MATLAB Quick Reference

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General Purpose Commands

Managing Commands and Functions

addpath	Add directories to MATLAB's search path
doc	Display HTML documentation in Help browser
docopt	Display location of help file directory for UNIX platforms
genpath	Generate a path string
help	Display M-file help for MATLAB functions in the Command Window
helpbrowser	Display Help browser for access to all MathWorks online help
helpdesk	Display the Help browser
helpwin	Display M-file help and provide access to M-file help for all functions
lasterr	Last error message
lastwarn	Last warning message
license	license
lookfor	Search for specified keyword in all help entries
partialpath	Partial pathname
path	Control MATLAB's directory search path
pathtool	Open the GUI for viewing and modifying MATLAB's path
profile	Start the M-file profiler, a utility for debugging and optimizing code
profreport	Generate a profile report
rehash	Refresh function and file system caches
rmpath	Remove directories from MATLAB's search path
support	Open MathWorks Technical Support Web Page
type	List file
ver	Display version information for MATLAB, Simulink, and toolboxes
version	Get MATLAB version number
web	Point Help browser or Web browser at file or Web site
what	List MATLAB-specific files in current directory
whatsnew	Display README files for MATLAB and toolboxes
which	Locate functions and files

Managing Variables and the Workspace

clear	Remove items from the workspace
disp	Display text or array
length	Length of vector
load	Retrieve variables from disk
memory	Help for memory limitations
mlock	Prevent M-file clearing
munlock	Allow M-file clearing
openvar	Open workspace variable in Array Editor, for graphical editing
pack	Consolidate workspace memory
save	Save workspace variables on disk
saveas	Save figure or model using specified format
size	Array dimensions
who, whos	List the variables in the workspace
workspace	Display the Workspace Browser, a GUI for managing the workspace

Controlling the Command Window

clc	Clear Command Window
echo	Echo M-files during execution
format	Control the display format for output
home	Move cursor to upper left corner of Command Window
more	Control paged output for the Command Window

Working with Operating Environment

beep	Produce a beep sound
cd	Change working directory
checkin	Check file into source control system
checkout	Check file out of source control system
cmopts	Get name of source control system, and PVCS project filename
copyfile	Copy file
customverctrl	Allow custom source control system
delete	Delete files or graphics objects
diary	Save session to a disk file
dir	Display a directory listing
dos	Execute a DOS command and return the result
edit	Edit an M-file
fileparts	Get filename parts
filebrowser	Display Current Directory browser, for viewing files
fullfile	Build full filename from parts
info	Display contact information or toolbox Readme files
inmem	Functions in memory
ls	List directory on UNIX
matlabroot	Get root directory of MATLAB installation
mkdir	Make new directory
open	Open files based on extension
pwd	Display current directory
tempdir	Return the name of the system's temporary directory
tempname	Unique name for temporary file
undocheckout	Undo previous checkout from source control system
unix	Execute a UNIX command and return the result
!	Execute operating system command

Starting and Quitting MATLAB

finish	MATLAB termination M-file
exit	Terminate MATLAB
matlab	Start MATLAB (UNIX systems only)
matlabrc	MATLAB startup M-file
quit	Terminate MATLAB
startup	MATLAB startup M-file

Operators and Special Characters

+	Plus
-	Minus
*****	Matrix multiplication
.*	Array multiplication
^	Matrix power
.^	Array power
kron	Kronecker tensor product
****	Backslash or left division
/	Slash or right division
./ and .	Array division, right and left
:	Colon
( )	Parentheses
[ ]	Brackets
{}	Curly braces
.	Decimal point
...	Continuation

,	Comma
;	Semicolon
%	Comment
!	Exclamation point
‘	Transpose and quote
.’	Nonconjugated transpose
=	Assignment
==	Equality
< >	Relational operators
&	Logical and
|	Logical or
~	Logical not
xor	Logical exclusive or

Logical Functions

all	Test to determine if all elements are nonzero
any	Test for any nonzeros
exist	Check if a variable or file exists
find	Find indices and values of nonzero elements
is*	Detect state
isa	Detect an object of a given class
iskeyword	Test if string is a MATLAB keyword
isvarname	Test if string is a valid variable name
logical	Convert numeric values to logical
mislocked	True if M-file cannot be cleared

Elementary Math Functions

abs	Absolute value and complex magnitude
acos, acosh	Inverse cosine and inverse hyperbolic cosine
acot, acoth	Inverse cotangent and inverse hyperbolic cotangent
acsc, acsch	Inverse cosecant and inverse hyperbolic cosecant
angle	Phase angle
asec, asech	Inverse secant and inverse hyperbolic secant
asin, asinh	Inverse sine and inverse hyperbolic sine
atan, atanh	Inverse tangent and inverse hyperbolic tangent
atan2	Four-quadrant inverse tangent
ceil	Round toward infinity
complex	Construct complex data from real and imaginary components
conj	Complex conjugate
cos, cosh	Cosine and hyperbolic cosine
cot, coth	Cotangent and hyperbolic cotangent
csc, csch	Cosecant and hyperbolic cosecant
exp	Exponential
fix	Round towards zero
floor	Round towards minus infinity
gcd	Greatest common divisor
imag	Imaginary part of a complex number
lcm	Least common multiple
log	Natural logarithm
log2	Base 2 logarithm and dissect floating-point numbers into exponent and mantissa
log10	Common (base 10) logarithm
mod	Modulus (signed remainder after division)
nchoosek	Binomial coefficient or all combinations
real	Real part of complex number
rem	Remainder after division
round	Round to nearest integer
sec, sech	Secant and hyperbolic secant
sign	Signum function
sin, sinh	Sine and hyperbolic sine
sqrt	Square root
tan, tanh	Tangent and hyperbolic tangent

Language Constructs and Debugging

MATLAB as a Programming Language

builtin	Execute builtin function from overloaded method
eval	Interpret strings containing MATLAB expressions
evalc	Evaluate MATLAB expression with capture
evalin	Evaluate expression in workspace
feval	Function evaluation
function	Function M-files
global	Define global variables
nargchk	Check number of input arguments
persistent	Define persistent variable
script	Script M-files

