Index

Symbols

(character in menus IV-134
(left parenthesis
    multidimensional wave indexing II-95
    wave indexing II-76
! character in menus IV-134
! operator IV-6, IV-41
!= operator IV-6, IV-41
operator
    deferred assignment V-1063–V-1064
    deferred assignments IV-233
    in instance names IV-20
    instance names and $ IV-20
    string expressions V-1064
#define IV-108
    example IV-110
    predefined symbols IV-110
#define statement V-16
#if-#elif-#endif statement V-16
#if-#endif statement V-16
#ifdef-#endif statement V-17
    example IV-110
#ifndef-#endif statement V-17
#pragma hide III-402
#undefine statement V-18
$ operator IV-6
    convert string to name IV-6, IV-18
    in dependency formulas IV-234
    in macros IV-121
    in user functions IV-62–IV-63, IV-83
    instance notation IV-20
    load waves (example) II-171
    page layout object names V-477
    precedence IV-19
        tricky case IV-19
    quoting liberal data folder path names II-110
    quoting liberal data folder paths IV-169
    with # operator IV-20
    with data folder paths IV-63
    with NVAR, SVAR, WAVE IV-62
    with window names IV-63
$operator
    examples IV-63
%& operator
    obsolete IV-8
%^ operator IV-6
%~ operator
    obsolete IV-8
%| operator
    obsolete IV-8
%d, %e, %f, %g, %s, etc.
    conversion specifications for printf IV-260, V-770–V-772
%W V-771
& character in menus IV-135
& operator IV-6, IV-41
    pass-by-reference IV-59
&& operator IV-6–IV-7, IV-41
&~ operator IV-6
* (asterisk)
    operator IV-6
    wave indexing II-76
*= operator IV-5
+ operator IV-6
++ operator IV-6, IV-43
+= operator
    accumulate operator IV-5
    string concatenation operator IV-6
- character in menus IV-134
- operator IV-6
-- operator IV-6, IV-43
-= operator IV-5
/ character in menus IV-134
/ operator IV-6
// (comment symbol) IV-2
/= operator IV-5
/C flag
    in user functions IV-31, IV-68
    WAVE reference IV-83, V-1069
/D flag
    in user functions IV-31
/S flag
    in user functions IV-31
/SDFR flag IV-80
/T flag
    in user functions IV-68, IV-83
    WAVE reference V-1069
/Z flag IV-21
^ operator IV-6
:
    conditional operator IV-6–IV-7
    indicating current data folder II-109
; character in menus IV-134
; command separator IV-2
< operator IV-6, IV-41
<<
    shift left operator IV-41
<< operator IV-6, IV-43
<= operator IV-6, IV-41
= operator
    assignment operator IV-5
    string assignment operator IV-6
== operator IV-6, IV-8, IV-41
    and roundoff error IV-8

> operator IV-6, IV-41
>= operator IV-6, IV-41
>>
    shift right operator IV-41
>> operator IV-6, IV-43
?: conditional operator IV-6–IV-7
[left bracket
    wave indexing II-76
[left square bracket
    multidimensional wave indexing II-95
\\ (double backslash)
    insert \ in annotation III-37
~ operator IV-6, IV-41
auto trace
    curve fit residuals III-186, III-219
auto wave
    curve fit residuals III-186, III-220
default
    curve fitting coefficient wave menu III-195
    curve fitting coefficients III-189
free
    default free wave name IV-95
New Wave
    curve fit destination III-197
    curve fit residuals III-220
    curve fitting coefficients wave III-195
none
    curve fit destination III-196
    curve fit epsilon III-193
PictGallery V-827
| (vertical bar character)
    bitwise operator IV-6, IV-41
    obsolete for comments IV-113
|| operator IV-6–IV-7, IV-41
.autosave files II-40
    opening explicitly II-41
.noindex files II-29

Numbers

32-bit version I-2
3D bar plots
    Gizmo II-457
3D scatter plot
    data format II-451
    Gizmo tour II-407, II-411
3D scatter plots
    Gizmo II-455
3D waves
    displaying II-95
    Gizmo II-407
4K displays III-507
    resolution of panels III-456
64-bit integers IV-39
    complex IV-39
64-bit version I-2

A

abbreviated date
    in notebooks III-13
Abort Experiment Load button II-27–II-28
abort key combinations IV-51
Abort operation V-18
aborting
    curve fitting III-180
    debug on abort IV-214, V-146
    from control panel IV-160
    macros IV-124
    network operations IV-270
    procedures IV-49, IV-51, V-18–V-19, V-1047
    progress windows IV-156
    threads IV-337
    user functions IV-112
AbortOnRTE keyword IV-49, V-18
AbortOnValue keyword IV-49, V-19
abs (absolute value) function V-19
abs of a wave V-1090
absolute value V-1090
    abs (real) function V-19
    cabs (complex) function V-58
acausal convolution III-285
accelerators
    in menus IV-135
Accumulate into dest III-128
accumulating histogram III-128
acos function V-19
acos of a wave V-1090
acosh function V-19
active page
    in page layouts II-478
ActiveX Automation IV-265
    as server IV-265
    example experiment IV-265
Adams-Moulton method V-454
adaptive thresholding III-355
Add Annotation dialog III-35–III-47
    dynamic pop-up menu III-38
    for page layouts II-494
    Insert: group III-35
    Special pop-up menu III-36
Add Controls submenu III-419
AddDropLine macro III-77
AddFIFOData operation V-20
AddFIFOVectData operation V-20
addition IV-6
AddListItem function V-20
AddMovieAudio operation V-21
AddMovieFrame operation V-21
AddWavesToBoxPlot operation V-22
AddWavesToViolinPlot operation V-22
ADInstruments data acquisition package IV-312
Adjust Indentation IV-27

AdoptFiles operation V-23
adopting
  all procedure files II-25
  files II-24
  files programmatically V-23
  notebooks II-25, V-696
  procedure files II-25, III-403
  unadopting II-25
  waves II-25
  waves in Data Browser II-119
AfterFileOpenHook hook function IV-281–IV-282
  example IV-284
AfterMDIFrameSizedHook hook function IV-285
AfterWindowCreatedHook hook function IV-286
AIFF files V-892
airy functions V-24–V-25
airyA function V-24
airyAD function V-24
airyB function V-25
airyBD function V-25
alerts
  from procedures V-165
aliases
  CreateAliasShortcut operation V-111
  creating V-111
aligning
  controls III-420
  drawing objects III-65
  graphs in page layouts II-490
  pictures in notebooks III-9
aligning comments III-409
alignment
  in annotation text III-54
All Files IV-149, IV-151
all-at-once fit functions III-256
  MPFXEMGPeak function V-667
  MPFXExpConvExpPeak function V-668
  MPFXGaussPeak function V-669
  MPFXLorentzianPeak function V-670
  MPFXVoigtPeak function V-671
  multivariate III-260
all-at-once functions
  complex fitting III-249
alog function V-25
alpha
  color blending III-498
  color table waves II-400
  Gizmo II-432
  graphics technology III-507
  image plots II-400–II-401
  in Gizmo II-428
  in graph traces II-298
  RGBA values IV-13
alternation
  in regular expressions IV-183
ambient light
  Gizmo II-432
Ambiguity function III-281
amplitude compensation in windowing III-278
analysis III-108–III-175
  area III-120–III-122
  convolution III-284–III-286
  correlation III-286
  decimation III-135–III-320
    by omission III-135
    by smoothing III-136
  differential equations III-322–III-336
  differentiation III-120, V-158
  Fourier Transforms III-270–III-279
  function plotting III-320–III-322
  functions
    plotting III-320–III-322
  histogram III-125–III-132
  image operations V-4
  integration III-120
  interpolation III-109–III-112
  level detection III-287–III-290
  matrix operations V-3, V-7
  missing values (NaNs) III-112
  of XY data III-108
  peak detection III-290–III-292
  principle component analysis V-739
  programming III-170–III-175
  related functions V-8
  related operations V-3
  root finding III-338–III-343
  rotate wave III-316
  smoothing III-292–III-299
  sorting III-132–III-135
  statistics operations V-4
  unwrap wave III-316
  wave statistics III-122–III-124
  windowing III-275–III-279
anchors
  in page layouts II-494
  legends III-40–III-41
  Simple Text drawing tool III-63
  tags III-46
  textboxes III-40–III-41
AND
  bitwise operator IV-6–IV-7, IV-41
  logical operator IV-6–IV-7, IV-41
Annotation Tweaks dialog III-39, III-41, III-46
AnnotationInfo function V-25
AnnotationList function V-26
annotations III-34–III-53
  Add Annotation dialog III-35
  alignment III-54
  anchors III-40–III-41, III-46
  AnnotationInfo function V-25
  AnnotationList function V-26
  AppendText operation V-35

as input mechanisms V-25
axis escape codes III-57
background color III-39
backslash characters III-37, III-58
centering text III-37
color III-54
color scale bars III-34, III-47–III-51
creating III-34, III-52
deleting III-34, III-45, III-53, V-154
drawing layer III-68
duplicating III-34
dynamic text III-56
in tags III-38
elaborate III-51–III-52
escape codes III-35, III-42, III-53–III-58
exterior III-40
affects graph plot area III-41
font styles III-54
fonts III-36, III-54
default III-36
relative size III-36
size III-36, III-43
default III-36
style (bold, italic, etc.) III-37
frame III-39
Gizmo II-444–II-445, II-472
halo III-39, IV-292
in graphs III-34–III-53
in page layouts II-483, II-494–II-496, III-34–III-53
in style macros II-352
interior III-40
LaTeX III-54
Legend operation V-483–V-484
legend symbols in III-57
legends III-42–III-43
definition III-34
position III-40–III-41
markers III-43, III-55
Modify Annotation dialog III-35
modifying III-34–III-35, III-53
names III-39, III-53
naming rules III-501
Normal escape code, \M III-37
opaque III-39
pictures III-54
position III-40–III-42, III-46–III-47
anchors III-40–III-41
exterior III-40
frozen III-41, III-46
in graphs III-40–III-41, III-46–III-47
in page layouts II-494, III-41
interior III-40
offset III-41
programming with III-52
quick start III-34
renaming III-39, III-53
ReplaceText operation V-801
rotating III-40
subscripts III-37, III-54
superscripts III-37, III-54
tab characters III-39
Tag operation V-1017–V-1022
tags III-43–III-47, III-55
definition III-34
TagVal function III-38
TagWaveRef function III-38
TeX III-54
text
color III-37, III-39
content III-35, V-35, V-801
justification III-37
text info variables III-55–III-56
TextBox operation V-1024–V-1027
textboxes
definition III-34
position III-40–III-41
transparency III-39
wave symbols III-37, III-42–III-43
APMath operation V-27
Append Columns dialog II-242
Append from Layout dialog II-486
Append Objects dialog II-486
Append operation V-29
Append to Layout dialog II-486
Append Traces to Graph dialog II-280, II-349
AppendBoxPlot operation V-30
AppendImage operation V-32
AppendLayoutObject operation V-33
AppendMatrixContour operation V-33–V-40
example II-367
AppendText operation V-35
AppendToGizmo operation V-35
AppendToGraph operation V-35
AppendToLayout operation V-36
AppendToTable operation V-37
AppendViolinPlot operation V-37
AppendXYZContour operation V-39–V-40
Apple events IV-261–IV-263
supported events IV-262
details IV-262
AppleScript IV-263–IV-264
executing scripts V-205
AppleScripts
executing Unix shell scripts IV-264
Apply to All
Copy or Share Wave dialog II-157
arbitrary numeric precision V-27
arc functions
inverse cosine V-19, V-1090
inverse hyperbolic cosine V-19
inverse hyperbolic sine V-42

inverse hyperbolic tangent V-42
inverse sine V-41, V-1090
inverse tangent V-42, V-1090
area
faverage function V-218
faverageXY function V-218
functions compared V-218
Integrate operation V-446
integrate1D function V-448
normalized V-1091
of polygons V-754
PolygonArea function V-750
waveform data III-120
XY area procedures III-122
area function III-121, V-40
subranges III-122
areaXY function III-122, V-41
arithmetic-geometric mean V-295
Arrange Objects dialog II-487
array data
HDF5 II-207
arrow keys
in Gizmo II-424
in tables II-243
moving graph cursors II-320
arrow markers in graphs V-614
arrow tool
Gizmo II-414
in page layouts II-481
selecting, deselecting drawing objects III-63
arrows
double arrow cursor II-285, II-288, II-308
drawing V-838
arrow head shape III-64, V-838
four-arrow cursor II-302
markers in graphs II-294
examples V-625
wind barbs V-614
on tags III-45–III-46
ASCII codes
char2num function V-60
escape codes for IV-14
num2char function V-713
ASCII text encoding III-460
Asian text encodings III-462
asin function V-41
asin of a wave V-1090
asinh function V-42
aspect ratio tool
Gizmo II-414
assignment operators IV-5
assignment statements IV-4–IV-10
data folders IV-3
deferred IV-233, V-1063–V-1064
associativity
of operators IV-6
atan function V-42
atan of a wave V-1090
atan2 function V-42
atanh function V-42
attribute list
Gizmo II-416–II-417
attributes
Gizmo II-419
global II-420
internal II-419
HDF5 II-198
HDF5 Browser II-195
authentication
in URLs IV-268
security IV-270
URLRequest operation V-1054
auto
general text tweaks II-141
auto-compiling procedures III-404, IV-26
auto-correlation III-287, V-107
auto-identify column type II-129
auto-save
in notebooks V-698
auto-trace destination waves in curve fitting III-196, III-234
Auto/Man Ticks tab II-308
automatic Igor update II-4
automatic multithreading
MultiThreadControl operation V-674
automatically multithreaded
MultiThreadingControl operation V-674
automation
Apple events IV-261
AppleScript IV-263
generating notebook commands III-29
loading files in folder (example) II-175
loading waves II-170
example II-171, II-173
notebooks III-25–III-30
examples III-26
overview I-8
retrieving text from notebooks III-28
Unix shell scripts IV-264
updating in notebooks III-28
AutoPositionWindow operation V-42
autosave II-36–II-42
.autosave files II-40
backing up II-37
data folders II-37
direct mode II-38
experiment files II-37
IgorInfo function V-361
indirect mode II-38–II-39
notebook files II-37
packed experiments II-37
procedure files II-37

Run Autosave Now II-39
unpacked experiments II-37, II-41
waves II-37
autosave modes II-38
Autoscale Axes in Graph Menu II-285
autoscaling II-285, II-287, II-302, II-348
Gizmo II-421
log axes II-302
Autosizing Columns By Double-Clicking II-252
Autosizing Columns Using Menus II-253
auxiliary procedure files III-396, III-398
average deviation of wave V-415, V-1084
2D V-415
average functions
compared V-218
faverage V-218
faverageXY V-218
FindSegmentMeans user-defined function III-174
mean V-586
average of several waves
WavesAverage user-defined function III-173
average value of a wave III-120
avg3D filter V-372
AVI movies
NewMovie operation V-683
related operations V-6
axes II-278–II-279, II-284–II-288, II-306–II-319, II-324–II-347
adding to graph II-280
AppendToGraph operation V-35
AppendWithCapturedAxis macro II-349
auto ticks II-308
autoscaling modes II-287
AxisInfo function V-43
AxisLabel function V-44
AxisList function V-44
AxisValFromPixel function V-45
bottom axis II-279
category axis V-43
category plots
bar gaps V-627
category gaps V-627
color II-308, V-634
computed manual ticks II-308
contour plot V-85
controlling wave II-279, II-318, II-357, V-43
coordinates for drawing III-68
crossing II-308
curve fit residuals III-219
date/time II-307, II-315–II-317
custom formats II-316
manual ticks II-317
suppress date II-316
drag and drop II-280
dragging II-288, II-307–II-308
draw between (examples) II-307, II-324, II-326
drawing layer III-68
exponential labels II-308
mode II-309
tick marks II-308
fake (custom axes) II-317
fills V-632
flags in Display operation V-161
free axis II-278–II-279, II-311
creating V-470, V-679
crossing at II-308
distance II-308
examples I-36, II-279, II-324, II-326
killing V-470
mirror axis II-307
modifying V-609
GetAxis operation V-295
hiding II-308
HorizCrossing free axis II-278–II-279
image plot V-381
KillFreeAxis operation V-470
labels
margin II-311
on mirror axes II-307
position II-311
scaling II-308
units II-279
left axis II-279
log axes II-308–II-309, II-315, II-319
curve fitting auto-trace III-196
minor ticks II-315
labels II-315
unexpected behavior II-315
log or linear axes II-307
LogLin mode II-315
low trip, high trip II-308
manual ticks II-312–II-314
minor ticks II-308
on log axes II-315
mirror axis II-307–II-308
ModifyFreeAxis operation V-609
ModifyGraph operation V-626, V-634
modifying II-306–II-319, V-626
moving II-288, II-307–II-308
multiple axes (example) I-36, II-324–II-325
NewFreeAxis operation V-470, V-679
not listed in dialogs II-357
offset II-288, II-307
PixelFromAxisVal function V-743
preferences II-349, II-363, II-381, II-404
probability II-317
range II-286–II-288
GetAxis operation V-295
SetAxis operation V-835
reciprocal II-317
removed automatically II-279

reversed II-287, V-835
right axis II-279
scaling II-285–II-288, II-319
scaling using mouse wheel II-286
SetAxis operation V-835
shortcuts II-353–II-354
split axes II-347
stacked axes V-626
example I-39
standard axes II-279
standoff II-289, II-307, II-326
ignored II-307
styles II-350–II-352
swap X & Y axes II-288
tags V-1017–V-1022
thickness II-308
thousands separators V-633
TickWavesFromAxis V-1034
top axis II-279
transforming II-317
units II-279, II-318–II-319, V-43
user ticks from waves II-308
VertCrossing free axis II-278–II-279
WMAxisHookStruct V-609
zero line II-310
Axes Properties dialog
Gizmo II-450
axis coordinate system
Gizmo II-421
axis cue
Gizmo II-415
axis cue objects
Gizmo II-448
Axis Label tab in Modify Graph dialog II-318
axis labels II-318–II-319
AxisLabel function V-44
escape codes II-318, III-57
exponential notation II-308
fonts II-308, II-318, III-54
size II-318
formatted text III-53
Gizmo II-471
hiding II-312
Label operation V-474
marker symbols II-319, III-37
parentheses omitted II-319
position II-311
preferences II-349
special characters II-319, III-37
subscripts II-318
superscripts II-318
text color II-308
trace symbols II-318
units II-318–II-319
Manual Override escape code II-319
prefix II-319
scaling II-319
x10^n prevention II-319
axis objects
Gizmo II-449
Axis Range tab II-286–II-288
Axis Range tab in Modify Axis dialog
Quick Set buttons II-287
axis relative drawing III-67
Axis tab II-307–II-308
axis tool
Gizmo II-414
AxisInfo function IV-173, V-43
AxisLabel function V-44
AxisList function V-44
AxisValFromPixel function V-45
axsize V-318
axsizeDC V-318

