

MATLAB Tips and Tricks

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Note: For all the commands listed here, more details can be found using the help of doc function – see getting help on the next page.

General Tips

	Example
Suppressing output to the screen: use a ';' at the end of a line,	<code>a = 10^2;</code>
Adding comments to a program: Start the line with a '%'	<code>% Comment here</code>
Special symbols:	
Resetting MATLAB by clearing memory: <code>clear all</code>	
Initializing a number from the keyboard: <code>R=input('Prompt');</code>	<code>x=input('Please enter the value for x:');</code>
Initializing a number from the keyboard: <code>R = input('prompt','s')</code>	<code>name=input('Please enter your name: ','s');</code>
Setting the output format: <code>format</code>	<code>Format compact; % Suppresses extra line-feeds</code>

Special Symbols

		Example
+	Addition	<code>x = 1+2;</code>
-	Subtraction	<code>x = 1-2;</code>
*	Matrix Multiplication	<code>x = 1*2;</code>
/	Division	<code>x = 1/2;</code>
^	Exponentiation	<code>x = 1^2;</code>
pi	The constant 'pi'	<code>x = pi;</code>
i , j	Contains the value $\sqrt{-1}$	
Inf	Machine infinity	
NaN	Not a number, 0/0 will give you this	
eps	The smallest difference between two numbers that can be represented by the computer, is machine dependent.	<code>>> eps ans = 2.2204e-16</code>
ans	A special symbol used to store the result of a calculation, if the result is not assigned	<code>>> 2+3 ans = 5</code>
...	Continuation of a line, often useful when you have a very long line.	<code>>> x=2+... 3 x = 5</code>

Getting Help

There are 4 ways of getting help in MATLAB:

	Example
Type help or help followed by the function name in the command window	help sin
The lookfor command searches for an exact function name.	lookfor sin
Use the help window in MATLAB – the doc command brings up a help window	doc sin
Use the MATLAB help desk	

Array Manipulation

	Example
Generate an evenly sampled vector : <code>x = xstart:xincrement:xend</code>	<code>x=-10:1:10;</code>
Generate an evenly sampled vector of n values: <code>x=linspace(xstart,xend,n)</code>	<code>x=linspace(-10,10,21);</code>
Generate a n×n matrix of zeros: <code>x=zeros(n);</code>	<code>x=zeros(10);</code>
Generate a n×m matrix of zeros: <code>x=zeros(n,m);</code>	<code>x=zeros(10,20);</code>
Generate a matrix of ones: <code>x=ones(n,m);</code>	<code>x=ones(10,13);</code>
Generate a n×m identity matrix: <code>x=eye(n,m);</code>	
Return the length of an array: <code>size(arr)</code>	<code>>> x=ones(10,13);</code> <code>>> size(x)</code> <code>ans = 10 13</code>
Return the length of the longest dimension of an array: <code>length(arr)</code>	<code>>> x=ones(10,13);</code> <code>>> length(x)</code> <code>ans = 13</code>
Accessing part of an array ‘:’	<code>x=[1,2 3; 4 5 6];</code> <code>>> x(:,1)</code> <code>ans =</code> 1 4
Computing the dot product of 2 arrays or squaring a matrix; use ‘.’	<code>x.*y</code> <code>x.^2</code>
Make a 2 2D grids for contour and surface plots use: <code>meshgrid</code>	<code>[x,y]= meshgrid[-2:0.1:2,-</code> <code>5:0.1:5];</code>

MATLAB Functions – uncommon ones

		Example
$\theta = \tan^{-1} \frac{y}{x}$ where $-\pi \leq \theta \leq \pi$	<code>atan(y,x)</code>	
modulus	<code>mod</code>	<code>x=mod(3,2);</code>
Rounds to nearest larger integer	<code>ceil</code>	<code>>> x=ceil(3.5)</code> <code>x = 4</code>

