

A.7.3 User Interface Objects

`menu`: Generate menu of choices for user input
`uibuttongroup`: Create user interface control object
`uicontextmenu`: Create context menu uicontrol
`uimenu`: Create menus on figure windows
`uipanel`: Create panel container object
`uipushtool`: Create push button on a toolbar
`uitoggletool`: Create toggle button on a toolbar
`uitoolbar`: Create toolbar on a figure

A.7.4 Finding Objects from Callbacks

`findall`: Find all graphics objects
`findfigs`: Find visible off-screen figures
`findobj`: Locate graphics objects with specific properties
`gcbf`: Return handle of figure containing object whose callback is executing
`gcbo`: Return handle of object whose callback is executing

A.7.5 GUI Utility Functions

`selectmoveresize`: Select, move, resize, or copy axes and uicontrol graphics objects
`textwrap`: Return wrapped string matrix for given uicontrol
`uistack`: Restack objects

A.7.6 Controlling Program Execution

`uiresume`: Resume program execution halted with
`uiwait`: Halt program execution, restart with `uiresume`

A.8 Symbolic Math Toolbox

A.8.1 Calculus

`diff`: Differentiate
`int`: Integrate
`jacobian`: Jacobian matrix
`limit`: Limit of an expression
`symsum`: Summation of series
`taylor`: Taylor series expansion

A.8.2 Linear Algebra

`colspace`: Basis for column space
`det`: Determinant
`diag`: Create or extract diagonals
`eig`: Eigenvalues and eigenvectors
`expm`: Matrix exponential
`inv`: Matrix inverse
`jordan`: Jordan canonical form
`null`: Basis for null space
`poly`: Characteristic polynomial
`rank`: Matrix rank
`rref`: Reduced row echelon form
`svd`: Singular value decomposition
`tril`: Lower triangle
`triu`: Upper triangle

A.8.3 Simplification

`collect`: Collect common terms
`expand`: Expand polynomials and elementary functions
`factor`: Factor
`horner`: Nested polynomial representation
`numden`: Numerator and denominator
`simple`: Search for shortest form
`simplify`: Simplification
`subexpr`: Rewrite in terms of subexpressions

A.8.4 Solution of Equations

`compose`: Functional composition
`dsolve`: Solution of differential equations
`finverse`: Functional inverse
`solve`: Solution of algebraic equations

A.8.5 Variable Precision Arithmetic

`digits`: Set variable precision accuracy
`vpa`: Variable precision arithmetic

A.8.6 Arithmetic Operations

`+`: Addition
`-`: Subtraction
`*`: Multiplication
`.*`: Array multiplication
`/`: Right division
`./`: Array right division

`\`: Left division
`.\`: Array left division
`^`: Matrix or scalar raised to a power
`.^`: Array raised to a power
`'`: Complex conjugate transpose
`.'`: Real transpose

A.8.7 Special Functions

cosint: Cosine integral, $Ci(x)$
dirac: Dirac delta function
heaviside: Heaviside function
hypergeom: Generalized hypergeometric function
lambertw: Solution of $\lambda(x)e^{\lambda(x)} = x$
sinint: Sine integral, $Si(x)$
zeta: Riemann zeta function

A.8.8 Access To Maple (Maple must be installed)

maple: Access Maple kernel
mapleinit: Initialize Maple
mfun: Numeric evaluation of Maple functions
mhelp: Maple help
mfunlist: List of functions for mfun
procread: Install a Maple procedure

A.8.9 Pedagogical and Graphical Applications

ezcontour: Contour plotter
ezcontourf: Filled contour plotter
ezmesh: Mesh plotter
ezmeshc: Combined mesh and contour plotter
ezplot: Function plotter
ezplot3: 3-D curve plotter
ezpolar: Polar coordinate plotter
ezsurf: Surface plotter
ezsurfz: Combined surface and contour plotter
funtool: Function calculator
rsums: Riemann sums
taylortool: Taylor series calculator

A.8.10 Conversions

char: Convert sym object to string
double: Convert symbolic matrix to double
int8: Convert symbolic matrix to signed 8-bit integer
int16: Convert symbolic matrix to signed 16-bit integer
int32: Convert symbolic matrix to signed 32-bit integer
int64: Convert symbolic matrix to signed 64-bit integer
poly2sym: Function calculator
single: Convert symbolic matrix to single
sym2poly: Symbolic polynomial to coefficient vector
uint8: Convert symbolic matrix to unsigned 8-bit integer
uint16: Convert symbolic ma-

trix to unsigned 16-bit integer
uint32: Convert symbolic matrix to unsigned 32-bit integer
uint64: Convert symbolic matrix to unsigned 64-bit integer

