USING MATLAB

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About Matlab

- Origins are in linear algebra
- Much functionality added later
- Runs on all platforms
- Many toolboxes exist

The User Interface

- You can use Matlab interactively
- Just type commands and view results
- Difficulty is saving session
- I prefer to use scripts (m-files)
- I use the built-in editor

My Approach

- Put commands into m-file
- Run from main Matlab window
- Edit m-file
- Rerun
- Repeat to perfection
- Save and turn in m-file

Variables

- A=5
- B=3
- C=A+B
- C=C+3

Vectors and Matrices

- Think of vectors as lists
- Think of matrices as arrays (lists of lists)
- V1=[0 1 2 3 4]
- V2=0:4
- M1=[1 0 1; 0 1 0; 0 0 1]
- M2=ones(3)

Accessing elements

- You can pick out individual components of vectors and matrices
- V1(3)
- M1(2,3)
- M1(:,2)
- M1(1,:)

Vector Math

- Try this:
- v=0:5
- z=v*v
- To square each element:
- z=v.*v
- Also ./ and .^

Plotting

- Make vectors for x and y axis and then plot them
- x=0:0.1:10
- y=sin(x)
- plot(x,y)
- plot(x,y,x,y,'o')

Functions

- exp, log, log10, sqrt
- sin, cos, tan, asin, acos, atan
- max, min, mean, median, sum, prod, sort

Flow Control

- if x<10 then
- x=x+1
- else
- x=x^2
- end

Flow Control (cont)

- for i=1:10
- z=z*i
- end

User-Defined Functions

- Suppose we want to plot: sin(3*x)+sin(3.1*x)
- Create user-defined function

- function r=f(x)
- r=sin(3*x)+sin(3.1*x)

- Save as f.m

User-Defined Functions (cont)

- Now just call it:

- x=0:0.1:50;
- y=f(x);
- plot(x,y)

Conclusions

- This should get you started with Matlab
- Watch the demo movie to see it in action