Useful Matlab Examples

Basic Math

Addition: $2 + 3$
Division (using previous answer): ans/4
Exponentiation: $31 \wedge 4$
Trig functions: log(100); sin(90 * pi/180)

Vectors

Assigning values: x = [0 : 1 : 5]; x = [7.5 : 2 : 33]
Taking a subset of the vector: x(2 : 5)
Assigning a single value: x(4) = x(3) + pi
Flipping between row and column vectors: x'
Reversing a row vector: flipdim(x, 2)
Squaring individual elements: y = x. $\wedge$ 2

Matrices

Assignment: x = [1 2 3 ; 3 1 2 ; 2 3 1]; x(2, 2) = 6
Math: x/4
Exponentiation: x. $\wedge$ 2
Matrix multiplication: x $\wedge$ 2
Extracting vectors: x(1, :); x(:, 1)

Plotting

2D plots: plot(x, y)
Turn on/off plot overlays: hold off; hold on
3D plots: image(x); surf(x); mesh(x)

Scripting

Create a file with the name of your script, ending in .m; e.g., meanvar.m:

```
function [meanval,varval] = meanvar(data)

% Computes the mean and variance of values in the data array

meanval = mean(data);
varval = var(data);
```

Images

Reading an image: a0 = imread('c : image.bmp','bmp');
Displaying an image: image(a0)
Assigning a subset of one color: b0 = a0(1 : 445, 240 : 420, 2);

Data Fitting

Erf function: y = (erf((x − mean)/stdev) + 1) ∗ range/2 + offset
Computing error of fit: err = sum((double(b0(200, :)) − y). ∧ 2)

Minimizing an error function with respect to one variable:
q = fminsearch(@(x) sqerferr(x, b0(200, :)), x0)

Loops

Looping across all rows of an array:
fori = 1 : size(b0, 1)
q = fminsearch(@(x) sqerferr(x, b0(i, :)), x0);
stdev0(i) = q(2);
end