Control Flow

break	Terminate execution of for loop or while loop
case	Case switch
catch	Begin catch block
continue	Pass control to the next iteration of for or while loop
else	Conditionally execute statements
elseif	Conditionally execute statements
end	Terminate for, while, switch, try, and if statements or indicate last index
error	Display error messages
for	Repeat statements a specific number of times
if	Conditionally execute statements
otherwise	Default part of switch statement
return	Return to the invoking function
switch	Switch among several cases based on expression
try	Begin try block
warning	Display warning message
while	Repeat statements an indefinite number of times

Interactive Input

input	Request user input
keyboard	Invoke the keyboard in an M-file
menu	Generate a menu of choices for user input
pause	Halt execution temporarily

Object-Oriented Programming

class	Create object or return class of object
double	Convert to double precision
inferiorto	Inferior class relationship
inline	Construct an inline object
int8, int16, int32	Convert to signed integer
isa	Detect an object of a given class
loadobj	Extends the load function for user objects
saveobj	Save filter for objects
single	Convert to single precision
superiorto	Superior class relationship
uint8, uint16, uint32	Convert to unsigned integer

Debugging

dbclear	Clear breakpoints

dbcont	Resume execution
dbdown	Change local workspace context
dbmex	Enable MEX-file debugging
dbquit	Quit debug mode
dbstack	Display function call stack
dbstatus	List all breakpoints
dbstep	Execute one or more lines from a breakpoint
dbstop	Set breakpoints in an M-file function
dbtype	List M-file with line numbers
dbup	Change local workspace context

Function Handles

function_handle	MATLAB data type that is a handle to a function
functions	Return information about a function handle
func2str	Constructs a function name string from a function handle
str2func	Constructs a function handle from a function name string

Character String Functions

General

abs	Absolute value and complex magnitude
eval	Interpret strings containing MATLAB expressions
real	Real part of complex number
strings	MATLAB string handling

String to Function Handle Conversion

func2str	Constructs a function name string from a function handle
str2func	Constructs a function handle from a function name string

String Manipulation

deblank	Strip trailing blanks from the end of a string
findstr	Find one string within another
lower	Convert string to lower case
strcat	String concatenation
strcmp	Compare strings
strcmpi	Compare strings, ignoring case
strjust	Justify a character array
strmatch	Find possible matches for a string
strncmp	Compare the first n characters of strings
strncmpi	Compare the first n characters of strings, ignoring case
strrep	String search and replace
strtok	First token in string
strvcat	Vertical concatenation of strings
symvar	Determine symbolic variables in an expression
texlabel	Produce the TeX format from a character string
upper	Convert string to upper case

String to Number Conversion

char	Create character array (string)
int2str	Integer to string conversion
mat2str	Convert a matrix into a string
num2str	Number to string conversion
sprintf	Write formatted data to a string
sscanf	Read string under format control
str2double	Convert string to double-precision value
str2mat	String to matrix conversion
str2num	String to number conversion

Radix Conversion

bin2dec	Binary to decimal number conversion
dec2bin	Decimal to binary number conversion
dec2hex	Decimal to hexadecimal number conversion
hex2dec	Hexadecimal to decimal number conversion
hex2num	Hexadecimal to double number conversion

Matrix Manipulation

Elementary Matrices and Arrays

blkdiag	Construct a block diagonal matrix from input arguments
eye	Identity matrix
linspace	Generate linearly spaced vectors
logspace	Generate logarithmically spaced vectors
numel	Number of elements in a matrix or cell array
ones	Create an array of all ones
rand	Uniformly distributed random numbers and arrays
randn	Normally distributed random numbers and arrays
zeros	Create an array of all zeros
: (colon)	Regularly spaced vector

Special Variables and Constants

ans	The most recent answer
computer	Identify the computer on which MATLAB is running
eps	Floating-point relative accuracy
i	Imaginary unit
Inf	Infinity
inputname	Input argument name
j	Imaginary unit
NaN	Not-a-Number
nargin, nargout	Number of function arguments
nargoutchk	Validate number of output arguments
pi	Ratio of a circle's circumference to its diameter,
realmax	Largest positive floating-point number
realmin	Smallest positive floating-point number
varargin, varargout	Pass or return variable numbers of arguments

Time and Dates

calendar	Calendar
clock	Current time as a date vector
cputime	Elapsed CPU time
date	Current date string
datenum	Serial date number
datestr	Date string format
datevec	Date components
eomday	End of month
etime	Elapsed time
now	Current date and time
tic, toc	Stopwatch timer
weekday	Day of the week

Matrix Manipulation

cat	Concatenate arrays
diag	Diagonal matrices and diagonals of a matrix
fliplr	Flip matrices left-right
flipud	Flip matrices up-down

repmat	Replicate and tile an array
reshape	Reshape array
rot90	Rotate matrix 90 degrees
tril	Lower triangular part of a matrix
triu	Upper triangular part of a matrix
: (colon)	Index into array, rearrange array

Vector Functions

cross	Vector cross product
dot	Vector dot product
intersect	Set intersection of two vectors
ismember	Detect members of a set
setdiff	Return the set difference of two vector
setxor	Set exclusive or of two vectors
union	Set union of two vectors
unique	Unique elements of a vector

Specialized Matrices

compan	Companion matrix
gallery	Test matrices
hadamard	Hadamard matrix
hankel	Hankel matrix
hilb	Hilbert matrix
invhilb	Inverse of the Hilbert matrix
magic	Magic square
pascal	Pascal matrix
toeplitz	Toeplitz matrix
wilkinson	Wilkinson's eigenvalue test matrix

Bitwise Functions

bitand	Bit-wise AND
bitcmp	Complement bits
bitor	Bit-wise OR
bitmax	Maximum floating-point integer
bitset	Set bit
bitshift	Bit-wise shift
bitget	Get bit
bitxor	Bit-wise XOR