B

B-spline surfaces V-418
back projection V-418
background color
in graphs III-442
in notebooks III-6
in panels III-443
in procedure windows III-405
background removal
DSPDetrend operation V-182
background tasks IV-319–IV-323
BackgroundInfo operation V-45
caveats IV-321
CtrlBackground operation V-118
CtrlNamedBackground operation V-119
debugger IV-321
demo IV-323
dialogs IV-321
errors IV-321
example IV-319, IV-321, IV-323
exit code IV-319
FakeData function V-215
KillBackground operation V-468
limitations IV-320
multitasking
example IV-335
old techniques IV-323
period IV-320
preemptive
example IV-335
SetBackground operation V-836
SetIdlePeriod operation V-848
SetProcessSleep operation V-852
terminating IV-319
tips IV-321
BackgroundInfo operation IV-323, V-45
backing up

autosave II-37
backslash
escape sequences IV-14
Unicode escape sequences IV-15
backslash characters
in annotations III-37, III-58
in file paths III-451
procedures III-455
in strings IV-14
LoadWave operation II-150
Shift JIS III-484
Backwards Differentiation Formula V-454
band pass filters III-312
band stop filters III-312
bar graph
with waveforms II-295
with XY pairs II-295
bar limits for ValDisplays III-419, III-435
Bartlet window function V-225
for images V-436
Bartlett window function V-183, V-225, V-1097
for images V-436
Base64Decode function V-45
Base64Encode function V-46
batch files
calling Igor from IV-265
Battle-Lemarie wavelet transform V-189
beams
definition V-420
extracting V-420
Beep operation V-46
BeforeDebuggerOpensHook hook function IV-284
BeforeExperimentSaveHook hook function IV-286
BeforeFileOpenHook hook function IV-287
example IV-288
BeforeUncompiledHook hook function IV-289
BEGIN keyword in Igor Text files II-151
Bessel functions V-46–V-47, V-897–V-898
besseli function V-46
besselj function V-46
besselk function V-47
bessely function V-47
bessI function V-47
beta function V-49
betai function V-49
bevels
for lines and traces III-496
Bezier curves
BezierToPolygon operation V-50
editing III-70–III-71
even-odd rule III-72
fill rules III-72
Text2Bezier operation V-1023
winding rule III-72
BezierToPolygon operation V-50
BigWaveLoadMode II-35
bilevel
TIFF files
II-158
bilinear interpolation V-384
bimodal thresholding III-355
binary data
in strings IV-175, V-1000, V-1071
in text waves III-475–III-477
binary files
description of II-126
FBinRead operation V-219
FBinWrite operation V-220
FReadLine operation V-261
GBLoadWave operation II-166, V-291
Igor binary wave files II-154–II-157
PadString function V-732
binary operators IV-6
AND IV-7
OR IV-7
XOR IV-7
BinarySearch function V-51
BinarySearchInterp function V-51
binomial function V-52
binomial smoothing III-294
binomialln function V-52
binomialNoise function V-52
bit streams
random V-485
bitfields
HDF5 II-211
bitmaps
exporting graphics III-97, III-104
PNGs III-97
bits
setting IV-12
bitwise operators IV-6, IV-41
<< IV-41
>> IV-41
AND IV-7, IV-41
complement IV-6, IV-41
OR IV-7, IV-41
XOR IV-7
Blackman window function V-183, V-225, V-1097
for images V-436
blanks
entering in tables II-247
in delimited text files II-129, II-137
blocks
in general text files II-138
in Igor Text files II-151
blurry images in PDFs III-96, III-103
BMP files
exporting V-405
importing V-390
BMPs
exporting graphics III-103

importing III-509
loading II-158
bottlenecks IV-340
GetRTLocation V-313
GetRTLocInfo V-314
bounce end effect method III-299
bounding box
page layouts II-489
bounding sphere V-53
boundingBall operation V-53
box axes
Gizmo II-449
box objects
Gizmo II-440
box plots II-330–II-337, II-345
AddWavesToBoxPlot operation V-22
AddWavesToViolinPlot operation V-22
appearance II-335
AppendBoxPlot operation V-30
creating V-30
fences II-332
hinges II-332
markers V-596
median II-331
ModifyBoxPlot operation V-593
outliers II-334, V-594
per dataset settings II-342
per-point settings II-343
quartiles II-331
trace names II-330
Tukey II-331
whiskers II-331–II-332, V-595
box smoothing III-295, V-878
BoxSmooth operation V-53
break
in for loops IV-48
in switch statements IV-44
break keyword V-54
breakpoints
setting in debugger IV-213
Brent's method V-725
Bring to Front II-481
broken dependency objects IV-233
Browse Waves dialog II-72
Browser XOP II-72
BrowseURL operation V-54
browsing
experiments II-21
waves II-72, II-228
BuildMenu operation IV-130, V-54
built-in fit functions
notes III-206–III-212
Bulirsch–Stoer method V-454
bulldozer icon (what it is) III-65
Burt-Adelson wavelet transform V-189
bush icon (it's a tree, really) III-65
Butterworth filters III-312
Button Control dialog III-420
Button controls
custom III-422
custom examples III-422
examples III-421
programming III-420–III-423
using III-415
button controls
aborts IV-160
Button operation III-420–III-423, V-55
ButtonControl subtype IV-205
keyword V-57
.bwav extension II-155
byte order marks III-471
FReadLine operation V-263
in notebooks V-697

C

C language IV-208
for external functions and operations IV-209
cabs (complex absolute value) function V-58
Calculate Normals
Gizmo II-432
cameras
data acquisition IV-312
GetCamera operation V-296
ModifyCamera operation V-600
NewCamera operation V-678
CameraWindow subtype IV-205
keyword V-58
Canny edge detector V-370
canonic tick defined II-312
canonical equivalence
Unicode V-693
Capture Graph Preferences dialog II-348
Capture Layout Preferences dialog II-498
Capture Notebook Preferences dialogs III-30
Capture Procedure Preferences dialog III-407
Capture Table Preferences dialog II-272
CaptureHistory function V-58
CaptureHistoryStart function V-58
carriage return
in data files II-129
in delimited text files II-126, II-135
in Igor Text files II-154
in tables II-258
saving text waves II-180
carriage returns
cross-platform issues III-453
escape code for IV-14
carriage-return/linefeed
in data files II-129
in delimited text files II-126
cartesian coordinates

conversion from crystallographic V-1090
conversion to crystallographic V-1091
Case Sensitive III-24
case statements IV-43
Constant keyword V-85
default keyword V-146
Strconstant keyword V-996
catch keyword V-58
category plots II-356–II-364
Add to next II-360–II-361
axis preferences II-363
axis range II-359, II-362
bar gaps II-358, V-627
bars disappear II-363
bars don't line up II-361–II-362
bars don't stack correctly II-363
bars on left or right II-359
category gaps II-358, V-627
combining with numeric II-362
creating II-356–II-357, V-161
example I-30
Draw to next II-360, II-363
drawing order II-359
horizontal bars II-359
Keep with next II-361
modifying II-357–II-360
New Category Plot dialog II-364
numeric categories II-362
options I-31
pitfalls II-362–II-363
preferences II-363–II-364
axes II-363
wave styles II-364
programming (example) II-356
Stack on next II-363
stacked bar charts II-360
tick in center II-358
tick mark labels II-358
using dimension labels II-357
vs numeric categories II-362
wave style preferences II-364
X scaling II-359, II-362
Catmull-Clark surfaces V-418
cd operation V-58
CDFFunc keyword V-948
CDFFunc subtype IV-205
ceil function V-59
centerOfMass function V-59
centerOfMassXY function V-59
cequal function V-60
Change Wave Scaling dialog II-68–II-69
Delta II-69
End II-69
Right II-69
SetScale Mode II-69
Start II-69
changeableByCommandOnly
in notebooks III-11
channels
in FIFO buffers IV-313
char2num function V-60
character classes IV-178
character encoding schemes III-462
character properties
in notebooks III-8
character set
cross-platform issues III-453
character-by-character operations IV-173
characters versus bytes III-483
chart controls III-415, IV-317–IV-319
creating III-423
live mode IV-314
programming IV-313–IV-319
review mode IV-314
scrolling IV-314
updates IV-316
using IV-313
Chart operation V-61–V-63
chebyshev function V-63
chebyshevU function V-64
Checkbox controls
custom III-424
programming III-424
using III-416
CheckBox operation III-424, V-64
CheckBoxControl subtype IV-205, V-66
keyword V-67
CheckDisplayed operation V-68
CheckName function V-68
chi-square
weighting wave III-199
ChildWindowList function V-69
Chinese
text encodings III-462
Cholesky decomposition V-555
Choose Dimensions dialog II-263
ChooseColor operation V-69
chunking II-214
HDF5 default compression II-215
chunks
in multidimensional waves II-92, II-95
in tables II-263
indexing
chunk numbers, s function V-811
scaled index, t function V-1011
maximum location V-1085
minimum location V-1085
Ci function V-109
circular convolution III-285
circular correlation V-107
CleanupName function V-70
Clear Cmd Buffer II-9

clearing
drawing objects III-73
in tables II-247
Clipboard
Export Graphics dialog III-98, III-104
importing data II-248
in SavePICT operation V-827
loading PICTs V-506–V-508
playing sound V-746
programming
GetScrapText operation V-315
PutScrapText operation V-785
searching V-327
clipboard
exporting data II-252
clipping
Gizmo II-421
troubleshooting in Gizmo II-470
Close Notebook Window dialog III-4
Close operation IV-195, V-71
Close Procedure Window dialog III-399
Close Window dialogs II-47, II-350
CloseHelp operation V-71
CloseMovie operation V-71
CloseProc operation V-72
closest integer function V-255
closing
graphs II-350
help windows II-3
page layouts II-477
procedure windows III-399
tables II-241
windows II-46
clustering
distance map V-259
FPClustering operation V-259
HCluster operation V-338
CM_Kn: covariance matrix waves V-125
cmap conversions
cmap2rgb V-418
cmplx function V-73
CmpStr function V-73
CMYK III-99, III-105
CMYK conversions
CMYK2RGB V-418
CMYK images
TIFF files II-158
co-occurrence matrix V-375
Cochran's (Q) test V-923
code marker comments III-408
code point III-462
codecs
NewMovie operation V-683
coefficient of correlation III-226, V-125
coefficients
coefficients wave in curve fitting III-195
curve fitting III-179
filtering III-300–III-301, III-306, III-308, III-311
coercion
in user functions IV-111
Coifman wavelet transform V-189
color
control panel background V-640
dialog V-69
direct color mode V-621
drawing environment V-839
Export Graphics dialog III-98, III-104
Gizmo II-428
in annotations III-54
in contour plots II-371–II-373, V-602–V-605
in graphs V-634
axes II-308
axis label text II-308
control bar V-634
cursors II-320
traces V-618–V-619, V-621
direct color mode V-621
in image plots II-392–II-402, V-636
in notebooks III-8
background V-696
text V-705
in procedure windows III-406
legends II-301
of annotation background III-39, V-1025
of annotation text III-37, III-39, V-1026
of markers V-621
of text in tables V-648
RGBA values IV-13
Save EPS File dialog III-98, III-105
Save PICT File dialog III-98, III-105
selecting V-69
color blending III-498
RGBA values IV-13
color index wave II-372–II-373, II-400–II-401
example II-372, II-401
from color table V-82
in contour plots II-371–II-373
in image plots II-400–II-401, V-636
color material
Gizmo II-429
color palette III-497–III-498
in pop-up menu controls V-766
Other... III-497
Recent Colors III-497
color scale bars III-34, III-47–III-51
axis ticks III-51
ColorScale operation V-74
dialog III-48
dimensions III-50
Gizmo II-472
height III-49
lateral offset III-50

margins III-50
orientation III-48
pasting in layouts II-494
position III-48
rotation III-50
settings III-48
size III-48
units III-50
user-defined ticks III-51
width III-49
color space conversion
cmap
to RGB V-418
CMYK
to RGB V-418
grayscale V-418
HSL
to RGB V-421
RGB
to grayscale V-424
to HSL V-424
to i123 V-424
to XYZ V-424
XYZ
to RGB V-428
color table waves II-399
alpha II-400
opacity II-400
translucency II-400
transparency II-400
color tables II-393–II-400
automatic color mapping II-372
color effects II-395
ColorTab2Wave operation V-82
compatibility II-395
first half, using II-372
gamma II-395
Gizmo II-431
gradients II-396
Igor and IgorRecent V-82
Igor Pro 4 II-396
Igor Pro 5 II-396
Igor Pro 6 II-398
Igor Pro 6.2 II-399
in contour plots II-371
in image plots II-393, V-636
listing V-118
manual color mapping II-372
names of built-in tables II-393
number of colors II-393
overlays II-393
reversing the color order II-392
RGB waves II-400
RGBA waves II-400
specialized II-395, II-397
color tables contrast effects II-395
color waves
Gizmo II-430
COLORPOP V-766
ColorScale operation V-74
colorscales
deleting V-154
Gizmo II-445
ColorTab2Wave
Gizmo II-429
ColorTab2Wave operation V-82
COLORTABLEPOP V-766
COLORTABLEPOPNONAMES V-766
column formats
in delimited text files II-129
column indices
in tables II-261, V-645
column labels
in delimited text files II-131, II-134, II-136
in general text files II-138, II-140–II-141
troubleshooting II-137
column major II-204
column names
can use index number instead V-645
for multidimensional waves II-261
pasting in tables II-240
column position waves
in delimited text files II-134
column styles preference II-272
column types
in delimited text files II-134, II-136
column-major order II-99, V-294
columns
.i, .d, .id, .real, .imag V-192
.x, .y, .xy V-192
appending to tables II-242
AppendToTable operation V-37
changing
positions II-252
styles II-253
widths II-252
extracting V-420
flipping V-419
formats II-249, II-255
in multidimensional waves II-92, II-95
column numbers, q function V-785
scaled indices, y function V-1119
index columns II-241, II-249
list of V-1075
maximum location V-1084
minimum location V-1084
names II-241
pasting column formats II-249
pasting index columns II-249
removing from tables II-242, V-794
showing X values II-235
specifying by index number V-645

titles in tables II-254
tooltips II-3
X columns II-241
comma-separated values
in delimited text files II-135
command buffer II-8–II-13, IV-2
searching II-11
command line II-8–II-13
command line completion IV-3
copying commands to V-1040
length limit II-8, IV-2
magnification II-53
searching II-11
Silent operation V-871
zooming II-53
command line completion IV-3
command line interface I-6
Command Settings III-4
command window II-8–II-13
background color II-12
Clear Cmd Buffer II-9
getting help II-12
magnification II-12
overview I-6
preferences II-12
shortcuts II-13
text format II-12
title II-9
Command-dot
aborting procedures IV-51
Command/History Settings II-12
commands IV-2–IV-21
assignment operators IV-5
assignment statements IV-4–IV-10
command line completion IV-3
comments IV-2
executing from
help windows II-3, III-4
notebooks III-4
procedure windows III-4
executing from Data Browser II-118
functions IV-11
line continuation IV-2
max characters per line II-8, IV-2
multiple IV-2
notebooks actions III-14–III-18, V-711, V-893, V-895
operands IV-8
operations IV-10
operators IV-6
overview II-8
parameters IV-2, IV-11–IV-21
relation to menus I-7
ToCommandLine operation V-1040
tooltips for IV-3
types IV-4–IV-11
use of commas IV-11
commas
as decimal separator in graphs II-288
in commands IV-11
in delimited text files II-131
in general text files II-138
commentizing III-408
Comments
using obsolete style V-871
comments IV-2
aligning III-409
code marker comments III-408
obsolete style V-871
vertical bar character obsolete IV-113
comparison functions
CmpStr V-73
equalWave V-196
limit V-485
max V-586
min V-589
SelectNumber V-834
SelectString V-834
comparison operations
Extract V-213
comparison operators IV-7
roundoff error IV-8
compatibility
Gizmo II-470
Igor6 and Igor7 III-480
long object names III-503
compatibility mode
Silent operation V-871
turning off V-811
compatible characters
Igor6 and Igor7 III-480
Unicode V-693
Compile button III-397, IV-26
compile time vs runtime IV-64
COMPILEPROCEDURES IV-279
compiling IV-26
auto-compiling IV-26
help files IV-257
procedures III-397, IV-26
complement operator IV-6, IV-41
complementary error function V-198
complex
64-bit integers IV-39
columns in tables II-241
curve fitting III-248
variable in user functions IV-112
waves in graphs III-273
complex conjugate V-1090
complex conjugate function V-84
complex declaration V-82
local variables in user functions IV-112
variables in user functions IV-112

complex functions V-7
all-at-once functions curve fitting III-249
cabs V-58
cequal V-60
cmplx V-73
conj V-84
cpowi V-111
curve fitting III-248
fresnelCS V-264
imag V-362
magsqr V-525
multivariate curve fitting III-248
p2rect V-732
r2polar function V-786
real V-788
user functions IV-31
complex keyword V-82
complex number type II-66
complex variables II-104, V-82, V-1065
complex waves II-81
accessing IV-68, IV-83, V-1069
assignments IV-68, IV-83, V-1069
curve fitting III-248
in graphs II-303
in Igor Text files II-151
in user functions IV-64, IV-68, IV-83, IV-111, V-1069
inverse V-541
statistics V-1082
Compose Expression dialog III-137
table selection III-138
compositing
ImageComposite operation V-368
compound datatypes
HDF5 II-212
compressing images V-418
compression factor
movies V-683
Concatenate operation V-82
concatenating
strings IV-8
waves II-80, V-82
condition
matrix V-531
conditional compilation IV-108
#define statement V-16
#if-#elif-#endif statement V-16
#if-#endif statement V-16
#ifdef-#endif statement V-17
#ifndef-#endif statement V-17
#undefine statement V-18
IgorVersion function V-362
predefined symbols IV-110
Conditional Compilation Examples IV-110
conditional operator II-82, IV-6–IV-7
conditional statements
if-else-endif IV-40
if-elseif-endif IV-40
in macros IV-120
in user functions IV-40
precedence of operators IV-41
conditionals in procedures
conditional operator IV-7
confidence bands
for curve fitting III-223, III-226
confidence intervals
curve fit coefficients III-223
conj function V-84
constant
numeric declaration IV-51
Constant keyword V-85
constant keyword
in switch statements IV-44
constants IV-51
Constant keyword V-85
GL_ constants II-471
in curve fitting III-189
in switch statements IV-44
in user functions IV-51
static IV-51
Static keyword V-906
Strconstant keyword V-996
syntax IV-51
constraints
sum of fit functions III-245
constraints in curve fitting III-227, III-232
context
loading text files II-133
context-sensitive help
for controls III-436
contextual menus
contextualmenu IV-127
controls V-756
DataBrowserObjectsPopup menu IV-138
dynamic IV-127
example IV-162
GraphPopup menu IV-138
TablePopup menu IV-138
WindowBrowserWindowsPopup menu IV-140
contextualmenu IV-127
continuation characters IV-2
in user functions IV-35, IV-113
continue keyword V-85
continue statements
for loops IV-48
continuous phase III-316
contour fills II-373
Contour Labels dialog II-378
contour level not closeable II-374
contour plots II-366–II-383
appearance preferences II-380
Append Contour Plot dialog II-381

AppendMatrixContour operation V-33–V-40
AppendXYZContour operation V-39–V-40
axes
GetAxis operation V-295
SetAxis operation V-835
axis preferences II-381
boundary II-370
change updating V-606
color II-369, II-371–II-373, V-602–V-605
color index wave II-372–II-373
ColorTab2Wave operation V-82
programming (example) II-372
color scale bars II-377, III-34, III-47–III-51, V-74
color tables II-372
ColorScale operation V-74
combining with image plots II-367
contour fills II-373
contour instance names II-376–II-377
Contour Labels dialog II-378
contour lines (see contour traces)
contour traces II-370–II-376
appearance II-370
color II-371–II-373
cursors II-375
drawing order II-376
extracting XY data II-376
instance names II-371
list of V-1044
names II-371
removing II-374
updating II-375
wave reference V-1045
Z value II-375
ContourInfo operation V-85
ContourNameList function V-86
ContourNameToWaveRef function V-87
creating II-367–II-368, V-33, V-39, V-162
crossing lines II-380
cursors II-375
z value V-1120
data
gridded II-366
matrix II-366
nonlinear grid II-366
sparse II-367
XYZ II-367
Delaunay triangulation II-370
DelayUpdate and DoUpdate II-375
drawing order II-376, II-379
FindContour operation V-239
gridded data II-366
interpolation II-370, II-379, V-87
labels II-377–II-379
color II-378
content II-378
coping with II-378
drawing order II-379
format II-378
ModifyContour operation V-603–V-604
modifying II-378–II-379
positioning II-378
removing II-378
rotation II-377–II-378
Tag/Q purpose II-379
turning off II-369
updating II-369
layers II-376, II-379
legends II-377, III-34, III-47–III-51
levels II-368, II-374
arbitrary II-369
automatic II-368
manual II-369
ModifyContour operation V-604
More Levels dialog II-369, II-374
stored in a wave II-369
Line Colors dialog II-369, II-371–II-372
lines (see contour traces)
log colors II-373, V-604
manual color mapping II-372
matrix data II-366
Modify Contour Appearance dialog II-368–II-370
ModifyContour operation V-600–V-606
modifying II-368–II-370
More Levels dialog II-369
multiple plots in graph II-376
names II-371, II-376–II-377
in legends II-371
NaNs V-605
New Contour Plot dialog II-381
pitfalls II-379–II-380
preferences II-380–II-381
programming notes II-371–II-372, II-375–II-377
references II-382
related operations V-1
removing V-791
ReplaceWave operation V-801
resolution II-370, II-379
shortcuts II-382–II-383
sparse data II-367
TraceInfo function V-1042
traces (see contour traces)
treatment of NaNs V-605
triangulation II-370
updating II-369, II-375
Voronoi triangulation V-602
XY markers II-370
XYZ data II-367
Z level (see levels)
Z value II-375
ContourInfo operation V-85
ContourNameList function V-86

