

MATLAB/GNU Octave quick reference sheet

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The < > symbols denote required arguments, [] args. are optional.

The bracketing symbols should not be written.

General session control

<code>whos</code>	List all defined variables
<code>clear</code>	Delete all defined variables
<code>clc</code>	Clear home screen
<code>edit <file>[.m]</code>	edit file, create if it doesn't already exist
<code>save '<filename>'</code>	Save all variables to <file-name>.mat
<code>load '<filename>'</code>	Load variables from <file-name>.mat
<code>help <command></code>	Quick help on <code>command</code>
<code>doc <command></code>	Extensive help on <code>command</code>

Variables

When assigning variables, the values will be displayed. This can be suppressed by adding the suffix ;

<code>ans</code>	Value of last calculation
<code>x = 1</code>	Define variable x to be a scalar with value 1
<code>x = y</code>	Set x equal to y
<code>v = [1,2,3]</code>	Define variable v to be a row vector with values $\begin{pmatrix} 1 & 2 & 3 \end{pmatrix}$
<code>v = [1;2;3]</code>	Define variable v to be a column vector
<code>M = [1,2,3;4,5,6]</code>	Define variable M to be a matrix with values $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix}$
<code>v = <s>[:st]:<e></code>	Create a row vector with values from s to e with a step size of st
<code>v = linspace(<s>,<e>[,<st>])</code>	Create a row vector with values from s to e with st intermediate values

<code>A = zeros(<N>[,M])</code>	Create a $N \times M$ matrix with values 0
<code>A = ones(<N>[,M])</code>	Create a $N \times M$ matrix with values 1
<code>A = rand(<N>[,M])</code>	Create a $N \times M$ matrix with uniformly distr. values in $[0, 1[$
<code>A = randn(<N>[,M])</code>	Create a $N \times M$ matrix with normal (Gaussian) distr. values with $\mu = 0, \sigma = 1$

Arithmetic and standard functions

In general, the number of elements returned equal the dimensions of the input variables. $\mathbf{a}*\mathbf{b} = ab$, $\mathbf{a}/\mathbf{b} = \frac{a}{b}$, $\mathbf{a}**\mathbf{b} = a^b$, $\mathbf{a}\% \mathbf{b}$: remainder, $\mathbf{sqrt}(\mathbf{a}) = \sqrt{a}$, $\mathbf{a}**(1/\mathbf{b}) = \sqrt[b]{a}$, $\mathbf{abs}(\mathbf{a}) = |a|$, $\mathbf{log}(\mathbf{a},\mathbf{b}) = \log_b(a)$ $\mathbf{sin}(\mathbf{a}) = \sin(a)$, $\mathbf{M}*\mathbf{N}$: element-wise multiplication of two vectors/matrices $\mathbf{M}*\mathbf{N}$: multiplication of two vectors/matrices $\mathbf{A}(:)$: show matrix as vector \mathbf{A}' : Transpose of vector/matrix $\mathbf{C}=[\mathbf{A};\mathbf{B}]$: Concentrate two vectors/matrices $\mathbf{size}(\mathbf{A})$: Dimensions of vector/matrix $\mathbf{sum}(\mathbf{A})$: Column sum of vector/matrix $\mathbf{inv}(\mathbf{A})$: Inverse of matrix $\mathbf{det}(\mathbf{A})$: Determinant of matrix $\mathbf{A} \backslash \mathbf{b}$: For a matrix A and col. vector b find solution x to $Ax = b$ Constants: $\mathbf{pi} = \pi$, $\mathbf{e} = e$, $\mathbf{i} = i$, $\mathbf{inf} = \infty$

Vector/matrix slicing

In the following, \mathbf{n} and \mathbf{m} can be single values or vectors.

<code>v(<n>)</code>	The n -th value of vector v
<code>v(1,<n>)</code>	The 1st to n -th value of vector v
<code>v(<n>,end)</code>	The n -th value to the end of vector v
<code>M(<n>,<m>)</code>	The n,m -th value of matrix M
<code>M(<n>, :)</code>	The n -th row of matrix M
<code>M(:, <n>)</code>	The n -th column of matrix M
<code>I = find(X > 2)</code>	Find indexes in X where the value is greater than 2

Plotting and visualization

In the following, \mathbf{n} and \mathbf{m} can be single values or vectors.

<code>figure</code>	Create new figure window
<code>plot(x,y)</code>	Plot vector y as a function of x with a line
<code>plot(x,y,'*')</code>	Plot vector y as a function of x with points
<code>plot(x,y,'*-')</code>	Plot vector y as a function of x with a line and points
<code>semilogx(x,y)</code>	Plot vector y as a function of x , with x on a log scale
<code>semilogy(x,y)</code>	Plot vector y as a function of x , with y on a log scale
<code>loglog(x,y)</code>	Plot vector y as a function of x , on a loglog scale
<code>hist(x)</code>	Plot a histogram of values in x
<code>grid</code>	Show numeric grid in the plot background
<code>axes equal</code>	Set a 1:1 aspect ratio on the plot axes
<code>title('bla')</code>	Set a plot title
<code>xlabel('bla')</code>	Set x -axis label

Custom functions

relations: `==`, `~=`, `>`, `<`, `<=`, `>=`

Conditional structures:

`if expr ... [elseif ...] [else ...] end`

Iteration structures: `for var=expr ... end`

Function syntax:

`function [out1, ...] = name (par1, ...)`

`...`
`end`

MATLAB reference manual

<http://www.mathworks.se/help/matlab/index.html>

GNU Octave reference manual

<https://www.gnu.org/software/octave/doc/interpreter/>

MATLAB/GNU Octave wikibook

https://en.wikibooks.org/wiki/MATLAB_Programming/GNU_Octave

Introduction to MATLAB

www.mathworks.com/moler/intro.pdf