A.8.11 Basic Operations

ccode: C code representation of a symbolic expression
ceil: Round toward plus infinity
conj: Complex conjugate
findsym: Determine symbolic variables
fix: Round toward zero
floor: Round toward minus infinity
fortran: Fortran representation of a symbolic expression
imag: Imaginary part of a complex number
latex: LaTeX representation of a symbolic expression
pretty: Pretty print a symbolic expression
real: Real part of an imaginary number
sym: Create symbolic object
syms: Shortcut for creating multiple symbolic objects

Integral Transforms

fourier: Fourier transform
ifourier: Inverse Fourier transform
ilaplace: Inverse Laplace transform
iztrans: Inverse z-transform
laplace: Laplace transform
ztrans: Z-transform

A.9 MATLAB Commands

Alpha

A.9.1 Main commands

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

































































A.9.3 Symbolic Toolbox Commands




















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A.10 MATLAB RGB Color Charts

Use of special colors in MATLAB graphics requires specification of so-called RGB components. Each number of the triplets in the following list reflects the relative intensity of Red, Green, or Blue components. When 0, the component has no contribution, and when 1 the component makes it maximum contribution. Note: you can use this same chart for HTML colors, but must multiply each number by 255.

Snow	(1.000 0.980 0.980)		Seashell	(1.000 0.961 0.933)	
Snow 2	(0.804 0.788 0.788)		Seashell 2	(0.933 0.898 0.871)	
Ghost White	(0.973 0.973 1.000)		Seashell 3	(0.804 0.773 0.749)	
White Smoke	(0.961 0.961 0.961)		Seashell 4	(0.545 0.525 0.510)	
Gainsboro	(0.863 0.863 0.863)		Honeydew	(0.941 1.000 0.941)	
Floral White	(1.000 0.980 0.941)		Honeydew 2	(0.957 0.933 0.878)	
Old Lace	(0.992 0.961 0.902)		Honeydew 3	(0.757 0.804 0.757)	
Linen	(0.941 0.941 0.902)		Honeydew 4	(0.514 0.545 0.514)	
Antq. White	(0.980 0.922 0.843)		Mint Cream	(0.961 1.000 0.980)	
Antq. White 2	(0.933 0.875 0.800)		Azure	(0.941 1.000 1.000)	
Antq. White 3	(0.804 0.753 0.690)		Alice Blue	(0.941 0.973 1.000)	
Antq. White 4	(0.545 0.514 0.471)		Lavender	(0.902 0.902 0.980)	
Papaya Whip	(1.000 0.937 0.835)		Lvndr Blush	(1.000 0.941 0.961)	
Bl. Almond	(1.000 0.922 0.804)		Misty Rose	(1.000 0.894 0.882)	
Bisque	(1.000 0.894 0.769)		White	(1.000 1.000 1.000)	
Bisque 2	(0.933 0.835 0.718)		Black	(0.000 0.000 0.000)	
Bisque 3	(0.804 0.718 0.620)		Dk Slate Gray	(0.192 0.310 0.310)	
Bisque 4	(0.545 0.490 0.420)		Dim Gray	(0.412 0.412 0.412)	
Peach Puff	(1.000 0.855 0.725)		Slate Gray	(0.439 0.541 0.565)	
Peach Puff 2	(0.933 0.796 0.678)		Lt Slate Gray	(0.467 0.533 0.600)	
Peach Puff 3	(0.804 0.686 0.584)		Gray	(0.745 0.745 0.745)	
Peach Puff 4	(0.545 0.467 0.396)		Light Gray	(0.827 0.827 0.827)	
Navajo White	(1.000 0.871 0.678)		Midnt Bl	(0.098 0.098 0.439)	
Moccasin	(1.000 0.894 0.710)		Navy	(0.000 0.000 0.502)	
Cornsilk	(1.000 0.973 0.863)		Cornflo. Blue	(0.392 0.584 0.929)	
Cornsilk 2	(0.933 0.910 0.804)		Dk Slate Blue	(0.282 0.239 0.545)	
Cornsilk 3	(0.804 0.784 0.694)		Slate Blue	(0.416 0.353 0.804)	
Cornsilk 4	(0.545 0.533 0.471)		Med Slate Bl	(0.482 0.408 0.933)	
Ivory	(1.000 1.000 0.941)		Lt Slate Bl	(0.518 0.439 1.000)	
Ivory 2	(0.933 0.933 0.878)		Med Blue	(0.000 0.000 0.804)	
Ivory 3	(0.804 0.804 0.757)		Royal Blue	(0.255 0.412 0.882)	
Ivory 4	(0.545 0.545 0.514)		Blue	(0.000 0.000 1.000)	
Lem. Chiffon	(1.000 0.980 0.804)		Dodger Blue	(0.118 0.565 1.000)	
			Dp Sky Bl	(0.000 0.749 1.000)	

