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

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

Variables

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

`ans`	Value of last calculation
`x = 1`	Define variable x to be a scalar with value 1
`x = y`	Set x equal to y
`v = [1,2,3]`	Define variable v to be a row vector with values $\begin{pmatrix}1&2&3\end{pmatrix}$
`v = [1;2;3]`	Define variable v to be a column vector
`M = [1,2,3;4,5,6]`	Define variable M to be a matrix with values $\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix}$
`v = <s>[:st]:<e>`	Create a row vector with values from `s` to `e` with a step size of `st`
`v = linspace(<s>,<e>[,st])`	Create a row vector with values from `s` to `e` with `st` intermediate values
`A = zeros(<N>[,M])`	Create a $N \times M$ matrix with values 0
`A = ones(<N>[,M])`	Create a $N \times M$ matrix with values 1
`A = rand(<N>[,M])`	Create a $N \times M$ matrix with uniformly distr. values in $[0, 1[$
`A = randn(<N>[,M])`	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. `a*b` $= ab$, `a/b` $= \frac{a}{b}$, `a**b` $= a^b$, `a%b`: remainder, `sqrt(a)` $= \sqrt{a}$, `a**(1/b)` $= \sqrt[b]{a}$, `abs(a)` $= |a|$, `log(a,b)` $= \log_b(a)$ `sin(a)` $= \sin(a)$,
`M.*N`: element-wise multiplication of two vectors/matrices
`M*N`: multiplication of two vectors/matrices
`A(:)`: show matrix as vector
`A'`: Transpose of vector/matrix
`C=[A;B]`: Concentrate two vectors/matrices
`size(A)`: Dimensions of vector/matrix
`sum(A)`: Column sum of vector/matrix
`inv(A)`: Inverse of matrix
`det(A)`: Determinant of matrix
`A\b`: For a matrix A and col. vector b find solution x to $Ax = b$
Constants: `pi` $= \pi$, `e` $= e$, `i` $= i$, `inf` $= \infty$

Vector/matrix slicing

In the following, `n` and `m` can be single values or vectors.

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

Plotting and visualization

In the following, `n` and `m` can be single values or vectors.

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

Custom functions

elations: `==`, `~=`, `>`, `<`, `<=`, `>=`
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`