## **Index**

A	close, 158, 392
abs, 15, 393	collect, 354, 397
acos, 15, 393	colon symbol, 44, 57
acot, 15, 393	Color, 137, 147
all, 182, 397	colormap, 328, 396
and, 181, 397	Command History Window, 6, 10
anonymous function, 231	Command Window, 6, 9
ans, 19, 392	comment, 10
any, 182, 397	conditional statement
arithmetic operations with scalars, 11	if-else-end, 186
array	if-elseif-else-end, 187
addition, subtraction, 64	if-end, 184
addressing, matrix, 43	continue, 202, 397
addressing, vector, 42	contour, 330, 395
creating, 35	contour3, 330, 395
division, 68	conv, 265, 397
element-by-element opera-	cos, 15, 393
tions, 72	cosh, 15, 393
· · · · · · · · · · · · · · · · · · ·	cot, 15, 393
multiplication, 65	coth, 15, 393
one-dimensional (vector), 35	cross, 77, 394
two-dimensional (matrix), 39	Current Directory Window, 23
Array Editor Window, 97	current directory, 22
arrow key, 10	curve fitting
asin, 15, 393	exponential function, 271
assignment operator, 16	logarithmic function, 271
atan, 15, 393	power function, 271
axis, 147, 396	reciprocal function, 271
В	curve fitting interface, 278
BackgroundColor, 147	curve fitting, 261, 267
bar, 152, 395	cylinder, 331, 395
bar3, 331, 395	<b>D</b>
barh, 152, 395	deconv, 265, 397
break, 202, 397	det, 70, 77, 394
C	determinant, 70
case, 189, 397	diag, 50, 394
cd, 24, 392	diff, 362, 398
ceil, 16, 393	differential equation, 303, 365
clc, 10, 392	differentiation, symbolic, 362
clear, 19, 392	differentiation, symbolic, 302

disp, 101, 394	fopen, 108, 392
display formats, 12	for, 193, 397
dot, 66, 77, 394	format, 13, 392
double, 352, 398	formatting text, 145, 146
dsolve, 365, 398	fplot, 140, 395
E	fprintf, 103-110, 394
EdgeColor, 147	function
Editor Window, 7	anonymous, 231
Editor/Debugger Window, 21	function functions, 234
element-by-element operations, 72	function handle, 235
ellipsis, 10	nested functions, 242
else, 186, 397	subfunctions, 240
elseif, 187, 397	user-defined, 221
end, 184, 189, 193, 197, 397	function file
eps, 19, 392	
equation, solving, 295, 348, 357	creating, 222
equations, set of linear, 71	function definition line, 224,
error bars, 150	225
errorbar, 151, 395	H1 line, 226
escape character, 104	help text lines, 226
exp, 14, 393	input/output arguments, 224
expand, 355, 398	saving, 227
exporting data, 114	structure, 223
eye, 40, 68, 394	using, 228
ezplot, 368, 398	function, built-in, 14
F	fzero, 296, 396
factor, 355, 398	G
factorial, 15, 393	global variables, 227
fclose, 109, 392	global, 227, 392
feval, 238, 396	Greek characters, 146
fid (file identifier), 108	grid, 148, 328, 396
Figure Window, 7	gtext, 145, 396
Figure Windows (multiple), 157	Н
figure, 158, 392	handle (function), 235
find, 182, 397	Help Window, 7
findsym, 353, 398	help, 226
fix, 16, 393	help, 226, 392
floor, 16, 393	hist, 153-156, 395
fminbnd, 298, 396	histograms, 153–156
FontAngle, 147	hold off, 142, 395
FontName, 147	hold on, 142, 395
FontSize, 147	I
FontWeight, 147	i, 19, 392

identity matrix, 68 if, 184, 397 Import Wizard, 116 importing a function, 237 importing data, 114 indefinite loop, 198 inf, 19, 392 input a string, 100 input, 99, 394 int, 363, 398 integration, numerical, 300 integration, symbolic, 363 interp1, 276, 397 interpolation     cubic spline, 276     linear, 276     nearest, 276 interpolation, 274 inv, 69, 77, 394 inverse, matrix, 69	nested, 200 while, 197  M marker, 137 markeredgecolor, 137 markerfacecolor, 137 markersize, 137 matrix adding elements, 47 deleting elements, 48 determinant, 70 identity, 68 inverse, 69 size of, 39 max, 76, 394 mean, 76, 394 median, 76, 394 mesh, 327, 328, 395 meshc, 329, 395
iskeyword, 19, 392 <b>J</b>	meshgrid, 325, 395 meshz, 329, 395 M-file, 21, 231
j, 19, 392 L	min, 76, 394 modifiers, text, 146
least squares, 268 left division, 70 legend, 145, 396 length, 49, 394 line, 143, 395 linestyle, 137 LineWidth, 147 linewidth, 137 linspace, 38, 394 load, 112, 394 log, 15, 393	multiple Figure Windows, 157  N NaN, 19, 392 nested functions, 242 nested loops, 200 not, 181, 397 nthroot, 14, 393 number format, 105 O ode113, 304, 396
logi, 15, 393 logical array, 176 logical operator, 179 logical vectors, 178 loglog, 149, 395 lookfor, 226, 392 loop for-end, 192	ode15s, 305, 396 ode23, 304, 396 ode23s, 305, 396 ode23t, 305, 396 ode23tb, 305, 396 ode45, 304, 396 ones, 40, 394 or, 181, 397

order of precedence, 11, 178, 180 otherwise, 189, 397	plot viewing direction (3-D), 333
output commands, 100	polar plot, 156
output to a file, 108	properties, 136
P	scatter plot (3-D), 332
passing a function, 237	special graphics, 152
percent symbol, 10	specifiers, 136
pi, 19, 392	stair plot, 152
pie, 153, 395	stem plot (3-D), 332
pie3, 332, 395	stem plot (3-D), 332 stem plot, 152
plot	± '