ContourNameToWaveRef function IV-198, V-87
contours
    FindContour operation V-239
ContourZ function V-87
control bar in graphs III-441
    color V-634
    ControlBar operation V-88
control bars
    expansion factor III-444
control characters
    in tables II-260
control panel units III-444
    NewPanel operation III-444
control panels
    scrolling mode V-319, V-866
Control Procedure dialog III-420
control structures III-437
    eventMod field III-438
ControlBar operation V-88
ControlInfo operation V-89–V-94
ControlNameList function V-94
controls III-414–III-446
    aborts IV-160
    action procedures III-415, III-420–III-429, III-441–III-442, V-57, V-66, V-137, V-763
        independent modules IV-240
        regular modules IV-237
        sliders III-430
    background color III-437
    blue bar III-419, III-435
    Buttons III-415, III-420–III-423
        Button operation V-55
        user data V-57
        WMButtonAction structure V-57
    charts III-415, IV-313–IV-319
        Chart operation V-61–V-63
    CheckBoxes
        user data V-66, V-136
        WMCheckboxAction structure V-66
    Checkboxes III-416, III-424
        CheckBox operation V-64
    color III-437
    Color pop-up menu V-766
    context-sensitive help III-436
    control bar III-441
        example I-41
    control panel units III-444–III-445
    control structures III-437
    ControlBar operation V-88
    ControlInfo operation V-89–V-94
    ControlNameList function V-94
    ControlUpdate operation V-94
    copying III-420
    custom
        WMCustomAction structure V-136
    CustomControl III-416, III-424
        examples III-424
CustomControl operation V-134
CustomControls
    WMCustomControAction structure V-137
data folders II-111
default appearance V-147
default font V-149
deferred compilation III-428, V-1064
disabling III-436
duplicating III-419
eventMod field III-438
Fill Pattern pop-up menu V-766
format strings III-420, V-855
formatted text in titles III-53
global variables
    deferred evaluation III-428, V-1064
graphic elements
    GroupBox III-416, III-426
    TitleBox III-418, III-433
group boxes V-334
GroupBox III-416, III-426
    user data V-336
hiding III-436
Igor Tips III-436
in graphs III-441
    drawing limitations III-442
killing III-435
    KillControl operation V-468
labelBack keyword III-437
Line Style pop-up menu V-766
list boxes V-488
ListBox III-416, III-426
    help V-493
    user data V-492
    WMListboxAction structure V-494
Marker Style pop-up menu V-766
ModifyControl operation V-606
ModifyControlList operation V-608
modifying III-414, III-419, V-606, V-608
moving and resizing III-63
naming rules III-501
points versus pixels III-445
pop-up menus III-416, III-426–III-428
    contextual menus V-756
    PopupContextualMenu operation V-756
    PopupMenu operation V-761
    user data V-763
programming III-419–III-442
    syntax III-420
radio buttons III-416, III-424
red bar III-419, III-435
related operations V-6
resolution of III-456
selecting III-419–III-420
Set Variable III-417, III-428–III-429
    SetVariable operation V-854–V-1064

WMSetVariableAction structure V-858
SetVariable
user data V-857
shortcuts III-446
size of III-443
Slider operation V-874
Sliders III-418, III-429
user data V-876
WMSliderAction structure V-876
sliders
repeating III-418, V-875, V-877
status line help III-436
structures for III-437
tab controls V-1011
tabbed panes III-418, III-431
TabControl III-418, III-431
creating III-431
user data V-1013
WMTabControlAction structure V-1013
tabs V-1011
TitleBox III-418, III-433
titles III-418, III-433, V-1038
updating III-436
ControlUpdate operation V-94
updating problems III-442
user data III-440, V-90, V-320
examples III-440
using III-321, III-415
example I-41
ValDisplays III-418
Value Displays III-433–III-435, III-442
ValDisplay operation V-1060–V-1064
ControlUpdate operation V-94
conversion functions V-7
char2num V-60
cmplx V-73
date2secs V-145
dateToJulian V-144
imag V-362
IndexToScale function V-442
JulianToDate V-468
LowerStr V-523
magsqr V-525
num2char V-713
num2istr V-713
num2str V-714
number-to-string V-902
p2rect V-732
pnt2x V-748
r2polar V-786
real V-788
ScaleToIndex function V-832
Secs2Date V-833
Secs2Time V-833
str2num V-996
UpperStr V-1053
x2pnt V-1114
conversion specifications in printf IV-260, V-770–V-772
Convert to UTF-8 Text Encoding dialog III-485
ConvertGlobalStringTextEncoding operation V-95
ConvertTextEncoding function
example III-479
ConvertTextEncoding operation V-98
ConvexHull operation V-101
convolution III-284–III-286, V-101–V-103
acausal III-285
circular III-285
curve fitting III-256
delay III-285
end effects III-285
FilterFIR operation V-230
for smoothing III-298
linear III-285
number of points in result III-285
Resample operation V-803
SmoothCustom operation V-883
Convolve dialog III-285
Convolve operation V-101–V-103
COO format sparse matrix III-152
cool graphs II-5
coordinate system
Gizmo II-420
coordinate systems for drawing III-66–III-68
SetDrawEnv operation V-842
coordinate transformation
Gizmo II-436
coordinates
cartesian to crystallographic conversion V-1091
crystallographic to cartesian conversion V-1090
window III-455
Copy or Share Wave dialog II-156
Apply to All II-157
copy to home II-24, II-155
CopyDimLabels operation V-103
CopyFile operation V-104
CopyFolder operation V-105
warning V-105
copying
data folders V-187
data from tables II-240, II-247, II-252, II-269
data objects with Data Browser II-115
from Clipboard V-315
from page layouts II-493
Igor binary wave files II-24
in page layouts II-482
rulers III-12
to Clipboard V-785
waves V-185–V-186
CopyScales operation V-107
Core Graphics
graphics technology III-507, V-866

Correlate dialog III-287
Correlate operation V-107–V-109
correlation III-286, V-107–V-109, V-532
  auto-correlation III-287, V-107
  circular correlation V-107
  cross-correlation III-287
correlation matrix for curve fit III-226
cos function V-109
cos of a wave V-1090
Cos window function V-225
cosh function V-109
cot function V-110
coth function V-110
CountObjects operation V-110
CountObjectsDFR operation V-111
covariance V-532
  cross-covariance V-556
covariance matrix
  curve fitting III-226, V-125
cpowi function V-111
crashes IV-340–IV-341
  crash log file IV-341
  Diagnostics folder IV-341
  minidump files IV-341
Create Line dialog
  Arrow Fat III-64
Create Rectangle dialog
  Fill Mode III-64
Create Text dialog III-63
create-paste II-248
CreateAliasShortcut operation V-111
CreateBrowser operation V-113
  modal Data Browser II-120
CreateDataObjectName function V-113
creating
  control panel V-687
  data
    in tables II-234, II-239, II-248
  data folders V-678
  derived rulers III-12
  experiments II-21
  files V-716
  free data folders V-680
  help files IV-255
  new rulers III-11
  notebook V-684
  procedure files III-398
  procedures III-397
  symbolic paths II-22
  waves V-526
CreationDate function V-114
creator code
  for Igor files III-449
  Open operation V-718
Crop to Page Contents
  page layouts II-498
Cross operation V-115
cross product V-115
cross-correlation III-287
cross-covariance V-556
cross-platform issues
  carriage return III-453
  character set III-453
  file extensions
    in procedures III-455
  file transfers III-448
  file types
    in procedures III-455
  fonts III-453
  FTP III-448
  keyboard III-452
  linefeed characters III-453
  mouse III-452
  notebook pictures III-19
  procedure files III-454
  text III-453
crystallographic coordinates
  conversion from cartesian V-1091
  conversion to cartesian V-1090
crystals
  Gizmo II-457
CSC format sparse matrix III-153
csc function V-115
csch function V-115
CSR format sparse matrix III-152
CsrInfo function V-116
CsrWave function V-116
  use CsrWaveRef instead IV-197
CsrWaveRef function IV-197, V-117
  example IV-163, IV-197
CsrXWave function V-117
CsrXWaveRef function IV-197, V-117
CTabList function V-118
Ctrl-Break
  aborting procedures IV-51
CtrlBackground operation IV-323, V-118
CtrlFIFO operation V-120
CtrlNamedBackground operation IV-319, V-119
cubic spline interpolation III-115
  example III-111, III-115
curly braces
  in wave assignments II-78
current data folder II-108
  Data Browser II-115
current experiment II-16
Cursor operation V-121
CursorMovedHook function IV-339
cursors
  activating II-320
  as input for procedures IV-163
  attached to wave II-320
  Click cursor V-872

color II-320, V-121
cross hair style II-320
CsrInfo function V-116
CsrWave function V-116
CsrWaveRef function V-117
CsrXWave function V-117
CsrXWaveRef function V-117
Cursor operation V-121
dashed lines II-320
deactivating II-320
detecting movement IV-339–IV-340
double arrow cursor II-285, II-288, II-308
four-arrow cursor II-302
free II-320
functions II-321
hcsr function V-340
hook functions IV-339
horizontal coordinate V-340
hour glass V-872
in contour plots II-375
in graphs (example) I-38, II-285
information about V-116
moving II-320
moving cursor calls function IV-339–IV-340
operations II-321
PauseForUser operation IV-152, IV-154
pcsr function V-741
putting in graphs II-319–II-321
qcsr function V-785
ranges of interest in curve fit III-197
example III-197
multivariate fit III-201
related functions V-10
related operations V-6
removing II-320
ShowInfo operation V-869
Sleep operation V-872
specifying range of interest II-320
style functions II-320
styles II-320
vcsr function V-1067
vertical coordinate V-1067
watch V-872
xcsr function V-1114
z value from contour trace V-1120
zcsr function V-1120
Cursors button
in Duplicate Waves dialog II-70
CursorStyle subtype IV-204
keyword V-124
Curve Fit progress window III-179, III-234
curve fitting III-178–III-268
auto trace (examples) I-47, I-51
aborting III-180
algorithms III-179–III-180
all-at-once functions III-256
Curve Fitting dialog and III-256
restrictions III-256
auto-trace destination waves III-196, III-234
length III-196
built-in functions
dblexp_XOffset III-207
double exponential III-208–III-209
exp_XOffset III-207
exponential III-207
gauss III-206
gauss2D III-212
Hill equation III-210
line III-210
log III-211
lognormal III-212
Lorentzian III-206
notes III-206–III-212
poly2D III-212
polynomial III-210
power law III-211
sigmoid III-211
sin III-209
two dimensional
gaussian III-212
polynomial III-212
Voigt III-206
chi-square III-179, III-235
CM_Kn: covariance matrix waves V-125
coefficient of correlation III-226, V-125
coefficients III-179
coefficient names III-195
Coefficients tab in Curve Fitting dialog III-185, III-189
coefficients wave III-184, III-195
confidence intervals III-223
default coefficient wave III-195
explicit coefficients wave III-195
for user-defined fit function III-190
names III-190
new wave III-195
values III-184
complex fit functions III-248
confidence bands III-223, III-226
nonlinear functions III-226
statistics III-225
waves generated by Igor III-225
confidence intervals
calculating after fit III-224
constraints III-227, III-232, V-129
constraint expressions III-228
equality constraint III-229
examples III-229
infeasible III-230
ODR III-238, V-132
pitfalls III-231
using command line III-228

using Curve Fitting dialog III-227
violated III-230
convolution and III-256
correlation coefficient III-233
correlation matrix III-226
covariance matrix III-226, V-125
Curve Fitting dialog III-213
CurveFit operation V-124
data folders III-232
dblexp (double exponential) V-127
derivatives III-193
destination waves III-196–III-197
auto-trace III-196
explicit destination III-196
log axes III-196
multivariate fits III-202
no destination wave III-196
saving III-196
differential equations and III-256
epsilon III-267
epsilon wave III-193
error estimates III-180, III-195, III-217, III-222–III-223
ODR III-238
examples
ellipse III-242–III-244
experiments III-265
function list in a string III-247
holding a coefficient III-184
implicit functions III-242–III-244
ODR III-239–III-241
residuals III-184
simple line fit III-182
summed exponentials III-246
excluding points III-198
exp (exponential) V-127
expected points/cycle III-209
exponentials III-187, III-207–III-209, III-265
problems III-208
extrapolation (example) I-50
fit constants III-189
fit function expression III-191
FitFunc keyword III-252, V-255
FuncFit operation V-273
FuncFitMD operation V-276
gauss (Gaussian)
1D V-127
2D V-128
gaussian (examples) I-47, I-55
growing exponential III-187
handling errors III-235
Hill equation V-128
history III-184, III-212
coefficients III-195
holding coefficients III-184
ODR III-238
identifiability problems III-226
implicit functions III-242–III-244, V-126
example III-242–III-244
independent variables III-191, III-255
multiple III-242
INFs III-232
initial guesses III-180, III-189, V-131
graphing III-193
ODR III-237
problems III-187
input values III-212
iteration paths, saving III-234
iteration start III-236
Levenberg-Marquardt algorithm III-179–III-180
line fit III-182, III-210, III-233, V-127
list of functions III-244
constraints III-245
linear dependency III-245
log axes
and auto-trace III-196
log normal V-128
lor (Lorentzian) V-127
M_Covar wave III-226
M_FitConstraint wave III-231
manual guesses III-187
mask wave III-198
multivariate fit III-201
maximum iterations III-234
miscellaneous options III-233
model curve III-196
multidimensional V-276
multiprocessor support
curve fitting
multitasking III-249–III-250
multithreading III-249
multivariate functions III-200–III-205, III-260, V-276
and update time III-202
examples
built-in function III-202
user-defined function III-203
independent variables III-191
model results III-202
Poly2D III-202
selecting data III-201
gridded III-201
multicolumn III-201
selecting function III-201
NaNs III-232
nonlinear least squares III-179
ODR III-236–III-241, V-126
constraints III-238, V-132
error estimates III-238
examples III-239–III-241
holding variables III-238

initial guesses III-237
results III-238
weighting III-237
ODR is threadsafe III-237
ODRPACK95 III-237
only guess III-189
output values III-184, III-212
coefficients III-195
ODR III-238
overview III-179–III-180
poly (polynomial)
1D V-127
2D V-128
polynomials III-210, III-265–III-267
two-dimensional III-212, V-403
example III-202
power law V-128
prediction bands III-226
problems
automatic guess didn't work III-187
with dialog III-205
proportional weighting III-199
quality in line fit III-235
quick fit III-181
limitations III-181
quit reason III-235
quitting III-180
r-squared III-221
ranges of interest III-197
reduced major axis III-237
references III-267, V-134
report III-184
coefficient values III-195
residuals III-184, III-217
auto trace III-219
auto wave III-220
axes III-219
calculating after fit III-220
example I-57
explicit residual wave III-220
removing the auto-trace III-220
results III-184, III-212
RMA III-237
robust fitting III-234
sigmoid V-128
simple example III-182–III-184
simplified III-181
sin (sine) V-127
singular value decomposition III-179, III-265
singularities III-265
special variables III-232–III-236
standard deviation for a point III-199
statistics III-222, III-227, V-1006
structure fit functions III-261–III-263
examples III-262
multivariate III-263
syntax III-263
WMFitInfoStruct structure III-263
subset of data III-197–III-198
continuous III-197
discontinuous III-198
multivariate fit III-201
sums of fit functions III-244
constraints III-245
linear dependency III-245
suppressing Curve Fit progress window III-234
termination criteria III-180, III-233
terminology III-178
to subset of data (example) I-49
to user-defined functions III-190–III-194
coefficient names III-190, III-195
Coefficients tab III-192
compile errors III-192
creating fit function III-190
FitFunc keyword III-252
forms not suitable for dialog III-254
function expression III-191
function format III-250–III-260
graphing initial guesses III-192
independent variables III-191
initial guesses III-192
making function always available III-194
special comments III-253
to XFUNCS (external functions) III-194
total least squares III-236–III-237
troubleshooting III-266–III-267
constraints III-231
Curve Fitting dialog III-205
singularities III-265
user-defined functions
all-at-once functions III-256, III-260
multivariate functions III-255, III-260
structure fit functions III-261–III-263
V_ variables III-232–III-236, III-265
Voigt III-206
W_coef wave III-196, V-131
W_sigma wave III-195–III-196, III-222
weighting (example) I-55
weighting wave III-199–III-200
ODR III-237
XY data ranges III-197
Curve Fitting dialog III-181–III-217
all-at-once functions III-256
Coefficient Wave menu III-195
Coefficients list III-185, III-189
Coefficients tab III-185, III-189
constraints III-227
details III-216
user-defined function III-192
constraints III-227
Data Options tab III-197
Data Mask menu III-198

details III-216
multivariate fit III-201
detailed description III-213–III-217
external functions and III-194
fit function selection III-183
From Target checkbox III-183
Function and Data tab III-183
details III-214
multivariate functions
selecting III-201
selecting gridded data III-201
selecting multicolumn data III-201
Function menu III-183
multivariate functions III-201
global controls III-214
Graph Now button III-192
input data III-183
New Fit Function dialog III-190
compile errors III-192
Save Fit Function Now button III-191
Test Compile button III-191
Output Options tab III-186
auto-trace length III-196
create covariance matrix III-226
Destination menu III-196
destination, New Wave III-197
details III-216–III-217
error analysis III-223
residuals III-218
problems III-205
selecting data waves III-183
simple example III-182
user-defined functions III-190
problems III-254
special comments III-253
CurveFit operation V-124
data folders IV-171
custom axes
Gizmo II-450
CustomControl III-416
CustomControl operation III-424, V-134
customize at point II-306, V-625
legends III-43
cutoff frequency
filtering III-312
smoothing V-879
cutting
in page layouts II-482
in tables II-248
rows or columns in tables II-268
CWT operation V-137
cyclic redundancy check value V-998, V-1071
cylinder objects
Gizmo II-442

D

d
suffix in tables II-241, II-254
dashed lines III-496
drawing V-839
in graphs II-294
preferences III-496
SetDashPattern operation V-837
Dashed Lines dialog III-496
data
archiving V-815
creating II-65, II-92
examples I-35, I-46, I-53
in tables II-234, II-239, II-248
editing by drawing (example) I-21–I-22, I-29
loading
example I-22
from files II-126–II-177
from Igor experiment file V-500–V-505
GBLoadWave operation II-166, V-291
JCAMPLoadWave operation V-464
MLLoadWave operation II-163
waves, LoadWave operation V-508
waves, MLLoadWave operation V-589
XLLoadWave operation II-159, V-1115
reading binary files V-219
saving in files II-177–II-181, V-220
saving waves in file V-813
sparse II-367
typing into a table (example) I-13
writing formatted V-260
data acquisition IV-312
BackgroundInfo operation V-45
cameras IV-312
chart controls IV-313–IV-319
Chart operation V-61–V-63
CtrlBackground operation V-118
CtrlFIFO operation V-120
CtrlNamedBackground operation V-119
FakeData function V-215
FIFO buffers IV-313–IV-319
FIFO2Wave operation V-228
FIFOStatus operation V-229
frame grabbers IV-312
GPIB IV-312
GW Instruments IV-312
Instrutech IV-312
KillBackground operation V-468
KillFIFO operation V-469
National Instruments IV-312
NewFIFO operation V-678
NewFIFOChan operation V-678
NIDAQ Tools IV-312
oscilloscope displays II-347–II-348
serial port IV-312