Structure Functions

fieldnames	Field names of a structure
getfield	Get field of structure array
rmfield	Remove structure fields
setfield	Set field of structure array
struct	Create structure array
struct2cell	Structure to cell array conversion

MATLAB Object Functions

class	Create object or return class of object
isa	Detect an object of a given class
methods	Display method names
methodsview	Displays information on all methods implemented by a class
subsasgn	Overloaded method for A(I)=B, A{I}=B, and A.field=B
subsindex	Overloaded method for X(A)
subsref	Overloaded method for A(I), A{I} and A.field

Cell Array Functions

cell	Create cell array
cellfun	Apply a function to each element in a cell array
cellstr	Create cell array of strings from character array
cell2struct	Cell array to structure array conversion
celldisp	Display cell array contents
cellplot	Graphically display the structure of cell arrays
num2cell	Convert a numeric array into a cell array

Multidimensional Array Functions

cat	Concatenate arrays
flipdim	Flip array along a specified dimension
ind2sub	Subscripts from linear index
ipermute	Inverse permute the dimensions of a multidimensional array
ndgrid	Generate arrays for multidimensional functions and interpolation
ndims	Number of array dimensions
permute	Rearrange the dimensions of a multidimensional array
reshape	Reshape array
shiftdim	Shift dimensions
squeeze	Remove singleton dimensions
sub2ind	Single index from subscripts

Sound Processing Functions

General Sound Functions

lin2mu	Convert linear audio signal to mu-law
mu2lin	Convert mu-law audio signal to linear
sound	Convert vector into sound
soundsc	Scale data and play as sound

SPARCstation-Specific Sound Functions

auread	Read NeXT/SUN (.au) sound file
auwrite	Write NeXT/SUN (.au) sound file

.WAV Sound Functions

wavplay	Play recorded sound on a PC-based audio output device
wavread	Read Microsoft WAVE (.wav) sound file
wavrecord	Record sound using a PC-based audio input device
wavwrite	Write Microsoft WAVE (.wav) sound file

File I/O Functions

File Opening and Closing

fclose	Close one or more open files
fopen	Open a file or obtain information about open files

Unformatted I/O

fread	Read binary data from file
fwrite	Write binary data to a file

Formatted I/O

fgetl	Return the next line of a file as a string without line terminator(s)
fgets	Return the next line of a file as a string with line terminator(s)
fprintf	Write formatted data to file
fscanf	Read formatted data from file

File Positioning

feof	Test for end-of-file

ferror	Query MATLAB about errors in file input or output
frewind	Rewind an open file
fseek	Set file position indicator
ftell	Get file position indicator

String Conversion

sprintf	Write formatted data to a string
sscanf	Read string under format control

Specialized File I/O

dlmread	Read an ASCII delimited file into a matrix
dlmwrite	Write a matrix to an ASCII delimited file
hdf	HDF interface
imfinfo	Return information about a graphics file
imread	Read image from graphics file
imwrite	Write an image to a graphics file
strread	Read formatted data from a string
textread	Read formatted data from text file
wk1read	Read a Lotus123 WK1 spreadsheet file into a matrix
wk1write	Write a matrix to a Lotus123 WK1 spreadsheet file

Specialized Math Functions

airy	Airy functions
besselh	Bessel functions of the third kind (Hankel functions)
besseli, besselk	Modified Bessel functions
besselj, bessely	Bessel functions
beta, betainc, betaln	Beta functions
ellipj	Jacobi elliptic functions
ellipke	Complete elliptic integrals of the first and second kind
erf, erfc, erfcx, erfinv	Error functions
expint	Exponential integral
factorial	Factorial function
gamma, gammainc, gammaln	Gamma functions
legendre	Associated Legendre functions
pow2	Base 2 power and scale floating-point numbers
rat, rats	Rational fraction approximation

Coordinate System Conversion

cart2pol	Transform Cartesian coordinates to polar or cylindrical
cart2sph	Transform Cartesian coordinates to spherical
pol2cart	Transform polar or cylindrical coordinates to Cartesian
sph2cart	Transform spherical coordinates to Cartesian

Matrix Functions

Matrix Analysis

cond	Condition number with respect to inversion
condeig	Condition number with respect to eigenvalues
det	Matrix determinant
norm	Vector and matrix norms
null	Null space of a matrix
orth	Range space of a matrix
rank	Rank of a matrix
rcond	Matrix reciprocal condition number estimate
rref, rrefmovie	Reduced row echelon form
subspace	Angle between two subspaces
trace	Sum of diagonal elements

Linear Equations

chol	Cholesky factorization
inv	Matrix inverse
lscov	Least squares solution in the presence of known covariance
lu	LU matrix factorization
lsqnonneg	Nonnegative least squares
minres	Minimum Residual Method
pinv	Moore-Penrose pseudoinverse of a matrix
qr	Orthogonal-triangular decomposition
symmlq	Symmetric LQ method

Eigenvalues and Singular Values

balance	Improve accuracy of computed eigenvalues
cdf2rdf	Convert complex diagonal form to real block diagonal form
eig	Eigenvalues and eigenvectors
gsvd	Generalized singular value decomposition
hess	Hessenberg form of a matrix
poly	Polynomial with specified roots
qz	QZ factorization for generalized eigenvalues
rsf2csf	Convert real Schur form to complex Schur form
schur	Schur decomposition
svd	Singular value decomposition

Matrix Functions

expm	Matrix exponential
funm	Evaluate general matrix function
logm	Matrix logarithm
sqrtm	Matrix square root

Low Level Functions

qrdelete	Delete column from QR factorization
qrinsert	Insert column in QR factorization

Data Analysis and Fourier Transform

Basic Operations

cumprod	Cumulative product
cumsum	Cumulative sum
cumtrapz	Cumulative trapezoidal numerical integration
factor	Prime factors
inpolygon	Detect points inside a polygonal region
max	Maximum elements of an array
mean	Average or mean value of arrays
median	Median value of arrays
min	Minimum elements of an array
perms	All possible permutations
polyarea	Area of polygon
primes	Generate list of prime numbers
prod	Product of array elements
rectint	Rectangle intersection Area
sort	Sort elements in ascending order
sortrows	Sort rows in ascending order
std	Standard deviation
sum	Sum of array elements
trapz	Trapezoidal numerical integration

var	Variance

Finite Differences

del2	Discrete Laplacian
diff	Differences and approximate derivatives
gradient	Numerical gradient