axis label, 144	surface plot (3-D), 327, 329
axis range, 147	surface with lighting plot (3-
bar plot (3-D), 331	D), 330
bar plot, 152	symbolic expression, 368
color specifiers, 136	text, 145
contour plot (2-D), 330	three-dimensional, 323
contour plot (3-D), 330	title, 144
cylinder, 331	waterfall plot (3-D), 330
error bars, 150	plot, 134, 395
formatting, 144–148	plot3, 323, 395
grid for 3-D plot, 325	Plots Toolstrip, 159
grid, 148	plotting a function, 139–141
histograms, 153–156	pol2cart, 333, 395 polar plot, 156
legend, 145	polar, 156, 395
line (3-D), 323	poly, 264, 397
line specifiers, 135, 137	polyder, 266, 397
logarithmic axes, 149	polyfit, 269, 397
marker specifiers, 136	polynomial
mesh (3-D), 327	addition, 264
mesh and contour plot (3-D),	derivative, 266
329	division, 265
mesh curtain plot (3-D), 329	MATLAB representation,
mesh plot (3-D), 328	261
multiple graphs in a plot, 141–	multiplication, 265
144	roots, 263
multiple plots on a page, 157,	value of, 262
159	polyval, 262, 397
pie charts, 153	pretty, 356, 398
pie plot (3-D), 332	property name, 137, 146
Plot Editor, 148	property value, 137, 146

quadl, 301, 396 R rand, 77, 78, 394 randi, 78, 79, 394 randin, 79, 394 random numbers, 77 randperm, 78, 394 relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15,	Q	stopping indefinite loop, 198
subfunctions, 240 subplot, 157, 396 supplot, 146 sum, 76, 394 superscript, 146 suff, 394 superscript, 146 suff, 394 supplot, 157, 396 supplot, 157, 396 supplot, 157, 396 supplot, 394 supplot, 157, 396 supplot, 394 supplot, 157, 396 supplot, 394 supplot, 397 switch, 189, 395 suft), 330, 396 suft), 330, 396 suft), 330, 396 suft), 330, 396 suft), 349, 395 supplot, 397 switch, 189, 397 switch, 189	quad, 300, 396	string, input, 100
subfunctions, 240 rand, 77, 78, 394 randi, 78, 79, 394 randin, 79, 394 random numbers, 77 randperm, 78, 394 relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15,	<del>-</del>	strings, 53–55
randi, 78, 79, 394 random, 79, 394 random numbers, 77 randperm, 78, 394 relational operator, 176 relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 sphere, 331, 395 sqrt, 14, 393 subs, 371, 398 subscript, 146 sumf, 76, 394 superscript, 146 sumf, 76, 394 superscript, 146 surf, 23P, 399 surfc, 32P, 395 surft, 32P, 395 surft, 189, 397 switch-case statement, 189 sym, 348, 398 symbolic math default variable, 353 differential equation solution, 365 differentiation, 362 equation solving, 357 expression, 350 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	R	subfunctions, 240
randi, 78, 79, 394 randn, 79, 394 randn, 79, 394 random numbers, 77 randperm, 78, 394 relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file     creating, 21, 222     input to, 97–100     output from, 100–110     running, 22     saving, 22 saving, 22 seript file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 subs, 371, 398 subscript, 146 sumf, 394 superscript, 146 surf, 327, 329, 395 surfc, 329, 395 surfcl, 329, 395 surfcl, 329, 395 surfcl, 329, 395 surfcl, 329, 395 surft, 320, 396 switch-case statement, 189 symbolic math default variable, 353 differential equation solution, 365 differentiation, 362 equation solving, 357 expression, 350 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	rand, 77, 78, 394	subplot, 157, 396
randn, 79, 394 random numbers, 77 randperm, 78, 394 relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 soript file, 20 semiclogn, 149, 395 semilogx, 149, 395 semilogx, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 subscript, 146 sum, 76, 394 superscript, 146 surf, 327, 329, 395 surfc, 329, 395 surft, 320, 396 switch, 189, 397 switch-case statement, 189 sym, 348, 398 symbolic math default variable, 353 differential equation solution, 365 differentiation, 362 equation solving, 357 expression, 350 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		subs, 371, 398
random numbers, 77 randperm, 78, 394 relational operator, 176 rem, 16, 393 reshape, 49, 394 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 sinh, 15, 393 sinh, 15, 393 sort, 76, 394 superscript, 146 surf, 327, 329, 395 surfcl, 329, 395 surftl, 380, 396 switch-case statement, 189 sym, 348, 398 symbolic math default variable, 353 differential equation solution, 365 differentiation, 362 equation solving, 357 expression, 350 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		subscript, 146
randperm, 78, 394 relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file     creating, 21, 222     input to, 97–100     output from, 100–110     running, 22     saving, 22 seript file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 surfc, 329, 395 surfl, 330, 396 swirch, 189, 397 switch- case statement, 189 sym, 348, 398 symbolic math default variable, 353 differential equation solution, 365 differentiation, 362 equation solving, 357 expression, 350 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		sum, 76, 394