SetBackground operation V-836
sound IV-312
VISA IV-312
Data Browser II-72, II-108, II-114–II-123
adopting waves II-119
browsing experiments II-21
browsing files II-117
copying objects II-115
CreateBrowser operation V-113
current data folder II-115
DataBrowserObjectsPopup IV-138
deleting data II-117
duplicating objects II-115
Execute Cmd button II-118
find dialog II-119
GetBrowserLine function V-295
GetBrowserSelection function V-296
info pane II-115
main list II-115
modal Data Browser II-119
ModifyBrowser operation V-600
moving data objects II-115
new data folder II-117
plot pane II-116
preferences II-119
saving experiment copies II-117
selecting objects II-115
shortcuts II-122
text encodings III-473
user-defined buttons II-120
data folder notes II-120
data folder references IV-78–IV-82
/SDFR flag IV-80
as function results IV-81
checking validity IV-81
CountObjectsDFR operation V-111
DataFolderRefChanges function V-143
DataFolderRefStatus function V-143
DFREF keyword IV-80
functions IV-81
GetDataFolderDFR function V-296
GetIndexedObjNameDFR function V-304
GetWavesDataFolder function V-317
in tables II-258, II-270
NewFreeDataFolder function V-680
structure fields IV-80
waves containing IV-82
data folders II-108–II-123
$ operator II-109
accessing in user functions IV-78–IV-82
assignment statements II-111, IV-3
autosave II-37
browsing in dialogs II-228
clearing IV-172
controls II-111
conventions IV-170
CountObjects operation V-110
CountObjectsDFR operation V-111
creating II-117, V-187, V-678, V-680
creating global variables in user functions IV-249
current data folder II-108–II-109, II-111, II-115, IV-171
determining V-296
setting II-108, V-837
curve fitting III-232
data folder containing wave V-317
data folder notes II-120
DataFolderDir function V-141
DataFolderExists function V-142
DataFolderList function V-142
DataFolderRefChanges function V-143
DataFolderRefStatus function V-143
dependencies II-111, III-56, IV-230
DFREF keyword IV-80
dialogs II-108
Dir operation V-160
DuplicateDataFolder operation V-187
dynamic text in annotations III-56
examples II-112–II-114
free IV-96–IV-99
full data folder paths IV-3
GetDataFolder function V-296
GetDataFolderDFR function V-296
GetWavesDataFolder function V-317
global variables II-108, II-111
KillDataFolder operation IV-172, V-469
killing II-109
listing objects in V-303–V-304
listing of II-115
loading from Igor experiment file V-500–V-505
MoveDataFolder operation V-658
MoveString operation V-663
MoveVariable operation V-665
MoveWave operation V-665
multitasking IV-330
name conflicts III-505
names II-109
CheckName function V-68
examples II-109
naming rules III-501
NewDataFolder operation V-678
NewFreeDataFolder function V-680
NVAR, SVAR and Wave keywords IV-66, IV-69
objects in data folders II-108
Packages data folder IV-170
programming IV-169–IV-172
quoting liberal names IV-169
references using $ IV-63
referring to waves II-111
related functions II-110, V-12
related operations II-110, V-6

relative data folder paths IV-3
renaming V-796
ReplaceWave operation II-114, V-801
root II-109, II-115, IV-3, V-810
saving unpacked II-18
Set Variable controls II-111
SetDataFolder operation V-837
setting and restoring current IV-171
storing runs of data IV-170
string containing name II-109
syntax II-109
quoting liberal names II-110
text encodings III-478
UniqueName function V-1048
use in commands IV-3
user-defined functions II-111
Value Display controls II-111
wave references IV-84
window macros II-111
Data Mask menu
Curve Fitting dialog III-198
data objects
Gizmo II-453
data type
in Igor Text files II-151
MatrixOp operation III-145
Redimension operation V-788
data types
of waves II-66
data units
changing II-68
SetScale operation V-853
max length II-69
data values II-63
changing units V-107
in tables II-235, II-241
in wave assignments II-74
databases
SQL II-181
DataBrowserObjectsPopup menu IV-138
DataFolderDir function V-141
DataFolderExists function V-142
DataFolderList function V-142
DataFolderRefChanges function V-143
DataFolderRefStatus function IV-81, V-143
dataset region references
HDF5 II-209
datasets
HDF5 II-202
Date Format dialog II-316
date function V-144
date/time axes II-307, II-315–II-317
date format II-316
in Modify Axis dialog II-316
manual ticks II-317
suppress date II-316
time format II-316
date/time data II-85
Excel files II-162
date2secs
example II-85
date2secs function V-145
dates
CreationDate function V-114
Date Format dialog II-130
date/time axes II-307, II-315–II-317
custom formats II-316
date2secs function V-145
DateTime function V-145
dateToJulian function V-144
format in tables II-239
formats II-246
in delimited text files II-130, II-132, II-136
in Igor Text files II-151
in notebooks III-13, III-20
in tables II-239, II-245, II-256
Julian V-144, V-468
JulianToDate function V-468
loading custom formats II-130
LoadWave operation II-131, II-144
modDate function V-592
ordering of components II-246
pasting in tables II-249
range of II-315
related functions V-7
representation of II-245, II-256, II-315
Secs2Date function V-833
SetScale operation V-854
stored in waves II-85
Table Date Format dialog II-246
units II-68–II-69
wave precision II-69
DateTime function V-145
dateToJulian function V-144
Daubechies wavelet transform V-189
dawson function V-145
dB
filtering III-305
dblexp
curve fitting function III-208
dblexp (double exponential) curve fit V-127
dblexp_peak
curve fitting function III-209
dblexp_XOffset
curve fitting function III-207
deactivate events
window hooks IV-303
debug on abort IV-214, V-146
debug on error IV-213, V-146
preventing IV-284
debugger IV-212–IV-227
background tasks IV-321

breakpoints IV-213
debug button IV-215
debug on abort IV-214, V-146
debug on error IV-213, V-146
Debugger operation V-145
DebuggerOptions operation V-146
DisableThreadSafe IV-226
enabling IV-212
enabling independent modules IV-239
expression evaluator IV-225
expressions inspector IV-223–IV-224
function variables IV-220
Go button IV-216
independent modules IV-239
macro variables IV-218
NVAR checking IV-213
procedure pane IV-225
setting breakpoints IV-213
shortcuts IV-226
single-stepping IV-216
stack list IV-216
Step button IV-216
Step Into button IV-216
Step Out button IV-216
stepping through code IV-216
Stop button IV-216
string inspector IV-222–IV-223, IV-225
structures IV-221
SVAR checking IV-213
threadsafe functions IV-225
V_debugDangerously IV-225, IV-227
variables list IV-216
columns IV-218
Variables pop-up menu IV-218
WAVE checking IV-213
wave inspector IV-222–IV-224
Debugger operation V-145
DebuggerOptions operation V-146
debugging
DisableThreadSafe IV-226
threadsafe functions IV-225
wave leaks IV-206–IV-207, V-1087
debugging procedures IV-212–IV-227
background tasks IV-321
Debugger operation V-145
DebuggerOptions operation V-146
fprintf operation IV-261, V-260
Print operation V-769
printf operation V-770
runtime stack information V-314
Silent operation V-871
Slow operation V-877
using print statements IV-212
decibels
filtering III-305
decimal numeric format
in tables II-255
decimal separator
in delimited text files II-136
in general text files II-141
in graphs II-288
in tables II-255
decimal symbols
tables II-255
decimation III-135–III-320
FindSegmentMeans user-defined function III-174
multidimensional II-98
of matrices V-557
Resample operation III-136, V-803
techniques
omission III-135
smoothing III-136
decommentizing III-408
decomposed characters
Unicode V-693
decomposing waves II-81
decompressing images V-419
deconvolution
images V-404
decrement operator IV-6, IV-43
default
in switch statements IV-44
default compression
HDF5 compression II-214
default file text encoding III-465
default font
GetDefaultFont function V-297
GetDefaultFontSize function V-297
GetDefaultFontStyle function V-297
in controls V-149
in graphs II-288
in notebooks III-9
in page layouts II-496
default keyword V-146
Default Output Resolution Factor II-465
default tab width
in notebooks III-6
default tabs
in notebooks III-6, V-696
procedure files III-406
procedure windows III-405
default wave properties II-67
DefaultFont operation V-147
DefaultGuiControls operation V-147
DefaultGuiFont operation V-149
DefaultTab keyword V-150
DefaultTab pragma III-406
define statement V-16
defined function V-152
DefineGuide operation V-153
Delaunay triangulation

contour plots V-605
Triangulate3d operation V-1046
delay
Sleep operation V-871
DelayUpdate
box in tables II-237, II-244
in page layouts II-483, II-487
DelayUpdate operation V-153
DELETE method
URLRequest operation V-1054
Delete Points dialog II-73
DeleteAnnotations operation V-154
DeleteFile operation V-155
DeleteFolder operation V-156
warning V-156
DeletePoints operation II-73, V-157
deleting
data in waves II-73, II-249
recreation macros II-48
delimited text files II-129–II-137
carriage return II-135
column formats II-129
column labels II-131, II-134, II-136
column position waves II-134
column types II-134, II-136
comma-separated values II-135
date columns II-132
dates II-130, II-136
decimal character II-136
delimiter characters II-131, II-136
escape codes II-135
example II-131
features of II-126–II-127
fixed field text files II-137
FORTRAN files II-137
INFs II-129
linefeed II-135
loading
matrices II-133
text waves II-134
loading process II-132
missing values II-136
NaNs II-129
nonnumeric columns II-132
numeric formats II-133
quotation marks II-135
quoted strings II-132, II-135
row labels II-134
row position waves II-134
saving multidimensional waves II-179
saving waves II-178, II-180
skipping lines II-136
spaces II-136
special characters II-134
times II-130
troubleshooting II-137
tweaks II-136
versus general text II-139
X scaling II-133
delimiter characters
in delimited text files II-126, II-131, II-136
in general text files II-138
in text data columns II-134
spaces II-136
deltax function V-157
use DimDelta instead V-160
dendrogram
example III-168
HCluster operation V-338
dendrogram wave
hierarchical clustering III-167
dense matrices III-151
dependencies IV-5, IV-230–IV-234
cascading IV-232
caveats IV-234
creating
in user functions IV-233
data folders IV-230
in user defined functions IV-234
independent modules IV-243
updating
in macros IV-123
in user functions IV-112
dependency assignments IV-230–IV-234
operator IV-233
creating
in user functions IV-233
data folders IV-230
deferred evaluation IV-233
deleting IV-232
examples I-44, III-321, IV-230
numeric variables IV-231
SetFormula operation V-847
string variables IV-231
waves IV-232
dependency formulas IV-230–IV-234
:= operator IV-5
broken objects IV-233
creating
in user functions IV-233
data folders IV-230
deleting IV-232
dynamic text in annotations III-56
for waves II-84
GetFormula function V-303
guided tour (example) I-44
SetFormula operation IV-234, V-847
status IV-231
using $ operator IV-234
using operations IV-234
derivatives in curve fitting III-193
derived rulers III-12

desktop
path to folder V-895
destination waves IV-85
automatic wave references IV-72
in curve fitting III-196–III-197
in wave assignment II-74
inline wave references IV-73, IV-86
issues IV-86
standalone wave references IV-72
subranges of II-76
wave references IV-86
determinant V-533
development systems IV-208
DF flag
function results IV-81
DFREF keyword IV-80
example IV-79
function results IV-81
functions IV-81
structure fields IV-80
Diagnostics folder IV-341
dialog wave browser II-228
filters II-229
dialogs
background tasks IV-321
browsing waves II-228
from procedures V-165, V-167
from user functions IV-144
modeless using panels IV-158
relation to commands I-7
relation to menus I-7
text areas
magnification II-53
zooming II-53
DIBs
exporting graphics III-103
saving V-826
differential equations III-322–III-336
coupled first-order equations III-327
curve fitting and III-256
derivative function III-324
discontinuities III-335
first-order equations III-325
higher order equations III-328
IntegrateODE operation V-452
interrupting calculations III-334
stopping and restarting calculations III-334
stopping on a condition III-335
Differentiate operation V-158
differentiation III-120
Differentiate operation V-158
multidimensional III-120
of XY data III-120
waveform data III-120
diffuse light
Gizmo II-432
digamma function V-159
digits after decimal point
in tables II-255
DimDelta function V-160
dimension labels II-93–II-94
CopyDimLabels operation V-103
example II-82
FindDimLabel function V-240
GetDimLabel function V-298
in category plots II-357
in delimited text files II-131
in tables II-262
length limit II-94, II-244
long dimension labels V-209
naming conventions II-94
SetDimLabel operation V-838
speed considerations II-94
text encodings III-473
viewing in tables II-235
wave indexing II-82
dimension scales
HDF5 V-342
dimension scaling
changing II-68
SetScale operation V-853
checking in tables II-235
dimension units
changing
SetScale operation V-853
dimensions
changing II-72
Redimension operation V-788
HDF5 II-204
number of, WaveDims function V-1072
platform-related issues III-455
DimOffset function V-160
DimSize function V-160
example IV-200
Dir operation V-160
direct autosave II-38
direct color mode V-621
direct reference to globals IV-114
converting to runtime lookup IV-114
directional lights
Gizmo II-433
directories
creating via FTP IV-275
deleting via FTP IV-275
downloading via FTP IV-273
FTPCreateDirectory operation V-265
FTPDelete operation V-267
uploading via FTP IV-274
DisableThreadSafe IV-226
disappearing drawing objects III-65, III-68
Discrete Prolate Spheroidal Sequences V-171
disk objects

Gizmo II-443
dispersion of wave V-1084
2D V-415
Display Advanced Options Menus II-466
display list
Gizmo II-416–II-417
Display operation V-161–V-163
display volume
Gizmo II-421
DisplayHelpTopic operation V-163
DisplayProcedure operation V-163
displays
high-resolution III-508
resolution of III-507
dissimilarity
hierarchical clustering V-339
dissimilarity matrix
hierarchical clustering III-162–III-163
distance map V-259
hierarchical clustering III-162
distance sorting
Gizmo II-432
distance transform V-419
distributing
drawing objects III-65
dithering
image plots V-637
division IV-6
Do It button I-7
do-while
in user functions IV-45
do-while statements V-165
DoAlert operation V-165
document info icon
in notebooks III-5
document properties
in notebooks III-6
Document Settings dialog III-6, III-20, III-405
documents
path to folder V-895
DOG wavelet transform V-140
DoIgorMenu operation V-166
DoPrompt operation
example IV-144
help for IV-148
DoPrompt statements V-167
doScroll keyword V-319, V-321, V-866
dot product V-534
MatrixOp operation III-144
dot-underscore files V-441
double declaration V-168
local variables in user functions IV-112
variable in user functions IV-112
double keyword V-168
double precision V-788
numeric variables II-104
double-clicking
on text III-408
double-precision floating point II-66
DoUpdate operation IV-112, IV-234, V-168
in macros IV-123
DoWindow operation V-168
style macros V-171
window title V-170
downloading
directories via FTP IV-273
files via FTP IV-273
files via HTTP IV-276
web pages via HTTP IV-276
DoXOPIdle operation V-171
DPI
platform-related issues III-455
DPSS operation V-171, V-672
drag and drop II-35, IV-280
graphs II-280
dragging
a marquee in a page layout II-482
cells in tables II-243
column boundaries in tables II-252
columns in tables II-252
object handles in layouts II-481
objects in layouts II-481
DrawAction operation V-172
DrawArc operation V-174
DrawBezier operation III-75, V-174
drawing
grouped objects III-76
drawing layer tool III-65
Drawing Limitations III-442
drawing objects
Gizmo II-436
drawing order of images
ReorderImages operation V-797
drawing order of traces II-297
ReorderTraces operation V-798
drawing tools III-62–III-78
absolute coordinates III-66
Align objects III-65
anchor for text III-63
arcs III-64, V-174
Arrow Fat III-64
Arrow tool III-63
arrows III-64
axis coordinates III-68
axis relative coordinates III-67
bevels III-496
Bezier curves
creating III-75
editing III-70–III-71
bezier curves V-174
circles III-64, V-176
coordinate systems III-66–III-68, III-73, V-842

copy III-73
creating objects III-63–III-72, III-74
curves V-174
dashed lines III-64–III-65
SetDashPattern operation V-837
deleting objects III-63, III-76, V-172
disappearing objects III-65, III-68, III-73
Distribute objects III-65
draw object commands V-172
Draw Poly tool III-69
Draw Wave tool III-73
DrawAction operation V-172
DrawArc operation V-174
DrawBezier operation V-174
drawing layer drawing tool III-65
Drawing mode III-62
DrawLine operation V-175
DrawOval operation V-176
DrawPICT operation V-176
DrawPoly operation V-176–V-177
DrawRect operation V-178
DrawRRect operation V-178
DrawText operation V-178
DrawUserShape operation V-179
duplicating objects III-63
Edit Poly tool III-69
Edit Wave tool III-73
end caps III-496, V-840
environment III-74, III-77
Environment pop-up menu III-65
fill modes III-64–III-65
Freehand Poly tool III-69
Freehand Wave tool III-73
grids III-66, V-1041
grouped objects III-65, III-74, III-77
HideTools operation V-347
in page layouts II-480
inserting objects V-172
joins III-496, V-840
kill layer III-76
layers II-479, III-68–III-69, III-76–III-77
Overlay drawing layer III-69
ProgAxes drawing layer III-68
ProgAxes layer III-68
ProgBack drawing layer III-68
ProgBack layer III-68
ProgFront drawing layer III-69
ProgFront layer III-68
selection (example) I-25
SetDrawLayer operation V-844
UserAxes drawing layer III-69
UserAxes layer III-68
UserBack drawing layer III-68
UserBack layer III-68
UserFront drawing layer III-69
UserFront layer III-68
Line Properties III-65
lines III-64, V-175
Lines (and Arrows) tool III-64
miters III-496, V-840
modifying objects III-63, III-74
monotonic waves III-73
Mover pop-up menu III-65
moving, resizing objects III-63, III-69, III-73
offscreen objects III-65, III-68, III-73
Operate mode III-62
operations III-74–III-76
Oval tool III-64
ovals V-176
Overlay drawing layer III-69
paste III-73
pasted objects disappearing III-73
pasted picture resizing III-73
picture resizing III-73
plot relative coordinates III-67
Polygon tool III-64, III-69–III-73
polygons
as input for procedures IV-164
creating III-69, III-75
example I-20
DrawPoly operation V-176
editing III-69–III-72
exiting edit mode III-71
last point III-69
origin III-75
scaling III-71
ProgAxes drawing layer III-68
ProgBack drawing layer III-68
ProgFront drawing layer III-68–III-69
programming III-73–III-77
example III-77
strategies III-76
Rectangle tool III-64
related operations V-5
relative coordinates III-67
replace group method III-76
Retrieve objects III-65, III-68
rotating objects III-63
Rounded Rectangle tool III-64
rounded rectangles
DrawRRect operation V-178
selecting, deselecting objects III-63, III-69, III-74
SetDashPattern operation V-837
SetDrawEnv operation III-74, V-838–V-843
SetDrawLayer operation V-844
shortcuts III-78
Show Tools III-62
ShowTools operation V-870
text III-63
anchor III-63
color III-63
properties III-63

rotation III-63
Text tool III-63
tool palette III-62
ToolsGrid operation V-1041
User Shapes tool III-65
UserAxes drawing layer III-68–III-69
UserBack drawing layer III-68
UserFront drawing layer III-68–III-69
wave editing III-73, III-75–III-76
waves as Bezier curves III-75
waves as polygons III-75
DrawLine operation V-175
DrawOval operation V-176
DrawPICT operation V-176
in independent modules IV-244
DrawPoly operation III-75, V-176–V-177
xOrg, yOrg III-75
DrawRect operation V-178
DrawRRect operation V-178
DrawText operation V-178
DrawUserShape operation V-179
formatted text III-53
DrawUserShape subtype IV-204
DSPDetrend operation V-182
DSPPeriodgram operation V-182
dummy objects in page layouts II-487
Duplicate operation II-70, V-185–V-186
examples II-70
free waves V-186
in user functions V-186
warning V-187
Duplicate Waves dialog II-70
DuplicateDataFolder operation V-187
duplicates
FindDuplicates operation V-240
duplicating
controls III-419
data folders V-187
data objects with Data Browser II-115
drawing objects III-63
waves II-70, V-185–V-186
waves in tables II-240, II-269
DWT operation V-189
dynamic IV-127
dynamic libraries
Matlab II-163
dynamic menu items IV-129
dynamic text
in annotations III-56
TagVal function V-1022
TagWaveRef function V-1023

