Introduction to MATLAB

The Basics

The MATLAB Environment

A Very Fancy Calculator

- MATLAB = Matrix Laboratory
- Collection of computational tools
  - Allows us to obtain results to complicated problems quickly
- MATLAB vs. Compiled programming languages
  - Matlab code is interpreted by MATLAB - no compiler
  - Interactive environment for easier debugging
  - Many tools built in for you

MATLAB Command Window

How to use MATLAB

- Command Line = Calculator
  - Order of operations is followed
- Working with Variables
  - Assign values using “=”
  - Variable names cannot include spaces
  - Case sensitive
  - Special Variables
    - “pi”, “eps”, “ans”, function names, etc...
- who, whos, clear, clc
- Using the “help” command
- The semicolon
  - Use to suppress printing

Scalars, Vectors, Matrices

What they are and how they are used

- Scalar - single number
  - a = 5; a=6.7; a = 1e-3;
- Vector - a row or column of numbers
  - b = [5 6 7]; b = [5; 6; 7]'; row vector
  - b = [5 6 7]'; b = [5; 6; 7;]; column vector
- Matrix - a collection of vectors
  - A = [1 2 3; 4 5 6];
- All treated the same in MATLAB
- More later...

Script Files

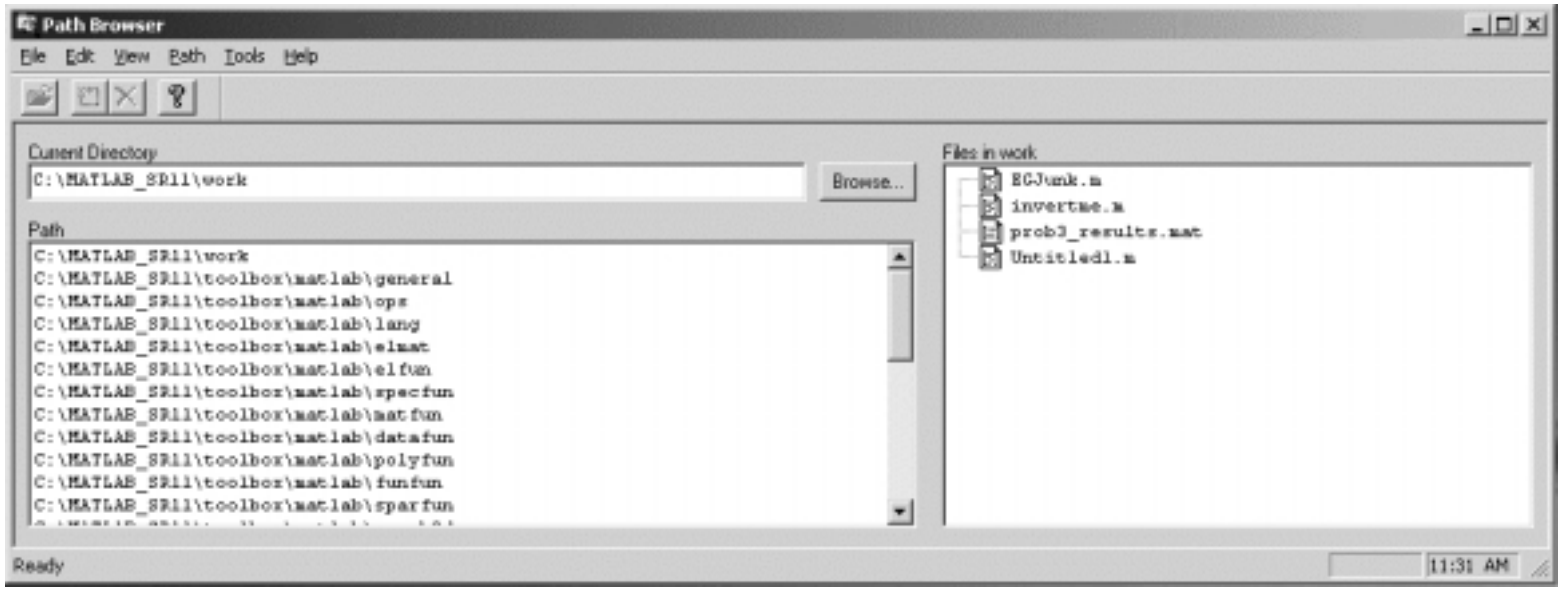
A Better Way to Use MATLAB

- Save commands in a file, and tell MATLAB to execute the *file*.
  - MATLAB executes each command in the file sequetially
  - Same format as using the command line
  - Allows changes to be made easily
  - Save as “your_file_name.m”
    - Execute by typing “your_file_name”
    - MATLAB looks for files with the .m extension
- Comments “%”
  - Ignored by MATLAB
  - Make the file more understandable
- The working directory & Path

MATLAB's Path

What is a path? Why use it?

- Tells MATLAB where to look for files
- Allows better organization of work
- "what", cd, pwd



Moving around directories

- pwd - display present working directory
  - This directory is set at startup by the current path.
  - MATLAB looks to pwd first, then looks through the path
- cd - change present directory
  - cd c:\mydirectory\ Changes to the specified directory
  - cd .. Moves up one level
- ls - list directory contents (could also use “dir”)
- what - what matlab files are in this directory?

Some useful commands that work in MATLAB

UNIX	DOS	Result
ls	dir	display contents of current directory
cd	cd	change directory
pwd	cd	display current working directory
mkdir	mkdir	makes a new directory
cp	copy	copy a file
mv	move	move a file
rm	del	delete a file

Formatting Output

Printing Variable Contents

- **format** command
  - Usage: **format *option***
- Formatting ***option***s:
  - short - up to 5 digits of the variable contents
  - long - up to 15 digits of the variable contents
  - short e - scientific notation w/ 5 digits
  - long e - scientific notation w/ 15 digits
  - rat - ratio of two integers
  - bank - dollars & cents format