Correlation

corrcoef	Correlation coefficients
cov	Covariance matrix

Filtering and Convolution

conv	Convolution and polynomial multiplication
conv2	Two-dimensional convolution
deconv	Deconvolution and polynomial division
filter	Filter data with an infinite impulse response (IIR) or finite impulse response (FIR) filter
filter2	Two-dimensional digital filtering

Fourier Transforms

abs	Absolute value and complex magnitude
angle	Phase angle
cplxpair	Sort complex numbers into complex conjugate pairs
fft	One-dimensional fast Fourier transform
fft2	Two-dimensional fast Fourier transform
fftshift	Shift DC component of fast Fourier transform to center of spectrum
ifft	Inverse one-dimensional fast Fourier transform
ifft2	Inverse two-dimensional fast Fourier transform
ifftn	Inverse multidimensional fast Fourier transform
ifftshift	Inverse FFT shift
nextpow2	Next power of two
unwrap	Correct phase angles

Polynomial and Interpolation Functions

Polynomials

conv	Convolution and polynomial multiplication
deconv	Deconvolution and polynomial division
poly	Polynomial with specified roots
polyder	Polynomial derivative
polyeig	Polynomial eigenvalue problem
polyfit	Polynomial curve fitting
polyint	Analytic polynomial integration
polyval	Polynomial evaluation
polyvalm	Matrix polynomial evaluat ion
residue	Convert between partial fraction expansion and polynomial coefficients
roots	Polynomial roots

Data Interpolation

convhull	Convex hull
convhulln	Multidimensional convex hull
delaunay	Delaunay triangulation
delaunay3	Three-dimensionalDelaunay tessellation
delaunayn	Multidimensional Delaunay tessellation
dsearch	Search for nearest point
dsearchn	Multidimensional closest point search
griddata	Data gridding
griddata3	Data gridding and hypersurface fitting for three-dimensional data
griddatan	Data gridding and hypersurface fitting (dimension >= 2)
interp1	One-dimensional data interpolation (table lookup)
interp2	Two-dimensional data interpolation (table lookup)
interp3	Three-dimensional data interpolation (table lookup)
interpft	One-dimensional interpolation using the FFT method
interpn	Multidimensional data interpolation (table lookup)
meshgrid	Generate X and Y matrices for three-dimensional plots
ndgrid	Generate arrays for multidimensional functions and interpolation
pchip	Piecewise Cubic Hermite Interpolating Polynomial (PCHIP)
ppval	Piecewise polynomial evaluation
spline	Cubic spline data interpolation
tsearch	Search for enclosing Delaunay triangle
tsearchn	Multidimensional closest simplex search
voronoi	Voronoi diagram
voronoin	Multidimensional Voronoi diagrams

Function Functions - Nonlinear Numerical Methods

bvp4c	Solve two-point boundry value problems (BVPs) for ordinary differential equations (ODEs)
bvpget	Extract parameters from BVP options structure
bvpinit	Form the initial guess for bvp4c
bvpset	Create/alter BVP options structure
bvpval	Evaluate the solution computed by bvp4c
dblquad	Numerical evaluation of double integrals
fminbnd	Minimize a function of one variable
fminsearch	Minimize a function of several variables
fzero	Find zero of a function of one variable
ode45, ode23, ode113, ode15s, ode23s, ode23t, ode23tb	Solve initial value problems for ODEs
odeget	Extract parameters from ODE options structure
odeset	Create/alter ODE options structure
optimget	Get optimization options structure parameter values
optimset	Create or edit optimization options parameter structure
pdepe	Solve initial-boundary value problems
pdeval	Evaluate the solution computed by pdepe
quad	Numerical evaluation of integrals, adaptive Simpson quadrature
quadl	Numerical evaluation of integrals, adaptive Lobatto quadrature
vectorize	Vectorize expression

Sparse Matrix Functions

Elementary Sparse Matrices

spdiags	Extract and create sparse band and diagonal matrices
speye	Sparse identity matrix
sprand	Sparse uniformly distributed random matrix
sprandn	Sparse normally distributed random matrix
sprandsym	Sparse symmetric random matrix

Full to Sparse Conversion

find	Find indices and values of nonzero elements
full	Convert sparse matrix to full matrix
sparse	Create sparse matrix

spconvert	Import matrix from sparse matrix external format

Working with Nonzero Entries

nnz	Number of nonzero matrix elements
nonzeros	Nonzero matrix elements
nzmax	Amount of storage allocated for nonzero matrix elements
spalloc	Allocate space for sparse matrix
spfun	Apply function to nonzero sparse matrix elements
spones	Replace nonzero sparse matrix elements with ones

Visualizing Sparse Matrices

spy	Visualize sparsity pattern

Reordering Algorithms

colamd	Column approximate minimum degree permutation
colmmd	Sparse column minimum degree permutation
colperm	Sparse column permutation based on nonzero count
dmperm	Dulmage-Mendelsohn decomposition
randperm	Random permutation
symamd	Symmetric approximate minimum degree permutation
symmmd	Sparse symmetric minimum degree ordering
symrcm	Sparse reverse Cuthill-McKee ordering

Norm, Condition Number, and Rank

condest	1-norm matrix condition number estimate
normest	2-norm estimate

Sparse Systems of Linear Equations

bicg	BiConjugate Gradients method
bicgstab	BiConjugate Gradients Stabilized method
cgs	Conjugate Gradients Squared method
cholinc	Sparse Incomplete Cholesky and Cholesky-Infinity factorizations
cholupdate	Rank 1 update to Cholesky factorization
gmres	Generalized Minimum Residual method (with restarts)
lsqr	LSQR implementation of Conjugate Gradients on the normal equations
luinc	Incomplete LU matrix factorizations
pcg	Preconditioned Conjugate Gradients method
qmr	Quasi-Minimal Residual method
qr	Orthogonal-triangular decomposition
qrdelete	Delete column from QR factorization
qrinsert	Insert column in QR factorization
qrupdate	Rank 1 update to QR factorization