E

e function V-190
earlyKeyboard
events in hook functions IV-302
edge detection
ImageEdgeDetection operation V-370
edge detectors
Canny V-370
Frei–Chen V-370
Kirsch V-370
Marr–Hildreth V-370
Prewitt V-370
Roberts V-370
Shen–Castan V-370
Sobel V-370
EdgeStats operation III-289, V-190–V-192
Edit operation V-192–V-193
Edit Text Cell dialog II-258
editing waves II-235
using drawing tools III-73
ei function V-194
eigenvalues
MatrixEigenV operation V-534
eigenvectors
MatrixEigenV operation V-534
elapsed time II-256, II-315–II-317, V-833
loading format II-130
elements column in tables
hiding V-649
elements keyword for ModifyTable operation II-263
ellipses
error ellipses II-305, V-200
EllipticE function V-194
EllipticK function V-194
embedding III-80–III-93
in control panels III-443
EMF III-102
saving V-826
emphasized ticks
in user tick waves II-314
Enable Transparency Blend
Gizmo II-428, II-433
Enable Updating
pictures in notebooks III-18
Enable Updating dialog III-14
end caps
for drawing tools V-840
for lines and traces III-496
for traces V-617
end effects
in convolution III-285
in smoothing III-299
End keyword
in Igor Text files II-151
in procedures V-194
EndMacro keyword V-195
EndStructure keyword V-195
endtry keyword V-195

energy loss when windowing III-278
engineering units
printf operation V-771
enhanced metafiles
exporting graphics III-102
graphics technology III-507
importing III-509
saving V-826
enoise function V-195
Enter key
in tables II-243
entering data in tables II-234, II-239, II-244
enums
HDF5 II-211
environment variables
GetEnvironmentVariable function V-298
SetEnvironmentVariable function V-844
UnsetEnvironmentVariable function V-1050
EPS
CMYK III-99, III-105
creating file III-98, III-105
embedding fonts III-99, III-105
exporting graphics III-97, III-103
missing PostScript fonts III-99, III-105
PostScript language level III-97, III-103
saving V-826
screen preview III-97, III-103
Symbol font III-493
transparency III-96, III-102
epsilon
curve fitting III-267
epsilon wave in curve fitting III-193, III-213
equality IV-6
equality operator IV-6, IV-8
and roundoff error IV-8
equalWave function V-196
equidistant projection V-781
erf function V-197
erfc function V-198
erfcw function V-198
error bars
arbitrary error values II-304
bar thickness II-304
cap thickness II-304
cap width II-304
examples II-304
in graphs II-304
modes II-304
NaNs in error values II-304
parts identified V-202
single sided II-304
XY Error box II-304
Error Bars dialog II-304
error ellipses II-305, V-200
error estimates in curve fitting III-222
error function V-197, V-463
error handling
text encodings text encodings
error handling III-464
error shading II-305, V-200
error waves II-304
ErrorBars operation V-199–V-203
errors
GetErrMessage function V-299
GetRTErrMessage function V-313
GetRTError function V-312
handling IV-49, V-1047
in background tasks IV-321
in macros IV-122
in user functions IV-110–IV-111
rtFunctionErrors pragma IV-55
escape codes
backslash characters in annotations III-58
backslashes
LoadWave operation II-150
examples III-35
for carriage return IV-14
for linefeed IV-14
in annotations III-35–III-38, III-42, III-53–III-58
in axis label II-318
in axis labels III-57
in delimited text files II-135
in Igor Text files II-154
in strings IV-14
LoadWave operation II-150
saving text waves II-180
text info variables III-51
wave symbols III-42
escape sequences IV-14
invalid text in tables II-260
null IV-16
Unicode IV-15
EstimatePeakSizes operation V-203
even-odd rule III-72
eventMod field III-438
example experiments II-4
examples
all-at-once function III-256
with convolution III-257
confidence bands III-223
confidence interval calculation III-224
constraints III-229
creating user-defined function III-190
fit arbitrary number of Gaussian peaks III-254
implicit function fitting III-242–III-244
manual guesses III-187
multivariate fit III-202
ODR fitting III-239–III-241
Poly2D III-202
prediction bands III-223
subrange destination III-197
sums of fit functions III-246–III-248

user-defined fit code III-252
user-defined multivariate function III-203
Excel files
date/time data II-162
loading II-159, V-1115
loading 2D data II-162
excluding points in curve fitting III-198
exclusive OR operator IV-6
Execute Cmd button II-118
Execute operation IV-111, IV-201, V-204
calling external operations from functions IV-202
calling macros from functions IV-202
data folder name V-317
GetErrMessage function V-299
independent modules IV-243
use of liberal names with IV-168
Execute/P operation V-204
operation queue IV-278
ExecuteCmdOnList function IV-201
ExecuteScriptText operation V-205
EXIF metadata V-395
exists function V-207
exp
curve fitting function III-207
exp (exponential) curve fit V-127
exp function V-208
exp_XOffset
curve fitting function III-207
expanding graphs II-285
examples I-35
expanding panels III-443
expected points/cycle in curve fitting III-209
expected wave reference error IV-75
experiment file
HDF5 packed II-16
compression II-16
loading data from V-500–V-505
packed II-16
SaveExperiment operation V-819
snooping II-26
unpacked II-17
experiment file text encoding III-465
experiment files
autosave II-37
errors saving II-30
locked II-30
read-only II-30
experiment folder II-17
Experiment Information dialog II-19
experiment recreation procedures II-26
ExperimentInfo operation V-208
ExperimentModified operation V-212
experiments II-16–II-30
browsing II-21, II-117
current experiment II-16
data folders II-18
empty table II-21
errors while loading II-27
examples II-4
Experiment Information dialog II-19
ExperimentInfo operation V-208
ExperimentModified operation V-212
HDF5 packed file II-16, II-223
Igor binary wave files II-19
initialization commands II-27, IV-204
LoadData operation II-156, V-500–V-505
loading data from II-117
loading of II-26
long dimension labels V-209
long object names V-208
Macro Execute Error dialog II-27
merging II-19
miscellaneous file II-19
missing folders II-28
name of II-9
new II-21, IV-292
notebooks in III-3, III-25
opening II-19, IV-292
packed file II-16
procedure files II-19, III-396, III-398, III-400, III-403
references to files and folders II-24
reverting II-20
safe save II-29
SaveExperiment operation V-819
saving II-16–II-19, IV-286
copies II-117
HDF5 compression II-16
saving of II-29
settings II-234
sharing Igor binary wave files II-156
table in new experiments II-234
templates II-21
temporary files II-29
transferring II-24, II-117
unpacked file II-17
variables file II-19
expInt function V-212
expnoise function V-213
exponential curve fitting III-265, V-127
problems III-208
exponential functions V-7
acosh V-19
alog V-25
asinh V-42
atanh V-42
cosh V-109
coth V-110
cpowi V-111
exp V-208
ln V-500

log V-520
sinh V-871
tanh V-1023
exponential integral V-212
exponential notation
tick mark labels II-308
forcing II-311
exponentiation IV-6
exponentiation operator IV-6
Export Graphics dialog III-98, III-104
Gizmo II-465
ExportGizmo operation II-465, V-213
exporting
bitmaps III-97, III-104
BMP files V-405
BMPs III-103
choosing a format III-98, III-104
CMYK III-99, III-105
Crop to Page Contents II-498
DIB files V-826
DIBs III-103
EMF files V-826
enhanced metafiles III-102
EPS III-97, III-103
EPS files V-826
FBinWrite operation V-220
from tables II-252, II-270, V-826
SaveTableCopy operation V-829
Gizmo II-465, V-213, V-826
graphics III-96–III-100, III-102–III-106, V-405
graphics formats III-96, III-102
graphs II-324, V-826
HDF5 II-197, V-6, V-12
images V-405
ImageSave operation V-405
JPEG files V-405, V-826
metafiles III-102
notebooks III-20–III-21
numeric variables V-220
PadString function V-732
page layouts II-482, II-498, V-826
PDFs III-96, III-103
PhotoShop files V-405
PICT files V-405, V-826
HiRes V-826
PNG files V-405, V-826
PNGs III-97
PostScript language level III-97, III-103
PostScript PICT files V-826
QuickTime files V-405
SavePICT operation V-826
SGI files V-405
string variables V-220
SVGs III-97, III-104
tables as graphics II-271
Targa files V-405
TIFF files V-405, V-408
to databases II-181
waves II-177–II-181, II-270, V-220, V-829, V-1093
WMF files V-826
exporting raw
raw PNG files V-408
expressions
as operation flag values IV-12
as parameters IV-12
in debugger IV-225
precision of IV-38
strings IV-13
expressions inspector in debugger IV-223–IV-224
exterior annotations III-40
affects graph plot area III-41
exterior subwindows III-443, V-318
window hooks IV-305
external functions IV-208
creating IV-209
curve fitting to III-194
FuncRefInfo function V-278
FunctionInfo function V-279
information about V-278–V-279
external operations IV-208
calling from a user function IV-202
conditional compilation IV-108
creating IV-209, V-736
IDLE events V-171
listing V-725
long object names III-504
OperationList function V-725
ParseOperationTemplate operation V-736
external text editor II-56
Extract operation V-213

F

f(z)
markers II-298
factorial function V-214
Faddeeva function V-214
FakeData function V-215
false and true IV-40
FAQ II-5
fast cosine transform V-571
fast sine transform V-571
fast staggered cosine transform V-572
fast staggered sine transform V-571–V-572
FastGaussTransform operation V-215
FastOp operation V-216
faverage function III-121, V-218
subranges III-122
faverageXY function V-218
FBinRead operation IV-195, V-219
FBinWrite operation IV-195, V-220
fences

box plots II-332
FetchURL function V-221
FFT
spatial frequency filtering III-360
wave references IV-75
FFT operation V-222–V-228
FFTs III-270–III-274, V-222–V-228
compared to Fourier transform III-272
continuous wavelet transform III-282
DFT equation III-272
effect on graphs III-273
effect on wave type and number of points III-270
Hanning window function III-277
harmonic analysis V-182
IDFT equation III-272
IFFT operation V-357–V-359
image analysis III-359–III-362
number of points restrictions III-270
one-sided spectrum III-270
periodograms V-182
phase calculation V-1051
unwrapping V-1051
phase polarity III-273
power spectra III-279
scaling amplitude III-272
spectral leakage III-277
speed III-274
swap diagonal quadrants V-427
two-sided spectrum III-270
wave type restrictions III-270
windowing III-275–III-279, V-182, V-1097
for images V-435
for matrices V-435
Hanning operation V-337
X scaling and units changed III-271
FGetPos operation IV-195, V-228
fidelity
in page layouts II-486
FIFO buffers
AddFIFOData operation V-20
AddFIFOVectData operation V-20
channels IV-313
chart controls IV-313–IV-319
Chart operation V-61–V-63
CtrlFIFO operation V-120
FIFO2Wave operation V-228
FIFOStatus operation V-229
KillFIFO operation V-469
NewFIFO operation V-678
NewFIFOChan operation V-678
programming IV-315
related operations V-6
SoundInStartChart V-888
SoundInStopChart V-889
updates IV-316
valid state IV-315
FIFO files
format IV-316
FIFO2Wave operation V-228
FIFOStatus operation V-229
fifth tick
in user tick waves II-314
FILE
GET method V-1054
PUT method V-1054
file extensions
.noindex II-29
.bwav II-155
cross-platform issues
in procedures III-455
.ibw II-155
Igor binary wave file II-155
Igor binary wave files II-155
Open File dialog IV-149
platform-related issues III-448
Save File dialog IV-151
File Information dialog
for notebooks III-25
procedure file version IV-167
file paths
in procedures III-455
length limits II-21
file permissions
Macintosh II-30
saving files II-30
Windows II-30
file reference numbers IV-196, V-716, V-719
FILE scheme
URLRequest operation V-1054, V-1058
file types
cross-platform issues III-448
in procedures III-455
Open File dialog IV-149
Save File dialog IV-151
files
adopting II-24
alias creation V-111
appending V-717
carriage return II-129
carriage-return/linefeed II-129
Close operation V-71
closing IV-195
CopyFile operation V-104
copying V-104
CreateAliasShortcut operation V-111
creating V-716
formatted text IV-259–IV-261
movies V-683
creator code V-718
cross-platform compatibility III-448–III-449
current file position V-228, V-264

DeleteFile operation V-155
deleting V-155
delimited text files II-129–II-137
delimiter characters II-126
dot-underscore files V-441
downloading via FTP IV-273
downloading via HTTP IV-276
drag and drop II-35, IV-280
errors saving II-30
FIFO buffers IV-313–IV-319
file types IV-149, IV-151
finding IV-195
fixed field text files II-137
formats II-126
FORTRAN files II-137
FTPCreateDirectory operation V-265
FTPDelete operation V-267
FTPDownload operation V-268
FTPUpload operation V-271
FunctionPath function V-287
general text files II-138–II-142
GetFileFolderInfo operation V-300
headers II-126
Igor binary wave files II-154–II-157
Igor Text files II-150–II-154
ImageFileInfo operation V-372
IndexedFile function V-440
information about V-300
linefeed II-129
linefeed characters III-453
loading data files II-126–II-177, IV-280
locked II-30
MacroPath function V-525
MIME-TSV IV-281–IV-283, IV-287, IV-289
MoveFile operation V-659
moving V-659
names
  length under Windows III-450
  platform-related issues III-450
  XOP length on Windows III-451
notebooks III-25
Open File dialog IV-149
Open operation V-716–V-721
opening IV-195, IV-280, V-722, V-724
ParseFilePath function V-733
paths
  extracting V-733
  manipulating V-733
  to functions V-287
  to macros V-525
procedure
  path separators III-455
programming IV-194
read-only II-30
reading V-717
reading binary files V-219, V-261
reading text files V-261
reference numbers V-716, V-719
related functions V-12
related operations V-5
safe save II-29
Save File dialog IV-151
saving data V-815
saving data files II-177–II-181
saving waves to V-812
searching V-327
SetFileFolderInfo operation V-845
setting information about V-845
shortcut creation V-111
Spotlight II-30
status V-265
temporary files II-29
terminator characters II-126
TextFile function V-1029
transferring
  cross-platform III-448–III-449
  FTP III-448
  via FTP V-268, V-271
types III-455, IV-282, IV-287–IV-288
uploading via FTP IV-274
writing V-717
  binary files V-220
  formatted data V-260
writing to IV-196
fill page
  printing graphs II-323
fill patterns III-498
  in pop-up menu controls V-766
fill rules
  polygons III-72
fill type in graphs II-295
fills
  axes V-632
Filter Design and Application dialog III-302
FilterFIR operation V-230–V-233
FilterIIR operation V-234–V-239
filtering III-299–III-316
  band pass filters III-312
  Butterworth filters III-312
  coefficients III-300–III-301, III-306, III-308, III-311
  cutoff frequency III-312
  dB III-305
  decibels III-305
  evaluating III-314
  Filter Design and Application dialog III-302
  FilterFIR operation V-230
  FilterIIR operation V-234
  FIR filters III-300
  FMaxFlat operation V-255
  high pass band III-303
  high pass example III-308

IIR filters III-300, III-312
ImageFilter operation V-372
ImageWindow operation V-437
Kaiser's maximally flat filter V-255
low pass band III-303
low pass example III-304
MatrixFilter operation V-539
MPR filter V-789
notch example III-310
Nyquist frequency III-300, III-312
order III-313
poles and zeros III-301
Remez Exchange III-311
Remez operation V-789
Resample operation V-803
zeros and poles III-301
filters
band stop filters III-312
dialog wave browser II-229
HDF5 II-217
Open File dialog IV-149
Save File dialog IV-151
Find bar II-54
find bar
replacing text II-54
Find dialog
Data Browser II-119
Find Same II-54
in procedure windows III-404
Find Selection II-54
in procedure windows III-404
Find Text dialog III-24
Find Text in Multiple Windows dialog II-55
FindAPeak operation V-246
FindContour operation V-239
FindDimLabel function V-240
FindDuplicates operation V-240
finding
FindSequence operation V-252
FindValue operation V-253
in Data Browser II-119
in tables II-249
procedures III-404
rulers in notebooks III-12
search expressions II-3
table values II-249
text II-54
text in command window II-11
text in notebooks III-24
text in procedure windows III-404
wave value V-252–V-253
FindLevel operation III-288, V-242–V-244
FindLevels operation III-288, V-244–V-245
FindLevelXY macro III-289
FindListItem function V-245
FindPeak operation III-290–III-292, V-247–V-248
FindPointsInPoly operation V-248
FindRoots operation V-248–V-252
polynomial coefficients V-251
FindSequence operation V-252
FindValue operation V-253
FIR filters III-300
high pass example III-308
low pass example III-304
notch example III-310
fit constants III-189
fit_
curve fitting destination wave name III-196
FitFunc keyword III-252, V-255
FitFunc subtype IV-205
fixed dimension
in tables II-264
fixed field text files
blanks II-138
field widths II-138
loading II-138
number of columns II-138
padding II-137
spaces II-137
fixed-length strings
HDF5 II-219
flags
in operations IV-10, IV-12
expressions require parentheses V-15
in user functions IV-31
flat-top windows V-227
Fletcher32
HDF5 compression II-213
floating panels V-687–V-688
WinList function V-1099
WinName function V-1100
floating point
double-precision II-66
single-precision II-66
floating point data
in Igor Text files II-151
VAX II-167
floating point truncation error
and equality operator IV-8
floor function V-255
flow control
break keyword V-54
break statements IV-48
continue keyword V-85
continue statements IV-48
default keyword V-146
do-while V-165
do-while loops IV-45
extraneous text after IV-114
for loops IV-46
for-endfor V-259
for-var-in-wave V-259

if-else-endif IV-40, V-357
if-elseif-endif IV-40, V-357
if-endif IV-40, V-357
in macros IV-120
in user functions IV-40
keywords V-13
loops IV-45
range-based for loops IV-47
return keyword V-809
strswitch statements V-1002
switch statements IV-43, V-1011
try-catch-endtry statements IV-49, V-1047
while loops IV-46
FMaxFlat operation V-255
Folder button II-28
folders
alias creation V-111
browsing II-117
CopyFolder operation V-105
copying V-105
CreateAliasShortcut operation V-111
creating via FTP IV-275
data folders II-108–II-123
DeleteFolder operation V-156
deleting V-156
deleting via FTP IV-275
downloading via FTP IV-273
experiment folder II-17
FTPCreateDirectory operation V-265
FTPDelete operation V-267
GetFileFolderInfo operation V-300
Igor Extensions folder II-32
Igor Help Files folder II-31
Igor Pro Folder II-30, IV-166
Igor Pro User Files II-31
Igor Procedures folder II-32
information about V-300
missing II-28
MoveFolder operation V-661
moving V-661
names
platform-related issues III-450
SetFileFolderInfo operation V-845
setting information about V-845
shortcut creation V-111
special II-30
symbolic paths II-22–II-24
uploading via FTP IV-274
User Procedures folder II-32, IV-166
WaveMetrics Procedures folder II-32, IV-166
FontList function V-256
fonts
cross-platform issues III-453
default V-147, V-149, V-297
in controls V-149
size V-297
style V-297
functions
FontList function V-256
FontSizeHeight function V-257
FontSizeStringWidth function V-258
in an axis label II-318
in annotation text III-54
in annotations III-36
in graphs II-288, II-308
in notebooks III-8–III-9
in procedure windows III-406
in tick labels II-308
missing
substitution III-453
notebook rulers III-7, III-12
relative size
in annotations III-36
size
in an axis label II-318
in annotations III-36, III-43
style
in annotations III-37, III-54
substitution for missing III-453
Text2Bezier operation V-1023
FontSizeHeight function V-257
FontSizeStringWidth function V-258
footers
in notebooks III-6, III-20
in procedure windows III-405
programming in notebooks III-26
for loops
in user functions IV-46
for-endfor statements V-259
for-var-in-wave statements V-259
format strings IV-259
engineering units V-771
printf operation V-770–V-772
formatted notebooks
text encodings III-472
formatted text
axis labels III-53
DrawUserShape operation III-53
in control titles III-53
in ListBox controls III-53
in SetVariable controls III-53
formatted text notebooks
MBCS III-472
FORTRAN files
features of II-127
loading II-126
Fourier transforms III-270–III-274
compared to FFTs III-272
discrete wavelet transform III-283
harmonic analysis V-182
periodograms V-182
phase polarity III-273

