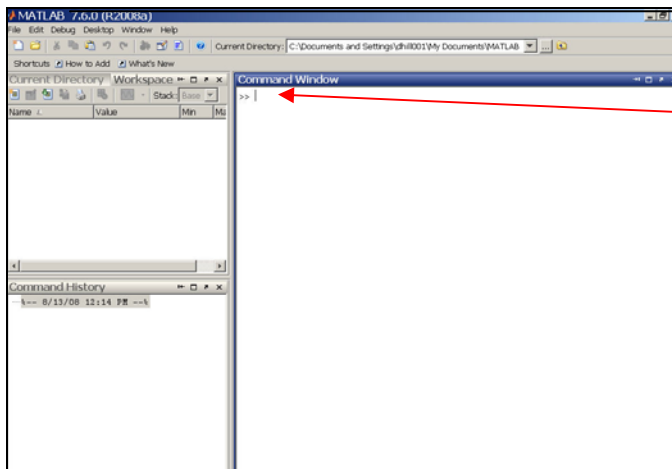
Find the one named Instructor Software and click on it. Another dropdown menu will appear. Find one named Math Software and click on it.

From the list find the one named MATLAB and click on it. You will then see buttons to click.

Click both of these to start MATLAB.

You will see a screen like the following:



This is where you enter commands. The Matlab command prompt is `>>`. You type commands after the prompt. Try the following command `ezplot('x^2',[-2,2])` which plots the parabola $y = x^2$ over interval $[-2, 2]$.

To quit Matlab, at a Matlab prompt type command `quit` or `exit`, then press Enter.

¹ D.R.Hill, 1/20/2009

Using Matlab as a (scientific) calculator

Matlab's computational engine uses (about) 15 decimal digits in computations (unless directed to do otherwise). So it can be used as a powerful calculator for arithmetic expressions and the calculation of values of function expressions.

Arithmetic Operations	Matlab command
+ (addition)	+ a + b
- (subtraction)	- a - b
x (multiplication)	* a*b (a times b)
/ (division)	/ a/b, b ≠ 0
^ (exponentiation)	^ a^b (a raised to the b power a ^b)

WARNING: You must indicate multiplication using the *.

Examples: In expressions it good practice to use parentheses as illustrated below. This is particularly important for fractions which are used in Matlab.

<u>Matlab expressions</u>	<u>Value shown in format long e</u>	<u>Value in format short</u>
(1.5 - 4.67)*(9/3.1)	-9.203225806451613e+000	-9.2032
(5.2 - 3.72)^(1/2)	1.216552506059644e+000	1.2166
(7.02 + 12.3)/(4.25 - 3.125)	1.717333333333333e+001	17.1733

In Matlab you can control how a numerical value is displayed by using what are called format commands. After a Matlab prompt type command **format long e** or **format short** to get the displays above. Other such commands are **format long** and **format short e**.

The number π (pi) in Matlab can be accessed by using the name **pi**. Here is what is displayed for π in various formats.

Format short display for pi	3.1416
Format long display for pi	3.141592653589793
Format short e display for pi	3.1416e+000
Format long e display for pi	3.141592653589793e+000

Note that the "e formats" display in scientific notation; 5.6782e+002 means 5.6782×10^2 .

Also note that the last decimal digit in a "short display" is obtained by rounding.

Regardless of the display format used to show values on the screen computations are done with 15 digit arithmetic.