Sparse Eigenvalues and Singular Values

eigs	Find eigenvalues and eigenvectors
svds	Find singular values

Miscellaneous

spparms	Set parameters for sparse matrix routines

Plotting and Data Visualization

Basic Plots and Graphs

bar	Vertical bar chart
barh	Horizontal bar chart
hist	Plot histograms
histc	Histogram count
hold	Hold current graph
loglog	Plot using log-log scales
pie	Pie plot
plot	Plot vectors or matrices.
polar	Polar coordinate plot
semilogx	Semi-log scale plot
semilogy	Semi-log scale plot
subplot	Create axes in tiled positions

Three-Dimensional Plotting

bar3	Vertical 3-D bar chart
bar3h	Horizontal 3-D bar chart
comet3	3-D comet plot
cylinder	Generate cylinder
fill3	Draw filled 3-D polygons in 3-space
plot3	Plot lines and points in 3-D space
quiver3	3-D quiver (or velocity) plot
slice	Volumetric slice plot
sphere	Generate sphere
stem3	Plot discrete surface data
waterfall	Waterfall plot

Plot Annotation and Grids

clabel	Add contour labels to a contour plot
datetick	Date formatted tick labels
grid	Grid lines for 2-D and 3-D plots
gtext	Place text on a 2-D graph using a mouse
legend	Graph legend for lines and patches
plotyy	Plot graphs with Y tick labels on the left and right
title	Titles for 2-D and 3-D plots
xlabel	X-axis labels for 2-D and 3-D plots
ylabel	Y-axis labels for 2-D and 3-D plots
zlabel	Z-axis labels for 3-D plots

Surface, Mesh, and Contour Plots

contour	Contour (level curves) plot
contourc	Contour computation
contourf	Filled contour plot
hidden	Mesh hidden line removal mode
meshc	Combination mesh/contourplot
mesh	3-D mesh with reference plane
peaks	A sample function of two variables
surf	3-D shaded surface graph
surface	Create surface low-level objects
surfc	Combination surf/contourplot
surfl	3-D shaded surface with lighting
trimesh	Triangular mesh plot
trisurf	Triangular surface plot

Volume Visualization

coneplot	Plot velocity vectors as cones in 3-D vector field
contourslice	Draw contours in volume slice plane
curl	Compute the curl and angular velocity of a vector field
divergence	Compute the divergence of a vector field

flow	Generate scalar volume data
interpstreamspeed	Interpolate streamline vertices from vector-field magnitudes
isocaps	Compute isosurface end-cap geometry
isocolors	Compute the colors of isosurface vertices
isonormals	Compute normals of isosurface vertices
isosurface	Extract isosurface data from volume data
reducepatch	Reduce the number of patch faces
reducevolume	Reduce number of elements in volume data set
shrinkfaces	Reduce the size of patch faces
slice	Draw slice planes in volume
smooth3	Smooth 3-D data
stream2	Compute 2-D stream line data
stream3	Compute 3-D stream line data
streamline	Draw stream lines from 2- or 3-D vector data
streamparticles	Draws stream particles from vector volume data
streamribbon	Draws stream ribbons from vector volume data
streamslice	Draws well-spaced stream lines from vector volume data
streamtube	Draws stream tubes from vector volume data
surf2patch	Convert srface data to patch data
subvolume	Extract subset of volume data set
volumebounds	Return coordinate and color limits for volume (scalar and vector)

Domain Generation

griddata	Data gridding and surface fitting
meshgrid	Generation of X and Y arrays for 3-D plots

Specialized Plotting

area	Area plot
box	Axis box for 2-D and 3-D plots
comet	Comet plot
compass	Compass plot
errorbar	Plot graph with error bars
ezcontour	Easy to use contour plotter
ezcontourf	Easy to use filled contour plotter
ezmesh	Easy to use 3-D mesh plotter
ezmeshc	Easy to use combination mesh/contour plotter
ezplot	Easy to use function plotter
ezplot3	Easy to use 3-D parametric curve plotter
ezpolar	Easy to use polar coordinate plotter
ezsurf	Easy to use 3-D colored surface plotter
ezsurfc	Easy to use combination surface/contour plotter
feather	Feather plot
fill	Draw filled 2-D polygons
fplot	Plot a function
pareto	Pareto char
pie3	3-D pie plot
plotmatrix	Scatter plot matrix
pcolor	Pseudocolor (checkerboard) plot
rose	Plot rose or angle histogram
quiver	Quiver (or velocity) plot
ribbon	Ribbon plot
stairs	Stairstep graph
scatter	Scatter plot
scatter3	3-D scatter plot
stem	Plot discrete sequence data
convhull	Convex hull
delaunay	Delaunay triangulation
dsearch	Search Delaunay triangulation for nearest point
inpolygon	True for points inside a polygonal region
polyarea	Area of polygon
tsearch	Search for enclosing Delaunay triangle
voronoi	Voronoi diagram

View Control

camdolly	Move camera position and target
camlookat	View specific objects
camorbit	Orbit about camera target
campan	Rotate camera target about camera position
campos	Set or get camera position
camproj	Set or get projection type
camroll	Rotate camera about viewing axis
camtarget	Set or get camera target
camup	Set or get camera up-vector
camva	Set or get camera view angle
camzoom	Zoom camera in or out
daspect	Set or get data aspect ratio
pbaspect	Set or get plot box aspect ratio
view	3-D graph viewpoint specification.
viewmtx	Generate view transformation matrices
xlim	Set or get the current x-axis limits
ylim	Set or get the current y-axis limits
zlim	Set or get the current z-axis limits

Lighting

camlight	Cerate or position Light
light	Light object creation function
lighting	Lighting mode
lightangle	Position light in sphereical coordinates
material	Material reflectance mode