windows V-182
X scaling and units changed III-271
FPClustering operation V-259
distance map V-259
fprintf
stderr V-261
stdout V-261
fprintf operation IV-194, IV-259–IV-261, V-260
conversion specifications IV-260
example IV-261
for debugging IV-261
frame grabbers
data acquisition IV-312
GetCamera operation V-296
ModifyCamera operation V-600
NewCamera operation V-678
frames
for notebook pictures III-14
in page layouts II-483
FReadLine operation IV-195, V-261
byte order marks V-263
cross-platform issues III-453
text encodings V-261, V-263
free axis II-278–II-279
creating V-470, V-679
killing V-470
modifying V-609
free cursors II-320
free data folder
lifetime IV-97
free data folders IV-96–IV-99
converting to global IV-99
creating V-680
deletion of waves IV-98
Multithread keyword example IV-325
NewFreeDataFolder function V-680
objects lifetime IV-98
free dimension
in tables II-264
free waves IV-91–IV-96, IV-207
converting to global IV-96
created from local waves IV-91
default name _free_ IV-95
Duplicate operation V-186
Extract operation V-214
leaks IV-94, IV-207
lifetime IV-92
Multithread keyword example IV-327
names of IV-91, IV-95, V-186, V-526, V-680
programming example IV-200
tracking IV-207
type of V-1092
wave leaks V-1087
WaveType function V-1092
Freedman-Daiconis method III-126
Frei–Chen edge operator V-370
frequency
InstantFrequency operation V-443
fresnel functions V-264
fresnelCos function V-264
fresnelCS function V-264
fresnelSin function V-264
Frobenius norm
MatrixFactor operation V-538
frustrum projection
Gizmo II-423
FSetPos operation IV-195, V-264
FStatus operation IV-195, V-265
FTP IV-272–IV-276
ASCII transfers IV-275
binary transfers IV-275
creating directories IV-275
creating help file links IV-257
deleting directories IV-275
downloading directories IV-273
downloading files IV-273
example experiment IV-272
FetchURL function V-221
FTPCreateDirectory operation V-265
FTPDelete operation V-267
FTPDownload operation V-268
FTPUpload operation V-271
GET method V-1054
image transfers IV-275
limitations IV-273
opening browser for URLs V-54
path specification IV-274–IV-275
PUT method V-1054
transfer types IV-275
transferring files III-448
troubleshooting IV-275
uploading directories IV-274
uploading files IV-274
URLRequest operation V-1054
FTPCreateDirectory operation V-265
FTPDelete operation V-267
FTPDownload operation V-268
FTPUpload operation V-271
FuncFit operation V-273
FuncFitMD operation V-276
FUNCREF keyword IV-107–IV-108, V-278
example IV-107
FuncRefInfo function V-278
Function Execution Error dialog III-415, IV-110
function keys in user menus IV-136
Function keyword V-279, V-1005
function references IV-107–IV-108
example IV-107
FUNCREF keyword V-278
FunctionInfo function V-279
FunctionList function V-284
FunctionPath function V-287

functions IV-11, V-731
aborting threads IV-337
bits
setting IV-12
by category V-7–V-12
complex V-7
conversion V-7
date and time V-7
definition I-5
DoPrompt statements V-167
exists function V-207
exponential V-7
external IV-208
FindRoots operation V-248
FunctionList function V-284
hook functions IV-280–IV-292, IV-339
named window hooks IV-293
SetIgorHook operation V-848
SetWindow operation V-865
static IV-281
subwindows IV-294
unnamed window hooks IV-305
user-defined hook functions V-848
window hooks V-865
local variable keywords V-13
MultiThread keyword V-673
numbers V-7
numeric types IV-11
overriding V-731
parameters IV-10
plotting III-320–III-322
example III-320
using dependencies III-321
printing result of IV-11
roots of III-338–III-343, V-248
nonlinear, 1D III-339
nonlinear, 2D III-341
cautions III-343
polynomials III-338
rounding V-7
rtFunctionErrors pragma IV-55
runtime stack information V-314
special V-8
Static keyword V-906
statistics V-10
subtype V-66, V-763, V-858
syntax guide V-15
ThreadSafe keyword V-1033
trigonometric V-7
fuzzy entropy III-355
fuzzy means III-355

G

GalleryGlobal keyword
in independent modules IV-244
gamma function V-288
gammaEuler function V-288
gammaNoise function V-289
gammInc function V-288
gammln function V-289
gammp function V-289
gammq function V-290
gaps in graphs II-303
gauss
curve fitting function III-206
gauss (Gaussian) curve fit
1D V-127
2D V-128
Gauss function V-290
gauss transform
discrete V-215
Gauss-Jordan method
MatrixInverse operation V-541
Gauss-Markov linear model
MatrixInverse operation V-541
Gauss1D function V-291
gauss2D
curve fitting function III-212
Gauss2d function V-291
gauss3D filter V-372
Gaussian filtering III-294
gaussian quadrature V-448
GBLoadWave operation II-166, V-291
gcd function V-294
GDI III-507, V-866
GDI+ III-506, V-866
Gear method V-454
general binary files
GBLoadWave operation V-291
loading II-166
general numeric format
in tables II-255
general perspective projection V-781
general text files II-138–II-142
blocks II-138
column labels II-141
commas II-138
decimal character II-141
example II-138
features of II-127
headers II-138
labels II-138, II-140
loading matrices II-140
loading process II-140
missing values II-141
saving waves II-179
saving waves as V-813
skipping lines II-141
spaces II-138
tabs II-138
trouble-shooting II-141

tweaks II-141
versus delimited text II-139
X scaling II-140
Generate Commands dialog III-29
Generate Notebook Commands dialog III-29
GeometricMean function V-295
geometry
related operations V-4
GET method IV-277
URLRequest operation V-1054
GetAxis operation V-295
GetBrowserLine function V-295
GetBrowserSelection function V-296
GetCamera operation V-296
GetDataFolder function V-296
GetDataFolderDFR function V-296
GetDefaultFont function V-297
GetDefaultFontSize function V-297
GetDefaultFontStyle function V-297
GetDimLabel function V-298
GetEnvironmentVariable function V-298
GetErrMessage function V-299
GetFileFolderInfo operation V-300
GetFormula function V-303
GetGizmo operation V-303
GetIndependentModuleName function V-303
independent modules IV-243
pop-up menus IV-242
GetIndexedObjName function V-303
GetIndexedObjNameDFR function V-304
GetKeyState function V-304
GetLastUserMenuInfo operation V-306
GetMarquee operation V-309–V-311
GetMouse operation V-312
GetRTErrMessage function V-313
GetRTError function V-312
GetRTLocation function V-313
GetRTLocInfo function V-314
GetRTStackInfo function V-314
GetScrapText operation V-315
GetSelection operation V-315–V-316
example III-28
GetUserData function V-316
GetWavesDataFolder function V-317
GetWindow operation V-318
GetWindowBrowserSelection function V-323
GIF files
file info V-372
Gizmo II-95, II-406–II-473
2D waves II-406
3D bar plots II-457
3D scatter plot
data format II-451
3D scatter plot tour II-407, II-411
3D scatter plots II-455
3D waves II-407
alpha II-428, II-432
ambient light II-432
annotations II-444–II-445, II-472
AppendToGizmo operation V-35
attribute list II-416–II-417
attributes II-419
global II-420
internal II-419
autoscaling II-421
Axes Properties dialog II-450
axis coordinate system II-421
axis cue II-415
axis cue objects II-448
axis labels II-471
axis objects II-449
box axes II-449
box objects II-440
Calculate Normals II-432
clipping II-421, II-470
color material II-429
color scale bars II-472, V-74
color specification II-428
color tables II-431
color waves II-430
ColorScale operation V-74
colorscales II-445
ColorTab2Wave II-429
compatibility II-470
coordinate system II-420
coordinate transformation II-436
crystals II-457
custom axes II-450
cylinder objects II-442
data conversion V-428
data objects II-453
Default Output Resolution Factor II-465
diffuse light II-432
directional lights II-433
disk objects II-443
Display Advanced Options Menus II-466
display list II-416–II-417
display volume II-421
display window II-414
distance sorting II-432
drawing objects II-436
Enable Transparency Blend II-428, II-433
Export Graphics dialog II-465
ExportGizmo operation II-465, V-213
exporting II-465, V-213, V-826
frustrum projection II-423
GetGizmo operation V-303
GizmoInfo function V-323
GL_ constants II-471
group objects II-466
guided tour of II-407
home orientation II-425

hook functions II-472
image plot
data format II-452
image plots II-458
info window II-416
isosurface II-433
isosurface plot
data format II-453
isosurface plots II-464
Light Properties dialog II-433
lights II-433, II-469
line objects II-436
LookAt projection II-424
main transformation II-436
matrix of X values II-406
matrix4x4 objects II-469
ModifyGizmo operation V-611
NaNs II-453
NewGizmo operation V-681
normals II-432
object list II-416–II-417
objects II-418
opacity II-428
OpenGL II-407, II-470
orthographic projection II-422
parametric surface plot
data format II-452
path plot
data format II-451
path plots II-454
Path Properties dialog II-455
perspective projection II-423
pie wedge objects II-447
positional lights II-434
printing II-464
projections II-422
quad objects II-438
quadric objects II-467
quaternion II-427
recreation macros II-471
reflection II-432
related operations V-2
RemoveFromGizmo operation V-792
RGBA II-428
ribbon plot
data format II-451
ribbon plots II-462
Rotate to Match II-416
rotation II-424
SaveGizmoCopy operation V-821
SavePICT operation II-465
Scatter Properties dialog II-456
shading II-433
shininess II-429, II-432, II-472
Specify Color II-419
specular light II-432
sphere objects II-440
string objects II-444, II-471
subwindows II-469
subwindows in layouts II-497
surface plot
data format II-451
surface plot tour II-410, II-412
surface plots II-459
Sync to Gizmo II-416
tetrahedron objects II-445
textboxes II-472
texture objects II-467
tick mark labels II-471
tool palette II-414
arrow tool II-414
aspect ratio tool II-414
axis tool II-414
hand tool II-414
home tool II-415
rotation tool II-415
stop tool II-415
translation II-425
translucency II-432
transparency II-428, II-432, II-470
triangle objects II-437
triplet axes II-450
triplet waves II-406
troubleshooting II-469
Use Global Attributes II-419
viewing volume II-421
viewport projection II-424
Voronoi interpolation II-412
voxelgram plots II-463
VRAM II-407, II-465
windows II-413
GizmoInfo function V-323
GizmoPlot subtype IV-205
keyword V-323
GL_ constants II-471
GLM
MatrixInverse operation V-541
global procedure files III-396, III-399, IV-25
Igor Pro User Files folder III-399
global variables II-104, IV-61
created by Igor operations IV-114
direct reference IV-114
for packages IV-249
in user functions IV-70
using structures instead IV-103
global waves IV-91, IV-96, IV-207
tracking IV-207, V-1087
WaveType function V-1092
gnoise function V-323
gnomonic projection V-781
Go Back and Go Forward II-52
Go button in debugger IV-216

GPIB
data acquisition IV-312
gradient fills III-498
gradient plots II-294, V-614
Graph Macros submenu II-48, II-350
Graph menu II-277
Graph Now button in Curve Fitting dialog III-192
graph size problems II-289
Graph subtype IV-204
keyword V-325
graphics
alpha III-498
color blending III-498
features of II-127
fill patterns III-498
gradient fills III-498
translucency III-498
graphics formats III-96, III-102
exporting III-98, III-104
graphics technology III-506, V-866
alpha III-507
Core Graphics III-507
enhanced metafiles III-507
GDI III-507
GDI+ III-506
Quartz III-507
Retina III-507
SVG III-507
transparency III-507
GraphMarquee subtype IV-204, V-310
keyword V-325
graphMode
printing graphs II-323
GraphNormal operation V-325
GraphPopup menu IV-138
graphs II-276–II-354
3D II-95
absolute width and height II-289
AddDropLine macro III-77
adding new axes II-280
annotation position III-40–III-42, III-46–III-47
annotations III-34–III-53
appending waves to II-280, II-348–II-349
example I-23
AppendToGraph operation V-35
arrow markers II-294, V-614
aspect ratio II-289
auto ticks II-308
auto width and height II-289
autoscaling and offsets II-302
autoscaling modes II-285, II-287, II-348
axes II-278, II-306–II-319, II-324–II-353, V-626
AxisValFromPixel function V-45
colors II-308, V-634
GetAxis operation V-295
PixelFromAxisVal function V-743
SetAxis operation V-835
background color III-442, V-634
bars II-295
bars to next II-296, II-360
bevels III-496
blank II-278
calibrator bars III-68
category plot options I-31
CheckDisplayed operation V-68
close graph (examples) I-26
color scale bars V-74
ColorScale operation V-74
comma as decimal separator II-288
complex traces II-303
computed manual ticks II-308
control bar V-88
color V-634
default control appearance V-147
default font V-149
ControlNameList function V-94
controls III-441
drawing limitations III-442
crossing axes II-308
cursors II-285, II-319–II-321
colors II-320
horizontal coordinate V-340
moving cursor calls function IV-339–IV-340
vertical coordinate V-1067
z value from contour trace V-1120
dash patterns for traces V-837
dashed lines II-294
data acquisition II-347–II-348
date/time axes II-307, II-315–II-317
custom date formats II-316
default font II-288, V-147
display modes II-290
Display operation V-161–V-163
drag and drop II-280
drawing coordinate systems III-67–III-68
drawing layers III-68
dynamic updating II-276
editing waves by drawing (example) I-21–I-22, I-29
end caps III-496
error bars II-304
error ellipses II-305, V-200
error shading II-305, V-200
ErrorBars operation V-199–V-203
expand II-285
expansion II-352
expansion onscreen V-611
exporting II-324, V-826
FFT and IFFT side effects III-273
fill between traces II-297
fill to next II-296
fill type II-295

fixed size II-289
fling mode II-286
font II-288, II-308
free axis II-279
    creating V-470, V-679
    killing V-470
    modifying V-609
free axis (example) I-36
gaps II-284, II-303
gradient plots II-294, V-614
grids II-309–II-310
    color II-309
    colors V-634
    styles II-309
        illustrations II-310
grouping
    add to next II-296
    draw to next II-296
    keep with next II-296
    next trace defined II-296
    pop-up II-296
    stack on next II-296
    trace order affects II-297
histogram bars II-295
in notebooks III-18
info panel II-319–II-321
    HideInfo operation V-347
    ShowInfo operation V-869
joins III-496
KillFreeAxis operation V-470
legend position III-40–III-42
line size II-294–II-295
line style II-294, II-348
linking in notebooks III-18
list of V-1098, V-1100
live II-347–II-348
log axes II-315
log or linear axes II-307
magnification II-352
magnification on screen V-611
making a new category graph
    example I-30
making a new graph II-45, II-277, II-348–II-349, V-161–V-163
    example I-15
manual scaling mode II-285, II-287
manual ticks II-312–II-314
margin adjust (examples) I-37, I-39
margins II-288
marker colors II-292
marker size as f(z) II-299
markers II-288, II-291
    as f(z) II-298
    numeric codes II-300
    table of II-300
marquee for scaling II-285
masking traces V-617
    example V-626
mirror axis II-307–II-308
miters III-496
Modify Graph dialog II-288–II-290
ModifyContour operation V-600–V-606
ModifyFreeAxis operation V-609
ModifyGraph operation V-611–V-635
ModifyImage operation V-635–V-639
modifying annotations III-35
modifying styles II-290–II-306
modifying traces appearance II-290–II-306, V-613
movies IV-245
multiple axes (example) I-36, II-324–II-325
names II-277, II-350
names and titles II-45
NaNs and INFs in graphs II-284
New Graph dialog II-277, II-349
NewFreeAxis operation V-470, V-679
next trace defined II-296
of complex waves II-303
oscilloscope displays II-347–II-348
page setups II-323, II-348
panning II-286
    fling mode II-286
per unit width and height modes II-289
pixel coordinates V-45, V-743
PixelFromAxisVal function V-743
plan width and height modes II-289
plot area II-279, II-289, V-320
    affected by annotations III-41
polar graph macros III-73
pop-up menu for scaling II-285
position II-348
positioning traces II-286
preferences II-348–II-349, II-363, II-380, II-403
Print Preview II-323
printing II-323, II-348, V-773–V-774
    fill page II-323
    same aspect II-323
quick append II-348, V-36
recreating from macro II-350
recreation macros V-1101
related functions V-10
related operations V-1
relation to layouts I-3
relation to waves I-3
removing
    contour plots V-791
    image plot V-794
    traces II-283
    waves V-792
ReorderImages operation V-797
reordering traces II-297
ReorderTraces operation V-798

ReplaceWave operation V-801
replacing traces II-284
reverse plotting II-287, V-835
saving II-323
SaveGraphCopy operation V-821
with waves II-323, V-821
saving as macro II-350
scaling II-284–II-288
screen dumps V-828
scrolling mode V-319, V-321, V-866
setting axis range II-286–II-288
shortcuts II-353–II-354, III-446
shrink II-286
size II-348, V-319
Slider operation V-874
split axes II-347
Split Axis procedure file II-347
stacked plots II-288, II-324–II-326, V-626
examples II-307, II-324
staggered plots (examples) II-326
sticks and markers to next II-296
sticks to next II-296
style macros II-350–II-352
subwindows III-82
subwindows in layouts II-497
surface plots II-95
swap X & Y axes II-288
tag position III-46–III-47
target window II-277
ternary II-317
textbox position III-40–III-42
tick mark control II-308
title II-277–II-278
trace color II-298
trace names II-282, V-620
TraceInfo function V-1042
TraceNameList function V-1044
TraceNameToWaveRef function V-1045
user ticks from waves II-308
vector plots II-294, V-614
volumetric II-95
wave list V-320
wave names by index V-1079
waveform data II-278
WaveName function V-1079
waves in V-1080
width II-288, II-348
window color V-634
window names V-1048
window recreation macro II-350
wintype function V-1103
wireframe plots II-95
X wave from trace V-1119
XY data II-278, V-1118–V-1119
zero line II-310
zooming II-285
zooming, panning (examples) I-35
graphSize
printing graphs II-323
GraphStyle subtype IV-204
keyword V-325
GraphWaveDraw operation III-75, V-325
GraphWaveEdit operation III-75, V-326
GraphWaveNormal operation III-76
gray-level co-occurrence matrix V-375
grayscale
TIFF files II-158
grayscale conversions
convert2gray V-418
greater than IV-6
greatest common divisor V-294
greedy
regular expressions IV-187
Greek letters III-491
Grep operation IV-176, V-327
text encodings V-329
GrepList function V-333
GrepList operation IV-176
GrepString function IV-177, V-334
grids
for controls V-1041
for drawing III-66, V-1041
ToolsGrid operation V-1041
grids in graphs II-309–II-310
colors II-309
drawing level V-627
styles II-309
GridStyle subtype IV-204
keyword V-334
group objects
Gizmo II-466
GroupBox controls III-416, III-426
drawing order of V-148
GroupBox operation V-334
guesses in curve fitting III-189
graphing III-192
guided tour of Gizmo II-407
guided tour of Igor I-12
GuideInfo function V-336
GuideNameList function V-337
GW Instruments data acquisition package IV-312
GZIP
HDF5 compression II-213

H

Haar wavelet transform V-140, V-189
half power point
smoothing V-879
Hamming window function V-183, V-226, V-1097
for images V-436
hand tool