Rounds to nearest smaller integer	<code>floor</code>	<pre>>> x=ceil(3.5) x = 3</pre>
Rounds to nearest integer	<code>round</code>	<pre>>> x=round(3.5) x = 4</pre>
Find the max or min value of a vector x, and its location	<code>max / min</code>	<pre>>> x=[1 3 5 0 -1 4]; >> [xmax,index]=max(x) xmax = 5 index = 3 >> [xmin,index]=min(x) xmin = -1 index = 5</pre>
Convert a matrix of numbers to a character	<code>char(x)</code>	
Convert a character string to a set if numbers	<code>double(x)</code>	
Convert a number to an integer string	<code>int2str(x)</code>	<pre>>> int2str(4.5) ans =5</pre>
Convert a number to a real string	<code>num2str(x)</code>	<pre>um2str(4.5) ans = 4.5</pre>
Convert a string to a number	<code>str2num</code>	

Conditionals and looping

	Example
<p>The while loop – a block of statements that is repeated indefinitely as long as some conditional is satisfied</p> <pre>while expression statement 1 statement 2 . . end</pre>	<pre>while x < 10 x = x + 1 end</pre>
<p>The for loop – a loop that executes a block of statements a specified number of times</p> <pre>For index = expr statement 1 statement 2 . . end</pre>	<pre>for n=1:10 x(n) = n end</pre>

Plotting

To	Use	example
Plot 2 vectors.	<code>plot(x,y)</code>	<pre>x=-pi:pi/10:pi y1=sin(x); plot(x,y1,'r-')</pre>
Add gridlines	<code>grid</code> – toggles the grid on/off <code>grid on</code> – turns the grid on <code>grid off</code> – turns the grid off	<pre>x=-pi:pi/10:pi; y1=sin(x); plot(x,y1,'r-'); grid on;</pre>
Do multiple overlaid plots on the same axis.	<code>hold on</code> / <code>hold off</code>	<pre>x=-pi:pi/10:pi; y1=sin(x); y2=cos(x); plot(x,y1,'r-') hold on plot(x,y2,'k--') hold off legend('sin x','cos x')</pre>
Do multiple figures.	use <code>figure(x)</code> where x is the figure number	<pre>figure(1) x=-pi:pi/10:pi; y1=sin(x); y2=cos(x); plot(x,y1) figure(2) plot(x,y2)</pre>
Do multiple plots.	use <code>subplot(m,n,p)</code>	<pre>x=-pi:pi/10:pi; y1=sin(x); y2=cos(x); subplot(2,1,1) plot(x,y1,'r-') subplot(2,1,2) plot(x,y2,'k--')</pre>
Polar plots	<code>polar(r,theta)</code>	<pre>theta=0:pi/10:2*pi; r=theta; polar(r,theta)</pre>
Adding titles to graphs.	<code>title('title')</code> , and <code>xlabel</code> and <code>ylabel</code> for x and y labels. See 'doc title' for more details, including special formatting	<pre>title('The title') xlabel('x'); ylabel('y');</pre>
Axis control:	<code>axis</code>	<pre>x=-pi:pi/10:pi; y1=sin(x); plot(x,y1,'r-'); axis([-pi pi -1 1]);</pre>
Set tick spaces	The command: <code>set(gca,'Xtick', vector)</code> where vector specifies the tick locationm, See: http://www.mathworks.com/access/helpdesk/help/techdoc/ref/axes_props.html For y use 'Ytick' and z 'Ztick'	<code>Set(gca,'xtick', 0:2:10)</code> – sets the x grid spacing from 0 to 10 in steps of 2
Do contour or surface plots	<code>surf</code> , <code>contour</code>	<pre>[x,y] = meshgrid([-2:0.2:2]); z = x.*exp(-x.^2-y.^2); surf(x,y,z)</pre>
Make the aspect ratio equal	<code>axis</code>	<pre>[x,y] = meshgrid([-2:0.2:2]); z = x.*exp(-x.^2-y.^2); contour(x,y,z); axis equal;</pre>