Transparency

alpha	Set or query transparency properties for objects in current axes
alphamap	Specify the figure alphamap
alim	Set or query the axes alpha limits

Color Operations

brighten	Brighten or darken color map
caxis	Pseudocolor axis scaling
colorbar	Display color bar (color scale)
colordef	Set up color defaults
colormap	Set the color look-up table (list of colormaps)
graymon	Graphics figure defaults set for grayscale monitor
hsv2rgb	Hue-saturation-value to red-green-blue conversion
rgb2hsv	RGB to HSVconversion
rgbplot	Plot color map
shading	Color shading mode
spinmap	Spin the colormap
surfnorm	3-D surface normals
whitebg	Change axes background color for plots

Colormaps

autumn	Shades of red and yellow color map
bone	Gray-scale with a tinge of blue color map

contrast	Gray color map to enhance image contrast
cool	Shades of cyan and magenta color map
copper	Linear copper-tone color map
flag	Alternating red, white, blue, and black color map
gray	Linear gray-scale color map
hot	Black-red-yellow-white color map
hsv	Hue-saturation-value (HSV) color map
jet	Variant of HSV
lines	Line color colormap
prism	Colormap of prism colors
spring	Shades of magenta and yellow color map
summer	Shades of green and yellow colormap
winter	Shades of blue and green color map

Printing

orient	Hardcopy paper orientation
pagesetupdlg	Page position dialog box
print	Print graph or save graph to file
printdlg	Print dialog box
printopt	Configure local printer defaults
saveas	Save figure to graphic file

Handle Graphics, General

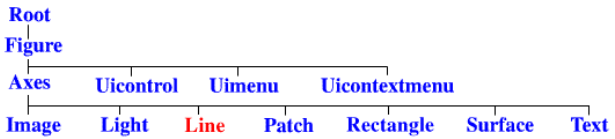
allchild	Find all children of specified objects
copyobj	Make a copy of a graphics object and its children
findall	Find all graphics objects (including hidden handles)
findobj	Find objects with specified property values
gcbo	Return object whose callback is currently executing
gco	Return handle of current object
get	Get object properties
rotate	Rotate objects about specified origin and direction
ishandle	True for graphics objects
set	Set object properties

Working with Application Data

getappdata	Get value of application data
isappdata	True if application data exists
rmappdata	Remove application data
setappdata	Specify application data

Handle Graphics, Object Creation

axes	Create Axes object
figure	Create Figure (graph) windows
image	Create Image (2-D matrix)
light	Create Light object (illuminates Patch and Surface)
line	Create Line object (3-D polylines)
patch	Create Patch object (polygons)
rectangle	Create Rectangle object (2-D rectangle)
surface	Create Surface (quadrilaterals)
text	Create Text object (character strings)
uicontextmenu	Create context menu (popup associated with object)



Handle Graphics, Figure Windows

capture	Screen capture of the current figure
clc	Clear figure window
clf	Clear figure
close	Close specified window
closereq	Default close request function
gcf	Get current figure handle
newplot	Graphics M-file preamble for NextPlot property
refresh	Refresh figure
saveas	Save figure or model to desired output format

Handle Graphics, Axes

axis	Plot axis scaling and appearance
cla	Clear Axes
gca	Get current Axes handle

Object Manipulation

reset	Reset axis or figure
rotate3d	Interactively rotate the view of a 3-D plot
selectmoveresize	Interactively select, move, or resize objects

Interactive User Input

ginput	Graphical input from a mouse or cursor
zoom	Zoom in and out on a 2-D plot

Region of Interest

dragrect	Drag XOR rectangles with mouse
drawnow	Complete any pending drawing
rbbox	Rubberband box

Graphical User Interfaces

Dialog Boxes

dialog	Create a dialog box
errordlg	Create error dialog box
helpdlg	Display help dialog box
inputdlg	Create input dialog box
listdlg	Create list selection dialog box
msgbox	Create message dialog box
pagedlg	Display page layout dialog box
printdlg	Display print dialog box
questdlg	Create question dialog box
uigetfile	Display dialog box to retrieve name of file for reading
uiputfile	Display dialog box to retrieve name of file for writing
uisetcolor	Interactively set a ColorSpec using a dialog box
uisetfont	Interactively set a font using a dialog box
warndlg	Create warning dialog box

User Interface Deployment

guidata	Store or retrieve application data
guihandles	Create a structure of handles
movegui	Move GUI figure onscreen
openfig	Open or raise GUI figure

User Interface Development

guide	Open the GUI Layout Editor
inspect	Display Property Inspector

MATLAB Interface to Java

class	Create object or return class of object
import	Add a package or class to the current Java import list
isa	Detect an object of a given class
isjava	Test whether an object is a Java object
javaArray	Constructs a Java array
javaMethod	Invokes a Java method
javaObject	Constructs a Java object
methods	Display method names
methodsview	Displays information on all methods implemented by a class

External Programming Interface

C MEX-Functions

mexAtExit	Register function to be called when MATLAB is cleared or terminates
mexCallMATLAB	Call MATLAB function or user-defined M-file or MEX-file
mexErrMsgTxt	Issue error message and return to MATLAB
mexEvalString	Execute MATLAB command in caller's workspace
mexFunction	Entry point to C MEX-file
mexFunctionName	Name of current MEX-function
mexGet	Get value of Handle Graphics property
mexGetArray	Get copy of variable from another workspace
mexGetArrayPtr	Get read-only pointer to variable from another workspace
mexIsGlobal	True if mxArray has global scope
mexIsLocked	True if MEX-file is locked
mexLock	Lock MEX-file so it cannot be cleared from memory
mexMakeArrayPersistent	Make mxArray persist after MEX-file completes
mexMakeMemoryPersistent	Make memory allocated by MATLAB's memory allocation routines persist after MEX-file completes
mexPrintf	ANSI C printf-style output routine
mexPutArray	Copy mxArray from your MEX-file into another workspace
mexSet	Set value of Handle Graphics property
mexSetTrapFlag	Control response of mexCallMATLAB to errors
mexUnlock	Unlock MEX-file so it can be cleared from memory
mexWarnMsgTxt	Issue warning message