Gizmo II-414
Hanning operation V-337
Hanning window function III-277, V-183, V-226, V-337, V-1097
for images V-436
Haralick's texture parameters V-375
harmonic analysis V-182
Hartley Transform V-419
Hartley transform III-364
Hash function V-338
hashing
WaveHash function V-1073
HCluster operation III-162, V-338
hcsr function V-340
HDF
HDF5CloseFile operation V-341
HDF5 II-183–II-226
array data II-207
attributes II-198
HDF5 Browser II-195
large II-222
bitfields II-211
browser II-184, II-193
case sensitivity II-203
compound datatypes II-212
compression II-213
dataset region references II-209
datatypes II-204
dimension scales V-342
dimensions II-204
dumping II-197
enums II-211
filters II-217
fixed-length strings II-219
functions II-197
guided tour II-183
HDF5 packed experiment files II-16, II-223
HDF5AttributeInfo function V-341
HDF5CloseGroup operation V-341
HDF5Control operation V-341
HDF5CreateFile operation V-341
HDF5CreateGroup operation V-341
HDF5CreateLink V-342
HDF5DataInfo structure V-342
HDF5DatasetInfo function V-342
HDF5DatatypeInfo structure V-342
HDF5DimensionScale operation V-342
HDF5Dump operation V-342
HDF5DumpErrors operation V-342
HDF5FlushFile operation V-343
HDF5LibraryInfo function V-343
HDF5LibVerLowBound II-222
HDF5LinkInfo function V-343
HDF5LinkInfoStruct structure V-343
HDF5ListAttributes operation V-343
HDF5ListGroup operation V-343
HDF5LoadData operation V-344
HDF5LoadGroup operation V-344
HDF5LoadImage operation V-344
HDF5MakeHyperslabWave II-202
HDF5OpenFile operation V-344
HDF5OpenGroup operation V-344
HDF5SaveData operation V-344
HDF5SaveDataHookStruct structure V-344
HDF5SaveGroup operation V-345
HDF5SaveImage operation V-345
HDF5TypeInfo function V-345
HDF5UnlinkObject operation V-345
hyperslabs II-202
Igor capabilities II-206
Igor limitations II-206
IGORVariable attribute II-205
images II-204
large attributes II-222
library compatibility II-222
loading programmatically II-187
multitasking II-206
multithreading II-206
names
conflicts III-505
nested datatypes II-211
object references II-208
opaque data II-211
operations II-197
overview of II-184
paths II-221
procedure files II-198
references II-208
related operations II-197, V-6, V-12
row major II-204
saving programmatically II-189
string charsets II-219
string formats II-219
string padding II-219
subsets II-202
text encodings II-221
variable-length datasets II-207
variable-length strings II-219
Windows paths II-221
HDF5 Browser II-193
guided tour II-184
HDF5 Browser dump II-197
HDF5 Browser.ipf II-198
HDF5 compression II-213–II-217
chunking II-214
default compression II-214
Fletcher32 II-213
GZIP II-213
HDF5SaveDataHook IV-290
HDF5SaveDataHook hook function II-215
HDF5SaveDataHookStruct structure V-344
HDF5SaveGroup operations II-214

IgorInfo function V-361
layout II-214
Miscellaneous Settings dialog II-17
NBit II-213
SaveExperiment operation II-214
saving experiments II-16
ScaleOffset II-213
shuffle II-213
SZIP II-213
TestHDF5ExperimentCompression function II-17
HDF5 packed experiment files II-223
organization II-223
writing II-225
HDF5 packed experiments II-16
HDF5 Utilities.ipf II-198
HDF5AttributeInfo function V-341
HDF5CloseFile operation V-341
HDF5CloseGroup operation V-341
HDF5Control operation V-341
HDF5CreateFile operation V-341
HDF5CreateGroup operation V-341
HDF5CreateLink operation V-342
HDF5DataInfo structure V-342
HDF5DatasetInfo function V-342
HDF5DatatypeInfo structure V-342
HDF5DimensionScale operation V-342
HDF5Dump operation V-342
HDF5DumpErrors operation V-342
HDF5FlushFile operation V-343
HDF5LibraryInfo function V-343
HDF5LibVerLowBound II-222
HDF5LinkInfo function V-343
HDF5LinkInfoStruct structure V-343
HDF5ListAttributes operation V-343
HDF5ListGroup operation V-343
HDF5LoadData operation V-344
HDF5LoadGroup operation V-344
HDF5LoadImage operation V-344
HDF5MakeHyperslabWave function II-202
HDF5OpenFile operation V-344
HDF5OpenGroup operation V-344
HDF5SaveData operation V-344
HDF5SaveDataHook hook function II-215, IV-290
HDF5SaveDataHookStruct structure V-344
HDF5SaveGroup operation V-345
compression II-214
HDF5SaveImage operation V-345
HDF5TypeInfo function V-345
HDF5UnlinkObject operation V-345
HEAD method
URLRequest operation V-1054
headers
in delimited text files II-134
in general text files II-138
in notebooks III-6, III-20
in procedure windows III-405
in text files II-126
programming in notebooks III-26
URLRequest operation V-1054
help II-2–II-5
checking links IV-258
closing help windows II-3
compiling help files IV-257
creating help files IV-255
creating links IV-257
DisplayHelpTopic operation V-163
FAQ II-5
for user-defined functions IV-259
from command window II-12
FTP links in IV-257
help windows II-3
hiding help windows II-3
Igor Help Browser II-2
in simple input dialog IV-145
in simple input dialogs IV-148
killing help windows II-3
kinds of help II-2
ListBox operation V-493
magnification II-53
overview I-8, II-2
programmatic display of topics V-163
related topics IV-256
shortcuts II-5
subtopics IV-256
syntax of help file IV-256
technical support II-4
templates
for a function III-397
for an operation III-397
tooltips II-3
topics IV-256
URLs IV-257
Web links in IV-257
zooming II-53
help files
CloseHelp operation V-71
compiling IV-257
creating IV-255
Igor Help File Template IV-255, IV-257
Igor Help Files folder II-2, II-31
links
checking IV-258
creating IV-257
finding IV-257
magnification II-53
setting default II-53
More Help Files folder II-2
OpenHelp operation V-721
syntax IV-256
URL links IV-257
Web links IV-257

zooming II-53
setting default II-53
help windows II-3
executing commands from II-3, III-4
Go Back and Go Forward II-52
hermite function V-345
hermite functions V-345–V-346
hermiteGauss function V-346
Hermitian transposition
MatrixOp operation III-144
hex dump
in tables II-260
hexadecimal literals IV-12
hexadecimal numbers
in tables II-245, II-255, II-257
representation of II-257
HFS paths V-734
hidden procedure files III-402
changes in Igor functionality III-403
creating III-402
hide
pragma keyword V-346
hide events
window hooks IV-304
Hide Info II-319
hide keyword V-346
hide pragma IV-54
Hide Tools III-62
hideable IV-127
HideIgorMenus operation V-346
HideInfo operation V-347
HideProcedures operation V-347
HideTools operation V-347
hiding
help windows II-3
HideProcedures operation V-347
notebooks III-4, V-699
procedure windows III-399, V-642
traces II-303
vs killing windows II-46
windows II-46
hierarchical clustering III-162–III-170
dendrogram example III-168
dendrogram wave III-167
dissimilarity V-339
dissimilarity matrix III-162–III-163
distance map III-162
HCluster operation V-338
linkage III-166, V-339
high pass band
filtering III-303
high pass filters
example III-308
high resolution
displays III-507
in panels III-456
high-DPI III-508
high-resolution displays III-508
Hilbert transform III-280
HilbertTransform operation V-348
Hill equation curve fit V-128
HillEquation
curve fitting function III-210
hinges
box plots II-332
Histogram
Freedman-Daiconis method III-126
histogram III-125–III-132
accumulating III-128
adaptive histogram equalization III-354
bin range III-125–III-128
bin width III-125–III-128
destination wave III-127
example I-53, III-128
histogram equalization III-354
Igor 1.2 compatibility III-128
image analysis V-378–V-379
integrating III-132
of images III-372
histogram clusters III-355
Histogram dialog III-128
Histogram operation III-125–III-132, V-349–V-353
histograms
JointHistogram operation V-466
TextHistogram operation V-1029
history archive II-10
history area II-8–II-13
CaptureHistory function V-58
CaptureHistoryStart function V-58
colored II-10
converting to UTF-8 III-489
copying from II-10
extracting text programmatically V-58
history archive II-10
history carbon copy II-10
limiting size of II-10
magnification II-12, II-53
printing to V-769–V-770
saving II-10
searching II-11
selecting text II-10
text encodings III-470
zooming II-53
history carbon copy II-10
holding coefficients in curve fitting
example III-184
home folder II-23, II-25, II-28
for packed experiments II-16
for unpacked experiments II-17
home orientation
Gizmo II-425
home symbolic path II-23

home text files II-56
home tool
Gizmo II-415
home waves II-87
hook functions
earlyKeyboard events IV-302
Gizmo II-472
independent modules IV-240
keyboard events IV-300
modified events IV-299
named window hooks IV-293
regular modules IV-237
subwindows IV-294
tooltips V-868
unnamed window hooks IV-305
HorizCrossing free axis II-278–II-279
horizontal dimension in tables II-263
horizontal index row II-261
Hough transform III-364, V-421
HSL conversions
hsl2rgb V-421
rgb2hsl V-424
HTML
cascading style sheets III-22
character encoding III-23
Native III-23
Shift-JIS III-23
UTF-2 III-23
UTF-8 III-23
embedding in notebooks III-23
examples III-23
graphics in notebooks III-23
JPEG III-23
picture frames III-23
PNG III-23
HTML 4.01 specification III-22
notebook character formatting III-23
notebook paragraph formatting III-22
notebooks III-21
saving notebooks III-21
specifications III-22
standards III-22
tooltips IV-311
HTTP IV-276–IV-278
DELETE method V-1054
downloading files IV-276
downloading web pages IV-276
FetchURL function V-221
GET method IV-277, V-1054
HEAD method V-1054
limitations IV-276
POST method IV-276, V-1054
proxy servers IV-276
PUT method V-1054
queries IV-277
SSL IV-276
troubleshooting IV-278
URLRequest operation V-1054
HTTP POST method
URLRequest operation V-1058
HTTPS
URLRequest operation V-1054
Hurwitz zeta function V-1120
hybridmedian filter V-372
hyperbolic functions
arbitrary precision V-27
cosine V-109
cotangent V-110
sine V-871
tangent V-1023
hyperG0F1 function V-353
hyperG1F1 function V-353
hyperG2F1 function V-354
hypergeometric function V-353
confluent V-353–V-354
generalized V-354
hyperGNoise function V-354
hyperGPFQ function V-354
hyperslabs
HDF5 II-202

I

i
suffix in tables II-241
i function V-355
i123 conversions
rgb2i123 V-424
.ibw extension II-155
ICA operation V-355
identifiability
curve fitting III-226
if-else-endif V-357
conditional operator IV-7
extraneous text after IV-114
in user functions IV-40
if-elseif-endif V-357
in user functions IV-40
if-endif V-357
in user functions IV-40
IFDL III-299
FMaxFlat operation V-255
IFFT
wave references IV-75
IFFT operation V-357–V-359
IFFTs
effect on graphs III-273
number of points restrictions III-271
speed III-274
wave type restrictions III-271
X scaling and units changed III-271
.ifn file extension

notebooks III-2
Igor
symbolic path II-23
updating II-4
upgrading II-4
Igor and IgorRecent
color tables V-82
Igor binary data
exporting from tables II-252
Igor binary wave files II-154–II-157
.bwav extension II-155
copy to home II-24
features of II-127
file extensions II-155
.ibw extension II-155
in experiments II-19
KillWaves operation II-71
LoadData operation II-156
names II-155
references to II-24
saving II-179
sharing versus copying II-24
Igor Crash Reports.txt IV-341
Igor Extensions
MacOS 10.15 and later III-512
notarization III-512
Igor extensions III-511–III-512, IV-208
creating IV-209
definition I-5
definition of I-5
development systems IV-208
IGOR32 II-32
IGOR64 II-32
third party XOPs III-511
WaveMetrics XOPs III-511
Igor Extensions folder I-6, II-32
Igor Filter Design Laboratory III-299
Igor Help Browser I-8, II-2
Igor Help File Template IV-255, IV-257
Igor help files
compiling IV-257
creating IV-255
FAQ II-5
Igor Help File Template IV-255, IV-257
links
checking IV-258
creating IV-257
finding IV-257
More Help Files folder II-2
syntax IV-256
URL links IV-257
Web links IV-257
Igor Help Files folder II-2, II-31
Igor help system
Igor Help Files folder II-2
overview I-8, II-2
IGOR keyword in Igor Text files II-151
Igor mailing list II-4
Igor Pro 8.ini file III-516
Igor Pro Folder II-30
include statement IV-166
Igor Pro User Files folder II-31
example I-62
global procedure files III-399
packages IV-247
shared procedure files III-400
Igor Procedures IV-25
Igor Procedures folder II-32, III-399
Igor program name
under Windows III-448
Igor TeX III-58
Igor Text files II-150–II-154
BEGIN keyword II-151
blocks II-151
carriage return II-154
commands II-152
creating V-813
data type II-151
data type flags II-151
dates II-151
End keyword II-151
escape codes II-154
examples II-150–II-151
features of II-127
format II-151
IGOR keyword II-151
linefeed II-154
missing values II-151
multidimensional waves II-151–II-153
NaNs II-151
not thread-safe II-152
saving multidimensional waves II-179
saving waves II-179
text waves II-154
times II-151
WAVES keyword II-151
X keyword II-152
X scaling II-152
Igor Tips
for controls III-436
shortcut II-5
Igor version V-359–V-360
localization V-360
Igor XOP Toolkit IV-209
Igor-object pictures III-18
igor-object pictures
platform compatibility III-19
IGOR32 I-2, III-512
Igor extensions II-32
reading huge waves II-35
IGOR64 I-2, III-512
Igor extensions II-32

saving huge waves II-35
IgorBeforeNewHook hook function IV-290
IgorBeforeQuitHook function IV-290
IgorExchange II-4
IgorInfo function V-359
autosave V-361
HDF5 default compression V-361
serial number V-360
IgorMenuHook function IV-291
IgorQuitHook hook function IV-292
IgorStartOrNewHook hook function IV-292
example IV-292
Igortips I-8
IgorUserFiles
symbolic path II-23
IGORVariable attribute II-205
IgorVersion
example IV-110
pragma keyword V-362
IgorVersion function V-362
IgorVersion keyword V-362
IIR filters III-300, III-312, V-234–V-239
coefficients, designing V-238
cutoff frequency III-312
order III-313
ilim function V-362
imag
suffix in tables II-241
imag function V-362
example II-81
image analysis III-352–III-382
2D kernels III-365
3D morphology V-395
adaptive histogram equalization III-354, V-378–V-379
alpha blending V-366
alpha compositing V-368
average 3D filter V-372
averaging V-417
B-spline surfaces V-418
back projection V-418
background subtraction III-379, V-403
Bartlet window V-436
Bartlett window V-436
beams
definition V-420
extracting V-420
bilinear interpolation V-383–V-384
binary dilation V-395
binary erosion V-395
Blackman window V-436
blending images V-366
Catmull-Clark surfaces V-418
close V-395
closing III-369
cmap conversions
cmap2rgb V-418
CMYK conversions
CMYK2RGB V-418
co-occurrence matrix V-375
color III-379
color space conversion III-352–III-353
cmap2rgb V-418
CMYK2RGB V-418
convert2gray V-418
hsl2rgb V-421
rgb2gray V-424
rgb2hsl V-424
rgb2i123 V-424
rgb2xyz V-424
xyz2rgb V-428
color transforms III-352–III-353
columns
extracting V-420
flipping V-419
setting values from a wave V-423
summing V-427
summing all V-427
comparing images V-398
Compositeing images V-368
compressing images V-418
convolution filters III-365
gauss III-365
median III-365
sharpen III-365
convolutions III-360
correlation V-415
correlations III-362
decompressing images V-419
dilation III-368, V-395
dot product V-428
edge detection III-365–III-368
edge detectors V-370
erosion III-368, V-395
extracting color info III-353
extracting ROIs V-425
feature extraction V-426
FFT III-359–III-362
calculating derivatives III-361
calculating integrals III-361
calculating sums III-361
cautions when using III-359
convolutions III-360
correlations III-362
high pass filtering III-360
low pass filtering III-360
spatial frequency filtering III-360
windowing III-362
filling V-409
filling from 1D wave V-419
filtering V-372, V-435, V-539
find lakes V-419

finding flat areas V-419
focus V-373
fuzzy classification V-420
gaussian 3D filter V-372
grayscale conversions
convert2gray V-418
rgb2gray V-424
grayscale transforms III-352–III-355
Hamming window V-436
Hanning window V-436
Hartley transform III-364, V-419
histogram equalization III-354, V-378–V-379
histograms III-372, V-378–V-379
Hough transform III-364, V-421
line detection III-364
HSL conversions
hsl2rgb V-421
rgb2hsl V-424
HSL segmentation III-374, V-421
hue segmentation III-353
hybridmedian filter V-372
i123 conversions
rgb2i123 V-424
image statistics III-371
ImageAnalyzeParticles operation V-363
ImageBlend operation V-366
ImageBoundaryToMask operation V-367
ImageComposite operation V-368
ImageEdgeDetection operation V-370
ImageFocus operation V-373
ImageGenerateROIMask operation V-374
ImageGLCM operation V-375
ImageHistModification operation V-378
ImageHistogram operation V-379
ImageInterpolate operation V-382
ImageLineProfile operation III-372, V-389
ImageMorphology operation V-395
ImageRegistration operation V-398
ImageRemoveBackground operation V-403
ImageRestore operation V-404
ImageRotate operation V-405
ImageSeedFill operation V-409
ImageSkeleton3D operation V-413
ImageSnake operation V-411
ImageStats operation V-414
ImageThreshold operation V-415
ImageTransform operation III-381, V-417
ImageUnwrapPhase operation V-433
ImageWindow operation V-435
indexing V-421
inserting images V-422
interpolation III-359, V-382
k-means clustering V-472
Kaiser window V-437
Kriging V-383
line detection III-364
line profile V-389
masking V-374, V-425
mathematical transforms III-358–III-364
maximum rank 3D filter V-372
median 3D filter V-372
minimum rank 3D filter V-372
morphological operations III-368–III-371
binary dilation V-395
binary erosion V-395
close V-395
closing III-369
dilation III-368, V-395
erosion III-368, V-395
ImageMorphology operation V-395
open V-396
opening III-369
top hat III-370, V-396
watershed III-371, V-396
multidimensional morphology V-395
multiplane images V-420, V-426
offsetting V-423
open V-396
opening III-369
operations V-4
padding V-423
example V-433
particle analysis III-375, V-363
particles
classification III-375
morphology V-395
path profile V-389
pixels
inverting V-422
matching V-422
planes
extracting V-420, V-426
example V-433
flipping V-420
inserting V-422
matching V-422
removing V-423
scaling V-425
summing V-427
summing all V-427
point finding 3D filter V-372
profiles III-372
projection slice V-423
rectification V-384
references III-382
reflectance V-426
region of interest III-378–III-379
boundary to ROI mask III-378
creating ROI wave III-378
creation V-374
marquee procedures III-379
marquee2mask procedures III-379