Sky Blue	(0.529 0.808 0.980)		Rosy Brown	(0.737 0.561 0.561)	
Lt Sky Blue	(0.529 0.808 0.980)		Indian Red	(0.804 0.361 0.361)	
Steel Blue	(0.275 0.510 0.706)		Saddle Brown	(0.545 0.271 0.075)	
Lt Steel Blue	(0.690 0.769 0.871)		Sienna	(0.627 0.322 0.176)	
Lt Blue	(0.678 0.847 0.902)		Peru	(0.804 0.522 0.247)	
Powder Blue	(0.690 0.878 0.902)		Burlywood	(0.871 0.722 0.529)	
Lt Turquoise	(0.686 0.933 0.933)		Beige	(0.961 0.961 0.863)	
Dk Turquoise	(0.000 0.808 0.820)		Wheat	(0.961 0.871 0.702)	
Med Turq	(0.282 0.820 0.800)		Sandy Brown	(0.957 0.643 0.376)	
Turquoise	(0.251 0.878 0.816)		Tan	(0.824 0.706 0.549)	
Cyan	(0.000 1.000 1.000)		Chocolate	(0.824 0.412 0.118)	
Light Cyan	(0.878 1.000 1.000)		Firebrick	(0.698 0.133 0.133)	
Cadet Blue	(0.373 0.620 0.627)		Brown	(0.647 0.165 0.165)	
Med Aqmrn.	(0.400 0.804 0.667)		Dark Salmon	(0.914 0.588 0.478)	
Aquamarine	(0.498 1.000 0.831)		Salmon	(0.980 0.502 0.447)	
Green	(0.000 1.00 0.000)		Light Salmon	(1.000 0.627 0.478)	
Dk Green	(0.000 0.392 0.000)		Orange	(1.000 0.647 0.000)	
Dk Olive Grn	(0.333 0.420 0.184)		Dark Orange	(1.000 0.549 0.000)	
Dk Sea Grn	(0.561 0.737 0.561)		Coral	(1.000 0.498 0.314)	
Sea Green	(0.180 0.545 0.341)		Light Coral	(0.941 0.502 0.502)	
Med Sea Grn	(0.235 0.702 0.443)		Tomato	(1.000 0.388 0.278)	
Lt Sea Grn	(0.125 0.698 0.667)		Orange Red	(1.000 0.271 0.000)	
Pale Green	(0.596 0.984 0.596)		Red	(1.000 0.000 0.000)	
Spring Grn	(0.000 1.000 0.498)		Hot Pink	(1.000 0.412 0.706)	
Lawn Grn	(0.486 0.988 0.000)		Deep Pink	(1.000 0.078 0.576)	
Chartreuse	(0.498 1.000 0.000)		Pink	(1.000 0.753 0.796)	
Med Sprg Grn	(0.000 0.980 0.604)		Light Pink	(1.000 0.714 0.757)	
Green Yellow	(0.678 1.000 0.184)		Pl Violet Red	(0.859 0.439 0.576)	
Lime Green	(0.196 0.804 0.196)		Maroon	(0.690 0.188 0.376)	
Yellow Green	(0.604 0.804 0.196)		Med Vlet Red	(0.780 0.082 0.522)	
Forest Green	(0.133 0.545 0.133)		Violet Red	(0.816 0.125 0.565)	
Olive Drab	(0.420 0.557 0.137)		Violet	(0.933 0.510 0.933)	
Dark Khaki	(0.741 0.718 0.420)		Plum	(0.867 0.627 0.867)	
Khaki	(0.941 0.902 0.549)		Orchid	(0.855 0.439 0.839)	
Pale Gldnrod	(0.933 0.910 0.667)		Med Orchid	(0.729 0.333 0.827)	
Lt Gldrd Yel	(0.980 0.980 0.824)		Dark Orchid	(0.600 0.196 0.800)	
Light Yellow	(1.000 1.000 0.878)		Dark Violet	(0.580 0.000 0.827)	
Yellow	(1.000 1.000 0.000)		Blue Violet	(0.541 0.169 0.886)	
Gold	(1.000 0.843 0.000)		Purple	(0.627 0.125 0.941)	
Lt Goldenrod	(0.933 0.867 0.510)		Med Purple	(0.576 0.439 0.859)	
Goldenrod	(0.855 0.647 0.125)		Thistle	(0.847 0.749 0.847)	
Dk Gldnrd	(0.722 0.525 0.043)				

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