C MX Functions

mxAddField	Add field to structure array
mxArrayToString	Convert arrays to strings
mxAssert	Check assertion value
mxAssertS	Check assertion value; doesn't print assertion's text
mxCalcSingleSubscript	Return offset from first element to desired element
mxCalloc	Allocate dynamic memory
mxChar	String mxArrays data type
mxClassID	Enumerated data type that identifies mxArray's class
mxClearLogical	Clear logical flag
mxComplexity	Specifies if mxArray has imaginary components
mxCreateCellArray	Create unpopulated N-dimensional cell mxArray
mxCreateCellMatrix	Create unpopulated two-dimensional cell mxArray
mxCreateCharArray	Create unpopulated N-dimensional string mxArray
mxCreateCharMatrixFromStrings	Create populated t wo-dimensional string mxArray
mxCreateDoubleMatrix	Create unpopulated two-dimensional, double-precision, floating-point mxArray
mxCreateNumericArray	Create unpopulated N-dimensional numeric mxArray
mxCreateNumericMatrix	Create numeric matrix and initialize data elements to 0
mxCreateScalarDouble	Create scalar, double-precision array initialized to specified value
mxCreateSparse	Create two-dimensional unpopulated sparse mxArray
mxCreateString	Create 1-by-n string mxArray initialized to specified strin g
mxCreateStructArray	Create unpopulated N-dimensional structure mxArray
mxCreateStructMatrix	Create unpopulated two-dimensional structure mxArray
mxDestroyArray	Free dynamic memory allocated by an mxCreate routine
mxDuplicateArray	Make deep copy of array
mxFree	Free dynamic memory allocated by mxCalloc
mxGetCell	Get cell's contents
mxGetClassID	Get mxArray's class
mxGetClassName	Get mxArray's class
mxGetData	Get pointer to data
mxGetDimensions	Get pointer to dimensions array
mxGetElementSize	Get number of bytes required to store each data element
mxGetEps	Get value of eps
mxGetField	Get field value, given field name and index in structure array
mxGetFieldByNumber	Get field value, given field number and index in structure array
mxGetFieldNameByNumber	Get field name, given field number in structure array
mxGetFieldNumber	Get field number, given field name in structure array
mxGetImagData	Get pointer to imaginary data of mxArray
mxGetInf	Get value of infinity
mxGetIr	Get ir array of sparse matrix
mxGetJc	Get jc array of sparse matrix
mxGetM	Get number of rows
mxGetN	Get number of columns or number of elements
mxGetName	Get name of specified mxArray
mxGetNaN	Get the value of NaN
mxGetNumberOfDimensions	Get number of dimensions
mxGetNumbe rOfElements	Get number of elements in array
mxGetNumberOfFields	Get number of fields in structure mxArray
mxGetNzmax	Get number of elements in ir, pr, and pi arrays
mxGetPi	Get mxArray's imaginary data elements
mxGetPr	Get mxArray's real data elements
mxGetScalar	Get real component of mxArray's first data element
mxGetString	Copy string mxArray's data into C-style string
mxIsCell	True if cell mxArray
mxIsChar	True if string mxArray
mxIsClass	True if mxArray is member of specified class
mxIsComplex	True if data is complex
mxIsDouble	True if mxArray represents its data as double-precision, floating-point numbers

mxIsEmpty	True if mxArray is empty
mxIsFinite	True if value is finite
mxIsFromGlobalWS	True if mxArray was copied from MATLAB's global workspace
mxIsInf	True if value is infinite
mxIsInt8	True if mxArray represents its data as signed 8-bit integers
mxIsInt16	True if mxArray represents its data as signed 16-bit integers
mxIsInt32	True if mxArray represents its data as signed 32-bit integers
mxIsLogical	True if mxArray is Boolean
mxIsNaN	True if value is NaN
mxIsNumeric	True if mxArray is numeric
mxIsSingle	True if mxArray represents its data as single-precision, floating-point numbers
mxIsSparse	True if sparse mxArray
mxIsStruct	True if structure mxArray
mxIsUint8	True if mxArray represents its data as unsigned 8-bit integers
mxIsUint16	True if mxArray represents its data as unsigned 16-bit integers
mxIsUint32	True if mxArray represents its data as unsigned 32-bit integers
mxMalloc	Allocate dynamic memory using MATLAB's memory manager
mxRealloc	Reallocate memory
mxRemoveField	Remove field from structure array
mxSetAllocFcns	Register memory allocation/deallocation functions in stand-alone engine or MAT application
mxSetCell	Set value of one cell
mxSetClassName	Convert MATLAB structure array to MATLAB object array
mxSetData	Set pointer to data
mxSetDimensions	Modify number/size of dimensions
mxSetField	Set field value of structure array, given field name/index
mxSetFieldByNumber	Set field value in structure array, given field number/index
mxSetImagData	Set imaginary data pointer for mxArray
mxSetIr	Set ir array of sparse mxArray
mxSetJc	Set jc array of sparse mxArray
mxSetLogical	Set logical flag
mxSetM	Set number of rows
mxSetN	Set number of columns
mxSetName	Set name of mxArray
mxSetNzmax	Set storage space for nonzero elements
mxSetPi	Set new imaginary data for mxArray
mxSetPr	Set new real data for mxArray

C Engine Routines

engClose	Quit engine session
engEvalString	Evaluate expression in string
engGetArray	Copy variable from engine workspace
engOpen	Start engine session
engOpenSingleUse	Start engine session for single, nonshared use
engOutputBuffer	Specify buffer for MATLAB output
engPutArray	Put variables into engine workspace

C MAT-File Routines

matClose	Close MAT-file
matDeleteArray	Delete named mxArray from MAT-file
matGetArray	Read mxArray from MAT-file
matGetArrayHeader	Load header array information only
matGetDir	Get directory of mxArrays in MAT-file
matGetFp	Get file pointer to MAT-file
matGetNextArray	Read next mxArray from MAT-file
matGetNextArrayHeader	Load array header information only
matOpen	Open MAT-file
matPutArray	Write mxArrays into MAT-files
matPutArrayAsGlobal	Put mxArrays into MAT-files

