

Outline: MATLAB syntax

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Statements and Comments

- ▶ Matlab is case sensitive
- ▶ Anything typed after % is ignored (comment character)
- ▶ Put ; at the end of the line suppresses printing values
- ▶ Use "help command" to get some information about a command
- ▶ Type the name of a variable to get its value(s)
- ▶ "who" returns the names of the defined variables
- ▶ "whos" returns the names and details of defined variables.

Value Creators

- ▶ Assign a value to variable: `"A=1;"`
- ▶ Create a list with concatenator: `"B=[1 2 3 4];"`
- ▶ Use implied list: with `"C = 1:10;"`
- ▶ Use array creator: `"D=zeros(rows,columns);"` or `"X=ones(rows,columns);"`
- ▶ create a row vector: `"z=zeros(10,1);"`
- ▶ create a column vector: `"g=zeros(1,5);"`

Arrays and Indexing

Given a variable `A=[1 2 3; 4 5 6; 7 8 9];`"

- ▶ `A(2,3)` is A(row 2, column 3) has value 6
- ▶ `A(4)` is the fourth value row-wise has the value 4
- ▶ `A(1,:)` is all values in the first row is 1,2,3
- ▶ `A(:,2)` is all values in the second column is 2,5,8

Arithmetic

- ▶ `+` is add "`c=a+b;`"
- ▶ `-` is subtract "`c=a-b;`"
- ▶ `*` is matrix multiply "`c=a*b;`"
- ▶ `.*` is element-wise multiply "`c=a.*b;`"
- ▶ `/` is matrix inverse "`c=a/b;`"
- ▶ `./` is element-wise divide "`c=a./b;`"

Scripts and Functions

- ▶ A script is a file ending in `.m` with a series of matlab commands
- ▶ This is a useful way to create a series of commands to avoid typing them every time
- ▶ Typing the name of the file (without the `.m`) executes the commands, leaving any results that are created
- ▶ A function is a set of commands in a file ending in `.m` where the first line is "function $y=F(x,t)$ " where `F.m` is the name of the file
- ▶ For the function `F`, the values of `x` and `t` are input; the value of `y` is output. All internal variables in the function are hidden
- ▶ A variable declared "global" passes values in and out of functions

Graphics (part 1)

- ▶ "`plot(x,y)`" plots the list `y` against `x`. They must be the same shape and size
- ▶ `xlabel('xxx')` puts the string `xxx` on the `x` axis
- ▶ Similarly for `ylabel` and `title`
- ▶ Options can be added to the plot command; "`plot(x,y,'r-')`" creates a red dash-dot line
- ▶ "Option, Value" pairs can be added to plot commands

Graphics (part 2)

- ▶ `"subplot(row,column,n)"` creates the nth plot in an array of graphs. The plots are numbered left-to-right, then top to bottom.
- ▶ `"subplot(2,2,3)"` causes the next plot commands to apply to the lower left plot in 2-row, 2-column set of plots
- ▶ `"print(-dtype,filename)"` will save the plot to a file with the type indicated (gif, jpeg, png, ps, etc)