MATLAB Review (Emily Macqueene, MECH 105)

Current folder

Must be in current folder to run a function

REMEMBER YOUR GODDANG SEMICOLONS

Can clear variables one at a time: clear b

Clears variable name for debugging

Arithmetic with Scalars

Scalar ~ vector or matrix

What does left division do?  
Display Formats:

How to have MATLAB show numbers in different ways

format [ ]

short

long

shorte

longe

bank

* and many more!

Row vectors vs column vectors using ;

Can’t input dimensionally inconsistent arrays

‘ transposes = flips columns and rows. Works for vectors and matrices.

(row, column) = opposite of Excel! Pulls number out of matrix

Can also assign new value

A(2,3) = 54. Changes that element to a new value.

Create array with consistent spacing? By 2 in this case?

J = [5 : 2 : 11] Must add the 2. Spacing defaults to 1. Goes from 5-11 in increments of 2

Ends at (probably) 11.

Or use linspace.

Linspace function = arrays with linear spacing

A = linspace (i, j, n) no probably

1st element, last element, number of elements

2D arrays define

Can use commas or spaces to separate row elements. Semicolons to terminate row.

Must be dimensionally consistent.

Element by element math operations: uses .\* or ./ or .^

. adds element by elements.

F = [1 3 5 7] and X = [1 1 1 1]

K = F/X. Use K = F./X for element by element.

If dot is omitted, it tries to do linear algebra, which no one gives a damn about.

* Only necessary when element by element is needed.

Never in front of + or – because not needed.

Should know (all with parentheses after):

Log

Sqrt

Round

Ceil

Floor

Sum

Length

Size

Min

Max

Mod

Rem

Plot(x,y)

Hold on

Plot(x,y,’options’)

Hold off = opens new figure

Remember the “hold on” and “hold off” commands.

Subplot = multiple axes on same figure

Subplot(m,n,p)

Title

Algorithms

Set of instructions for solving a problem step by step

Algorithm Discussion

This algorithm accomplishes the task of helping a child pick a which string instrument they would like to study. Many older music students work at music festivals where young children can try out various musical instruments and decide which one they would like to study. The instruments are categorized by instrument family, and each category has an older student directing the children to each instrument. I worked in the string instrument category, which included the violin, viola, cello, and the double bass. The algorithm in pseudocode describes the process I used to direct people to the instruments they were interested in.

1. Start
2. Ask if interested in playing an instrument from the string family.

If yes, continue

Else tell them to go somewhere else

1. Ask which instrument they are interested in trying out

If violin, lead them to the violins

Else If viola, lead them to the violas

Else If cello, lead them to the cellos

Else If bass, lead them to the double basses

Else, return to line 2

1. Ask if they would like to try another instrument from the string family.

If yes, return to line 3

Else If no, continue

Else, tell them to go somewhere else

1. Thank them for coming
2. End

Relational Operators

Have == and ~=

<= and >=

Compare arrays element by element

Order of Precedents:

Paren

Exponent

Logical not

Mult and Div

Add and Sub

Relational operators

Logical and

Logical or

Lookup “xor”

Logical symmetric difference between two logical elements

Looks at true || false = true

Xor(1,1) = 0

Conditional Statements (if/then)

Value = input(‘Pick a number here’)

If Value < 0

Disp(‘Yay negative number’)

If Value > 0

Disp(‘Yay positive number.’)

If Value = 0

Disp(‘You have nothing.’)

Else

Disp(‘You moron you.’)

End

How to write a MATLAB program for Taylor series for sin(x)

Create array.