Serial Port I/O

Creating a Serial Port Object

serial	Create a serial port object

Writing and Reading Data

fgetl	Read one line of text from the device and discard the terminator
fgets	Read one line of text from the device and include the terminator
fprintf	Write text to the device
fread	Read binary data from the device
fscanf	Read data from the device, and format as text
fwrite	Write binary data to the device
readasync	Read data asynchronously from the device
stopasync	Stop asynchronous read and write operations

Configuring and Returning Properties

get	Return serial port object properties
set	Configure or display serial port object properties

State Change

fclose	Disconnect a serial port object from the device
fopen	Connect a serial port object to the device
record	Record data and event information to a file

General Purpose

clear	Remove a serial port object from the MATLAB workspace
delete	Remove a serial port object from memory
disp	Display serial port object summary information
instraction	Display event information when an event occurs
instrfind	Return serial port objects from memory to the MATLAB workspace
isvalid	Determine if serial port objects are valid
length	Length of serial port object array
load	Load serial port objects and variables into the MATLAB workspace
save	Save serial port objects and variables to a MAT-file
serialbreak	Send a break to the device connected to the serial port
size	Size of serial port object array

Handle Graphic Properties

Root

ButtonDownFcn; CallbackObject; Children; Clipping; CreateFcn; CurrentFigure; DeleteFcn; Diary; DiaryFile; Echo; ErrorMessage; FixedWidthFontName; Format; FormatSpacing; HandleVisibility; HitTest; Interruptible; Language; Parent; PointerLocation; PointerWindow; Profile; ProfileCount; ProfileFile; ProfileInterval; ScreenDepth; ScreenSize; Selected; SelectionHighlight; ShowHiddenHandles; Tag; Type; UIContextMenu; Units; UserData; Visible

Figure

AlphaMap; BackingStore; BusyAction; ButtonDownFcn; Children; Clipping; CloseRequestFcn; Color; Colormap; CreateFcn; CurrentAxes; CurrentCharacter; CurrentObject; CurrentPoint; DeleteFcn; Dithermap; DithermapMode; DoubleBuffer; FixedColors; HandleVisibility; HitTest; IntegerHandle; Interruptible; InvertHardcopy; KeyPressFcn; MenuBar; MinColormap; Name; NextPlot; NumberTitle; PaperOrientation; PaperPosition; PaperPositionMode; PaperSize; PaperType; PaperUnits; Parent; Pointer; PointerShapeCData; PointerShapeHotSpot; Position; Renderer; RendererMode; Resize; ResizeFcn; Selected; SelectionHighlight; SelectionType; ShareColors; Tag; Type; UIContextMenu; Units; UserData; Visible; WindowButtonDownFcn; WindowButtonMotionFcn; WindowButtonUpFcn; WindowStyle

Axes

ALim; ALimMode; AmbientLightColor; Box; BusyAction; ButtonDownFcn; CLim; CLimMode; CameraPosition; CameraPositionMode; CameraTarget; CameraTargetMode; CameraUpVector; CameraUpVectorMode; CameraViewAngle; CameraViewAngleMode; Children; Clipping; Color; ColorOrder; CreateFcn; CurrentPoint; DataAspectRatio; DataAspectRatioMode; DeleteFcn; DrawMode; FontAngle; FontName; FontSize; FontUnits; FontWeight; GridLineStyle; HandleVisibility; HitTest; Interruptible; Layer; LineStyleOrder; LineWidth; NextPlot; Parent; PlotBoxAspectRatio; PlotBoxAspectRatioMode; Position; Projection; Selected; SelectionHighlight; Tag; TickDir; TickDirMode; TickLength; Title; Type; Units; UIContextMenu; UserData; View; Visible; XAxisLocation; XColor; Xdir; XGrid; XLabel; XLim; XLimMode; XScale; XTick; XTickLabel; XTickLabelMode; XTickMode; YAxisLocation; YColor; YDir; YGrid; YLabel; YLim; YLimMode; YScale; YTick; YTickLabel; YTickLabelMode; YTickMode; ZColor; ZDir; ZGrid; ZLabel; ZLim; ZLimMode; ZScale; ZTick; ZTickLabel; ZTickLabelMode; ZtickMode

Line

BusyAction; ButtonDownFcn; Children; Clipping; Color; CreateFcn; DeleteFcn; EraseMode; HandleVisibility; HitTest; Interruptible; LineStyle; LineWidth; Marker; MarkerEdgeColor; MarkerFaceColor; MarkerSize; Parent; Selected; SelectionHighlight; Tag; Type; UIContextMenu; UserData; Visible; XData; YData; ZData

Text

BusyAction; ButtonDownFcn; Children; Clipping; Color; CreateFcn; DeleteFcn; Editing; EraseMode; Extent; FontAngle; FontName; FontSize; FontUnits; FontWeight; HandleVisibility; HitTest; HorizontalAlignment; Interpreter; Interruptible; Parent; Position; Rotation; Selected; SelectionHighlight; String; Tag; Type; UIContextMenu; Units; UserData; VerticalAlignment; Visible

Uicontrol

BackgroundColor; BusyAction; ButtonDownFcn; Callback; CData; Children; Clipping; CreateFcn; DeleteFcn; Enable; Extent; FontAngle; FontName; FontSize; FontUnits; FontWeight; ForegroundColor; HandleVisibility; HitTest; HorizontalAlignment; Interruptible; ListboxTop; Max; Min; Parent; Position; Selected; SelectionHighlight; SliderStep; String; Style; Tag; TooltipString; Type; UIContextMenu; Units; UserData; Value; Visible

Uimenu

Accelerator; BusyAction; ButtonDownFcn; Callback; Checked; Children; Clipping; CreateFcn; DeleteFcn; Enable; ForegroundColor; HandleVisibility; HitTest; Interruptible; Label; Parent; Position; Selected; SelectionHighlight; Separator; Tag; Type; UIContextMenu; UserData; Visible