relational operator, 176 rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 soript file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 sirapposition, 363 surfc, 329, 395 swifc, 329, 395 switch, 189, 397 switch, 189 symbolic math default variable, 353 differential equation solution, 365 styre, 19, 394 spm, 348, 398 symbolic math default variable, 353 differential equation solu		superscript, 146
rem, 16, 393 reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 soript file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 surfc, 329, 395 swirfl, 330, 396 switch, 189, 397 switch, 189 symbolic math default variable, 353 differential equation solution, 365 styre, 357 expression, 350 surgle, 36, 39 surgle, 49, 395 styre, 49, 394 styre, 49, 395 styre, 49, 395 st		surf, 327, 329, 395
reshape, 49, 394 right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file     creating, 21, 222     input to, 97–100     output from, 100–110     running, 22     saving, 22 script file, 20 semicolon, 10, 17 semilogy, 149, 395 semilogy, 149, 395 semilogy, 149, 395 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 size, 30, 396 switch, 189, 397 switch, 189 symbolic math default variable, 353 differential equation solution, 365 differential equation solution, 365 differential equation solution, 365 stry asymbolic math default variable, 353 differential equation solution, 365 surple, 353 differential equation solution, 365 stry asymbolic math default variable, 353 differential equation solution, 365 surple, 353 differential equation solution, 365 surple, 353 differential equation solution, 365 surple, 353 differential equation solution, 365 stry asymbolic math default variable, 353 differentialequation solution, 365 stry asymbolic math default variable, 353 differentialequation solution, 365 stry asymbolic math default variable, 353 dif	_	surfc, 329, 395
right division, 71 roots, 263, 397 Rotation, 147 round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file     creating, 21, 222     input to, 97–100     output from, 100–110     running, 22     saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 simplify, 356, 398 sin, 15, 393 sinh, 15, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 switch, 189, 397 switch, 189, 397 switch-case statement, 189 symbolic math default variable, 353 differential equation solution, 365 differential equation solving, 357 expression, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		surfl, 330, 396
roots, 263, 397 Rotation, 147 round, 15, 393 S save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file     creating, 21, 222     input to, 97–100     output from, 100–110     running, 22     saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 switch-case statement, 189 sym, 348, 398 symbolic math default variable, 353 differential equation solution, 365 equation solving, 357 expression, 360 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		switch, 189, 397
Rotation, 147 round, 15, 393 S save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file     creating, 21, 222     input to, 97–100     output from, 100–110     running, 22     saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  sym, 348, 398 symbolic math default variable, 353 differential equation solution, 365 equation solving, 357 expression, 360 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	_	switch-case statement, 189
round, 15, 393 Save, 111, 394 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  symbolic math default variable, 353 differential equation solution, 365 differentiale equation solution, 365 differential equation solution, 365 equation solving, 357 expression, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		sym, 348, 398
default variable, 353 differential equation solution, 365 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  differential equation solution, 365 expression, 360 integration, 363 numerical calculations with, 271 symp, 350, 398 variable, 349, 350 syms, 350, 398 Table, display, 86, 102 tan, 15, 393 tanh, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		symbolic math
differential equation solution, 365 saving the workspace, 111 scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  differential equation solution, 365 differential equation solution, 362 equation solving, 357 expression, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	S	default variable, 353
