MATLAB Reference Card

Command Line

The command line is where you directly run commands and interact with MATLAB. When writing scripts, use the command line to develop and test commands and then copy them into your script when you are satisfied with how they run.

Run a command and display the result

Run a command and hide the result

Move through command history

Finding Help

MATLAB has a very comprehensive help system. MATLAB Help has detailed explanations and examples of how to use commands. The help command provides a quick synopsis on how to use each command.

Open MATLAB Help
List help topics
Show help for a command

Variables

In MATLAB, you declare a new variable by assigning a value to it. Variables declared in the command line and in scripts are part of the global workspace. Variables declared in functions are local to the function and disappear when the function finishes.

Assign a value to a variable
Display the value of a variable
Show all defined variables
Erase a variable

Create a Matrix

Create a 2x2 matrix
Create a 4x4 matrix filled with 1
Create a 3x3 matrix filled with 0
Create an 8x8 identity matrix
Create a 2x1 column vector
Create a 1x2 row vector
Create [1 2 3 4 5]
Create [1 2 3 4 5]
Create [4 6 8 10]
Create [8 7 6 5]
Create [8 7 6 5]
Create logistically spaced vector

Indexing a Matrix

Referring to particular element or set of elements of a matrix is called indexing. Indexing can be used to read a value from a matrix or to store a new value.

Element at 1,3
2nd Row
3rd Column
5-10 elements
2,5,10 elements

Matrix Operations

Note that since vectors are also matrices, most matrix operations can also be used on vectors.

Size of a matrix
Largest dimensions of a matrix
Transpose
Transpose - Shortcut
Matrix Inverse
Matrix Addition
Matrix Subtraction
Matrix Multiplication
Matrix Exponentiation
Component-wise Multiplication
Component-wise Division
Component-wise Exponentiation

Vector Operations

These operations are designed to work with vectors, which are 1xN or Nx1 matrices.

Norm (length) of a vector
Vector Dot product
Vector Cross product
Sum the components of a vector
Cumulative sum of vector elements
Subtract each component from the next

Math Functions

These functions can be used on single numbers, vectors, or matrices. On vectors and matrices, the functions are applied to the individual components of the variable.

Square Root
Exponential
Natural Logarithm
Base-10 Logarithm
Determine the sign of a number

Trig Functions

The following functions take or return radians. For degrees, append a “d” to the end of the function name.

Sine
Cosine
Tangent
Inverse Sine
Inverse Cosine
Inverse Tangent
Inverse Tangent

WAVE Files

Open a wave file
Save a wave file
Play a sound

Plotting

Plotting commands affect the active plot. This is typically the most recently created plot. If no plot is open, plotting commands will create a new window and use it.

Plot y vs. t
Plot y vs. t and x vs. t
Plot with a logarithmic x axis
Plot with a logarithmic y axis
Plot with logarithmic x,y axes
Create and activate a new plot window
Turn on the grid on a plot
Turn off the grid on a plot
Set the x axis limits
Set the y axis limits
Set the x and y axis limits

You can control the color and line type of each plotted line by specifying a line format after the y-value. Line formats can be combined into a single string.

Red
Blue
Green
Cyan
Yellow
Dotted Line
Dashed Line
Dash-dot Line
Plot a blue line
Plot a dotted green line
Plot green and red lines
Label your plots for clarity.

X Axis Label
Y Axis Label
Plot Title
Add a plot legend
You can put multiple plots in a single window with the subplot command. For example, to make two plots stacked on top of each other:

subplot(2,1,1)
Select first plot area
plot(t, y)
Create the plot
title('Output Voltage')
Label the plot
subplot(2,1,2)
Select second plot area
plot(t, x)
Create the plot
title('Input Voltage')
Label the plot

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