saving the workspace, 111  scatter3, 332, 395  script file  creating, 21, 222  input to, 97–100  output from, 100–110  running, 22  saving, 22  script file, 20  semicolon, 10, 17  semilogx, 149, 395  semilogy, 149, 395  sign, 16, 393  simplify, 356, 398  sin, 15, 393  sinh, 15, 393  sinh, 15, 393  sinh, 15, 393  size, 49, 394  solve, 357, 398  sort, 76, 394  sphere, 331, 395  sqrt, 14, 393  365  differentiation, 362  equation solving, 357  expression, 363  numerical calculations with,  371  object, 348  plotting expression, 368  variable, 349, 350  syms, 350, 398  T  table, display, 86, 102  tan, 15, 393  tanh, 15, 393  text modifiers, 146  text, 145, 396  title, 144, 396  Toolstrip, 5, 159  transpose operator, 41  trapz, 302, 396		differential equation solution,
scatter3, 332, 395 script file creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  differentiation, 362 equation solving, 357 expression, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		365
script file	-	differentiation, 362
creating, 21, 222 input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 expression, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		· · · · · · · · · · · · · · · · · · ·
input to, 97–100 output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 integration, 363 numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		
output from, 100–110 running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  numerical calculations with, 371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		*
running, 22 saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  371 object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	± '	_
saving, 22 script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  object, 348 plotting expression, 368 variable, 349, 350 syms, 350, 398 table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		*
script file, 20 semicolon, 10, 17 semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  plotting expression, 368 variable, 349, 350 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		
semicolon, 10, 17  semilogx, 149, 395  semilogy, 149, 395  sign, 16, 393  simplify, 356, 398  sin, 15, 393  sinh, 15, 393  sinh, 15, 393  size, 49, 394  solve, 357, 398  sort, 76, 394  sphere, 331, 395  sqrt, 14, 393  variable, 349, 350  syms, 350, 398  Table, display, 86, 102  tan, 15, 393  tanh, 15, 393  text modifiers, 146  text, 145, 396  title, 144, 396  Toolstrip, 5, 159  transpose operator, 41  trapz, 302, 396		2
semilogx, 149, 395 semilogy, 149, 395 sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  **Variable, 35, 398 syms, 350, 398 T table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	-	
semilogy, 149, 395  sign, 16, 393  simplify, 356, 398  sin, 15, 393  sinh, 15, 393  size, 49, 394  solve, 357, 398  sort, 76, 394  sphere, 331, 395  sqrt, 14, 393  Symb, 356, 396  table, display, 86, 102  tan, 15, 393  tanh, 15, 393  text modifiers, 146  text, 145, 396  title, 144, 396  Toolstrip, 5, 159  transpose operator, 41  trapz, 302, 396		
sign, 16, 393 simplify, 356, 398 sin, 15, 393 sinh, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393  table, display, 86, 102 tan, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	_	<del>-</del>
simplify, 356, 398 sin, 15, 393 sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		
sin, 15, 393 sinh, 15, 393 tanh, 15, 393 text modifiers, 146 text, 145, 396 total, 15, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396	_	
sinh, 15, 393 size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 text modifiers, 146 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		
size, 49, 394 solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 text modifiers, 140 text, 145, 396 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		
solve, 357, 398 sort, 76, 394 sphere, 331, 395 sqrt, 14, 393 title, 144, 396 Toolstrip, 5, 159 transpose operator, 41 trapz, 302, 396		
sort, 76, 394  sphere, 331, 395  sqrt, 14, 393  Toolstrip, 5, 159  transpose operator, 41  trapz, 302, 396		
sphere, 331, 395 sqrt, 14, 393 transpose operator, 41 trapz, 302, 396		
sqrt, 14, 393 transpose operator, 41 trapz, 302, 396		* ' '
- 1. (a)2. 304. 390	- · · · · · · · · · · · · · · · · · · ·	
	stairs, 152, 395	
2+d 77 304	std, 77, 394	
stem 153 395		
stem3, 332, 395 uiimport, 116, 394		u11mport, 116, 394

```
V
variable
   defining, matrix, 39-41
   defining, scalar, 16
   defining, vector, 36–38
   global, 227
   local, 226
   name, 18
   predefined, 19
vector
   adding elements, 46
   constant spacing, 37, 38
   creating, 36
   deleting elements, 48
vectorization, 75
view, 333, 396
W
waterfall, 330, 396
while, 197, 397
who, 20, 96, 392
whos, 20, 96, 392
Workspace Window, 97
workspace, 96
X
xlabel, 144, 396
xlsread, 114, 394
xlswrite, 115, 395
xor, 182, 397
Y
ylabel, 144, 396
Z
zeros, 40, 394
```