ROI masking III-378
registration III-358, V-384, V-398
resizing V-423
restoring V-404
RGB conversions
cmap2rgb V-418
CMYK2RGB V-418
hsl2rgb V-421
rgb2gray V-424
rgb2hsl V-424
rgb2i123 V-424
rgb2xyz V-424
xyz2rgb V-428
ROI masking V-367
ROIs III-379, V-425
rotating image columns V-425
rotating image rows V-425
rotation III-357, V-405
rows
extracting V-420
flipping V-420
setting values from a wave V-423
summing V-427
summing all V-427
sampling III-359
scaling V-425
seed fill III-377
segmentation III-374
selectColor V-425
shading V-426
shifting V-423
shrinkRect V-426
spatial transforms III-357
stacking images V-427
statistics V-414
subimage selection III-379
subscene extraction V-426
surface extraction V-419
swap diagonal quadrants V-427
textures V-421
threshold III-355–III-357, V-415
adaptive III-355
bimodal III-355
examples III-356
fuzzy entropy III-355
fuzzy means III-355
histogram clusters III-355
iterated III-355
Otsu's method III-355
top hat V-396
transforms V-417
adaptive histogram equalization III-354
color III-352–III-353
explicit lookup tables III-353
grayscale III-353–III-355
histogram equalization III-354
hue segmentation III-353
RGB to HSL III-353
to grayscale III-352
to RGB III-352
value III-353–III-355
unwrapping phase III-374
value transforms III-353–III-355
vol2surf V-428
Voronoi interpolation V-384
voronoi tesselation V-428
warping V-384
watershed V-396
wave operations III-358
efficiency III-358
wavelet transforms III-362–III-363
denoising III-363
image compression III-362
windowing III-362, V-435
example V-437
X projection V-428
XYZ conversions
rgb2xyz V-424
xyz2rgb V-428
Y projection V-428
Z projection V-428
image loading
EXIF metadata V-395
image plot
data format II-452
image plots II-385–II-404
calculated X and Y II-387, II-389
alpha II-400–II-401
appearance preferences II-403
Append Image Plot dialog II-404
AppendImage operation V-32
axes
GetAxis operation V-295
SetAxis operation V-835
axis preferences II-404
color
24-bit II-386, II-401
ColorTab2Wave operation V-82
custom II-401
direct II-386, II-401
false II-386
indexed II-386, II-400–II-401
negative II-392
reversing II-392
RGB II-386, II-401
color index wave II-400–II-401
color scale bars II-402, III-34, III-47–III-51, V-74
color table waves II-399
color tables II-393–II-400
ColorScale operation V-74
combining with contour plots II-367
creating II-386–II-387, V-162

Cursor operation V-121
cursors V-121, V-741, V-785
moving cursor calls function IV-339–IV-340
dithering V-637
evenly-spaced data II-389
example II-401
filtering V-372, V-539
flipping II-391–II-392
Gizmo II-458
image instance names II-403
Image Range Adjustment II-393
ImageFilter operation V-372
ImageFromXYZ operation V-373
ImageInfo operation V-380
ImageNameList function V-397
ImageNameToWaveRef function V-398
images
color effects II-395
contrast effects II-395
contrast enhancement II-393
overlays II-393
interpolation V-637
inverting V-835
legends II-402, III-34, III-47–III-51
linear colors II-400
log colors II-387, II-400
logarithmic V-637
MatrixFilter operation V-539
missing data II-386
Modify Image Appearance dialog II-387–II-388
ModifyImage operation V-635–V-639
modifying II-387
names II-403
NaNs II-386
New Image Plot dialog II-404
NewImage operation V-681
opacity II-400–II-401
orientation II-391–II-392
pcsr function V-741
pixel size II-388, II-392
pixels II-386, II-388
preferences II-403–II-404
programming notes II-401, II-403
qcsr function V-785
rectangle edges II-388
related operations V-1
ReplaceWave operation V-801
reversing II-391–II-392
RGB waves II-400–II-401
RGBA waves II-400–II-401
Set Axis Range Dialog II-392
shortcuts II-404
smoothing V-637
translucency II-400–II-401
transparency II-400–II-401
transparent data II-386
unevenly-spaced II-389
with non-gridded data II-391
with XY centers II-389
X and Y coordinates II-388
X and Y waves II-389
image processing
contrast enhancement II-393
Image Range Adjustment II-393
ImageAnalyzeParticles operation V-363
ImageBlend operation V-366
ImageBoundaryToMask operation V-367
ImageComposite operation V-368
ImageEdgeDetection operation V-370
ImageFileInfo operation V-372
ImageFilter operation V-372
ImageFocus operation V-373
ImageFromXYZ operation V-373
ImageGenerateROIMask operation V-374
ImageGLCM operation V-375
ImageHistModification operation V-378
ImageHistogram operation V-379
ImageInfo operation V-380
ImageInterpolate operation V-382
ImageLineProfile operation V-389
ImageLoad operation V-390
ImageMorphology operation V-395
ImageNameList function V-397
ImageNameToWaveRef function IV-198, V-398
ImageRegistration operation V-398
ImageRemoveBackground operation V-403
ImageRestore operation V-404
ImageRotate operation V-405
images
average deviation V-415
average value V-415
averaging V-417
background subtraction V-403
beams
extracting V-420
color scale bars II-402, III-34, III-47–III-51
columns
extracting V-420
flipping V-419
setting values from a wave V-423
summing V-427
summing all V-427
compressing V-418
decompressing V-419
deconvolution V-404
dispersion V-415
exporting
BMP files V-405
DIB files V-826
EMF files V-826
EPS files V-826
ImageSave operation V-405

JPEG files V-405, V-826
PhotoShop files V-405
PICT files V-405, V-826
HiRes V-826
PNG files V-405, V-826
PostScript PICT files V-826
QuickTime files V-405
raw PNG files V-408
SavePICT operation V-826
SGI files V-405
Targa files V-405
TIFF files V-405, V-408
WMF files V-826
features of II-127
filling from 1D wave V-419
HDF5 II-204
ImageFileInfo operation V-372
ImageLoad operation V-390
importing V-390
indexing V-421
inserting V-422
kurtosis V-415
legends II-402, III-34, III-47–III-51
Load Image Dialog II-157
loading II-157
JPEG files V-390
PNG files V-390
Sun Raster files V-390
TIFF files V-390
TIFF stacks II-158
loading BMPs II-158
loading JPEGs II-158
loading PNGs II-157
loading Sun Raster files II-159
loading TIFFs II-158
masking V-425
maximum column location V-415
maximum row location V-415
maximum value V-415
minimum column location V-415
minimum row location V-415
minimum value V-415
multiplane images V-420, V-426
NewImage operation V-681
number of points in ROI V-415
offsetting V-423
padding V-423
example V-433
pixels
inverting V-422
planes
extracting V-420
flipping V-420
inserting V-422
removing V-423
summing V-427
summing all V-427
reflectance V-426
removing V-794
ReorderImages operation V-797
resizing V-423
restoring V-404
RMS value V-415
rotating image columns V-425
rotating image rows V-425
rotation V-405
rows
extracting V-420
flipping V-420
setting values from a wave V-423
summing V-427
summing all V-427
saving waves as II-180
selectColor V-425
shading V-426
shifting V-423
skewness V-415
smoothing V-515
stacking V-427
standard deviation V-415
textures V-421
variance V-415
voronoi tesselation V-428
ImageSave operation V-405
ImageSeedFill operation V-409
ImageSkeleton3D operation V-413
ImageSnake operation V-411
ImageStats operation V-414
ImageThreshold operation V-415
ImageTransform operation V-417
ImageUnwrapPhase operation V-433
ImageWindow operation V-435
imaginary component function V-362
implicit functions
curve fitting III-242–III-244
importing
BMPs III-509
data in tables II-239, II-248
EMFs III-509
FBinRead operation V-219
FReadLine operation V-261
from databases II-181
from Igor experiment file V-500–V-505
GBLoadWave operation II-166, V-291
graphics V-390
Load Image Dialog II-157
with drawing objects III-73
HDF5 II-197, V-6, V-12
ImageLoad operation V-390
images II-157, V-390
BMPs II-158
JPEGs II-158

Load Image Dialog II-157
PNGs II-157
Sun Raster files II-159
TIFF stacks II-158
TIFFs II-158
JCAMPLoadWave operation V-464
JPEGs III-509
limitations on graphics III-509
MLLoadWave operation II-163
notebooks III-20
numeric variables V-219
PadString function V-732
pasted picture resizing III-73
PDFs III-510
PICTs III-509–III-510
PNGs III-509
string variables V-219, V-261
TIFFs III-509
UnPadString function V-1050
waves II-126–II-177, V-219, V-508, V-589
waves in a folder (example) II-175
XLLoadWave operation II-159, V-1115
importing images
PNG versus raw PNG II-157
importing waves
setting wave names II-176
in line
in notebooks III-9
include statements III-400–III-401, IV-25, IV-166
include keyword V-17
independent modules IV-240
IndependentModule pragma IV-240
menu control IV-167
optional IV-167
version control IV-166
incomplete gamma function V-289–V-290
increment in wave assignment II-76
increment operator IV-6, IV-43
Indent Left IV-27
Indent Right IV-27
indentation
in notebooks III-7–III-8
in procedure windows III-405
of procedures IV-26
independent component analysis V-355
independent modules IV-238
containing regular modules IV-242
control action procedures IV-240
debugger IV-239
dependencies IV-243
example IV-239
Execute operation IV-243
hook functions IV-240
include statements IV-240
IndependentModuleList function V-438
limitations IV-240
pictures IV-244
pop-up menus IV-241
procedure windows IV-239
ProcGlobal keyword IV-238
ProcGlobal keywords IV-245
public functions IV-238
qualified names IV-238–IV-239
static functions IV-238–IV-239
user-defined menus IV-241
WinList function V-1099
independent variables
curve fitting III-191
IndependentModule keyword V-437
IndependentModule pragma IV-55, IV-238
GetIndependentModuleName function V-303
include statements IV-240
index sort III-134–III-135
index values
CopyScales operation V-107
in tables II-241, II-261
index columns in tables II-241
multidimensional waves V-160
pasting in tables II-249
viewing in tables II-235
index waves II-77
wave assignment statements II-77
IndexedDir function V-438
IndexedFile function V-440
dot-underscore files V-441
example II-175
sorting file lists V-441
indexing
dimension labels II-82
index waves II-77
multidimensional waves II-92, II-95–II-97
strings IV-16
text waves IV-17
using dimension labels II-93
value waves II-77
waves II-76
IndexSort
example III-135
IndexSort operation III-134–III-135, V-442
applications III-134
IndexToScale function V-442
indirect autosave II-38–II-39
inequality IV-6
INF
in wave assignments II-76
Inf function V-442
infinity function V-442
Info (File Information dialog) III-25
info pane
Data Browser II-115
info panel
HideInfo operation V-347

in graphs II-319–II-321
ShowInfo operation V-869
info window
Gizmo II-416
INFs II-83
detecting V-715
in curve fitting III-232–III-233
in delimited text files II-129
in graphs II-284
in tables II-247
in WaveStats operation III-124
number of V-1084
removing from waves V-1091
zapping V-570
initial guesses in curve fitting III-180, V-131
initialization commands II-27
inline parameters
in user functions IV-33
inline wave references IV-73
destination waves IV-86
input devices
cross-platform issues III-452
input/output queues
multitasking
example IV-333
Insert File III-13, III-403
Insert Page Break III-20
Insert Points dialog II-73
insert-paste II-248
INSERTINCLUDE IV-279
inserting
pictures in notebooks V-706
inserting data II-249
in tables II-244
in waves II-73
inserting pictures
in notebooks III-13
inserting text
in procedure windows III-403
insertion cell in tables II-236, II-239, II-244
InsertPoints operation II-73, V-443
instance names IV-20
contour instance in ModifyContour V-600
InstantFrequency operation V-443
Instrutech data acquisition package IV-312
int declaration
local variables in user functions IV-33
variables in user functions IV-33
int keyword V-446
int64 declaration
local variables in user functions IV-33
variables in user functions IV-33
int64 keyword V-446
integer data II-85
in Igor Text files II-152
numeric format
in tables II-255
integers
16-bit II-66
32-bit II-66
64-bit II-66, IV-39
64-bit integers complex IV-39
8-bit II-66
expressions in user functions IV-38, IV-113
in wave assignments IV-9
numeric format
in tables II-255
variable in user functions IV-33, V-446, V-1048
Integrate operation V-446
integrate1D function V-448
Integrate2D operation V-449
IntegrateODE operation III-322, V-452–V-458
integrating histogram III-132
integration III-120
area function V-40
area under curve III-120
areaXY function V-41
faverage function V-218
faverageXY function V-218
gaussian quadrature V-448
Integrate operation V-446
integrate1D function V-448
Integrate2D operation V-449
multidimensional III-120
of user functions III-336
of XY data III-120
Romberg V-448
trapezoidal V-40–V-41, V-218, V-446, V-448
waveform data III-120
XY area procedures III-122
interior annotations III-40
Internet
FetchURL function V-221
FTP IV-272
FTP transfer V-271
FTP transfers V-268
HTTP IV-276
opening preferred browser V-54
interp function V-458
example II-80, III-110
Interp2D function V-458
Interp3D function V-458
Interp3DPath operation V-459
Interpolate2 operation III-115, V-459
dialog III-117
example III-111
removing NaNs III-114
Interpolate3D function V-461
interpolation III-114
2D
ContourZ function V-87
Interp2D function V-458

3D
Interp3D function V-458
Interpolate3D function V-461
bilinear V-383
cubic spline III-115
dialog III-117
example II-80, III-109, III-111, III-115
image analysis V-383
in image plots V-637
in wave assignments II-78, II-83
Interpolate2 operation III-115, V-459
linear III-115
methods III-114
not in multidimensional waves II-96
of multidimensional data V-459
of XY data III-109, V-458
of XYZ data V-459, V-899
Resample operation V-803
smoothing spline III-115
smoothing spline algorithm III-118
smoothing spline parameters III-119
spherical V-899
invalid text
in procedure files III-470
in tables II-259
inverse cosine V-19
inverse hyperbolic functions
cosine V-19
sine V-42
tangent V-42
inverse of a matrix V-540–V-541
inverse of a wave V-1090
inverse sine function V-41
inverse tangent V-42
inverse tangent function V-42
inverse trig functions
inverse cosine V-19, V-1090
inverse sine V-41, V-1090
inverse tangent V-42, V-1090
inverseErf function V-463
inverseErfc function V-463
invisible procedure files III-402
changes in Igor functionality III-403
creating III-402
isosurface
transparency II-433
isosurface plot
data format II-453
isosurface plots
Gizmo II-464
issues
dimensions III-455
ItemsInList function V-463
iterate-loop
loop index V-355, V-463
loop limit V-362, V-466
iterated thresholding III-355

J

j function V-463
JacobiCn function V-465
JacobiSn function V-465
JCAMP-DX files II-168
JCAMPLoadWave operation II-168, V-464
jlim function V-466
joins
for drawing tools V-840
for lines and traces III-496
for traces V-616
JointHistogram operation V-466
weighting wave V-466
JPEG files
EXIF metadata V-395
importing V-390
JPEGs
exporting V-405
file info V-372
HTML graphics III-23
importing III-509
loading II-158
saving V-826
Julian dates
dateToJulian function V-144
JulianToDate function V-468
JulianToDate function V-468
justification of text
in annotations III-37
in notebooks III-7–III-8

K

k-means clustering V-472
Kaiser Bessel window function V-183, V-226, V-437, V-1097
Kaiser window function
for images V-437
Kaiser's maximally flat filter V-255
KDE
StatsKDE operation V-946
violin plots II-337
kernel densitiy estimate
StatsKDE operation V-946
kernel density estimate
violin plots II-337
keyboard
cross-platform issues III-452
events in hook functions IV-300
shortcuts in user menus IV-134, IV-136, V-304
keyword-value packed strings II-84, IV-173
keywords V-13
extraction
by index number V-998

FindListItem function V-245
ItemsInList function V-463
NumberByKey function V-714
RemoveByKey function V-790
RemoveFromList function V-793
RemoveListItem function V-795
ReplaceNumberByKey function V-799
ReplaceStringByKey function V-800
StringByKey function V-997
StringFromList function V-998
WhichListItem function V-1095
flow control V-13
function local variable keywords V-13
insertion
AddListItem function V-20
object references V-13
other programming keywords V-13
procedure declarations V-13
procedure subtypes V-13
syntax guide V-15
kill
defined I-22
kill events
window hooks IV-303
Kill Symbolic Paths dialog II-23
Kill Waves dialog II-71
KillBackground operation IV-323, V-468
KillControl operation V-468
KillDataFolder operation V-469
example IV-172
KillFIFO operation V-469
KillFreeAxis operation V-470
killing
background task V-468
controls III-435, V-468
data folders II-109, V-469
defined I-22
FIFO buffers V-469
graphs II-350
help windows II-3
notebooks III-4
numeric variables II-117, V-471
page layouts II-477
pictures III-511, V-470
procedure windows III-399
string variables II-117, V-471
symbolic paths II-23, V-470
tables II-241
vs hiding windows II-46
waves II-70–II-71, II-117, V-471
all of them II-71
from tables II-243
windows II-46, V-169
KillPath operation V-470
KillPICTs operation V-470
KillStrings operation II-105, V-471
KillVariables operation II-104, V-471
KillWaves operation II-70, V-471
examples II-71
Igor binary wave files II-71
KillWindow operation V-471
Kirsch edge detector V-370
KMeans operation V-472
Kolmogorov-Smirnov V-948
Korean
text encodings III-462
Kriging V-383
Kronecker product V-560
kurtosis of wave V-415, V-1084
2D V-415
kwBackgroundColor V-93
kwCmdHist
GetWindow operation V-318
kwControlBar V-93
kwControlBarBottom V-93
kwControlBarLeft V-93
kwControlBarRight V-93
kwControlBarTop V-93
kwFrame
DoWindow operation V-170
kwFrameInner
GetWindow operation V-318
kwFrameOuter
GetWindow operation V-318
kwSelectedControl V-93
kwTopWin
DoWindow operation V-170
GetWindow operation V-318
Notebook operation V-695
NotebookAction operation V-712
PrintNotebook operation V-775
SaveNotebook operation V-823
SetWindow operation V-865
SpecialCharacterInfo operation V-893
SpecialCharacterList operation V-895

L

l
suffix in tables II-241
Label operation V-474
Label Options tab II-311–II-312
labels
in delimited text files II-131
in general text files II-138, II-140
in graphs II-293–II-294
laguerre function V-474–V-475
LaguerreA function V-475
Lambert equal area projection V-781
LambertW function V-475
LAPACK matrix routines
errors III-138

MatrixEigenV operation V-534
MatrixLinearSolve operation V-542
MatrixLLS operation V-544
MatrixMultiplyAdd operation V-549
MatrixSchur operation V-579
MatrixSVD operation V-584
numeric support III-138
references III-138
V_flag III-138
LaTeX III-58
in annotations III-54
layers
drawing layers III-68–III-69
in control panels III-68
in graphs III-68
in multidimensional waves II-92, II-95
in page layouts II-476, II-479–II-480
in tables II-262
indexing V-1119
z function V-1119
maximum location V-1085
minimum location V-1085
names III-68
numbers V-786
r function V-786
Overlay drawing layer III-69
ProgAxes drawing layer III-68
ProgAxes layer III-68
ProgBack drawing layer III-68
ProgBack layer III-68
in page layouts II-479–II-480
ProgFront drawing layer III-69
ProgFront layer III-68
in page layouts II-479–II-480
UserAxes drawing layer III-69
UserAxes layer III-68
UserBack drawing layer III-68
UserBack layer III-68
in page layouts II-479–II-480
UserFront drawing layer III-69
UserFront layer III-68
in page layouts II-479–II-480
layout II-214
Layout Macros submenu II-48
Layout operation V-476
Layout subtype IV-205
keyword V-478
LayoutInfo function V-478
LayoutMarquee subtype IV-205, V-310
keyword V-480
LayoutPageAction operation V-480
LayoutSlideShow operation V-481
LayoutStyle subtype IV-205
keyword V-483
leaks
free waves IV-94
least common multiple V-294
left-shift operator IV-6, IV-43
leftx function V-483
use DimOffset instead V-160
Legend operation V-483–V-484
legendreA function V-484
legends III-42–III-43
automatically updated III-42–III-43
color as f(z) II-301
color scale bars III-34, III-47–III-51
customize at point III-43
default III-42
definition III-34
exterior III-40
affects graph plot area III-41
font size III-43
in page layouts II-483, II-495
interior III-40
making a legend (example) I-16
markers III-43
modifying III-35
offset III-41
position III-40–III-42
standard legend III-42
symbols in annotations III-57
wave symbols III-37, III-42–III-43
length limit II-8, IV-2
less than IV-6
level detection III-287–III-290
EdgeStats operation III-289, V-190–V-192
FindLevel operation III-288, V-242–V-244
FindLevels operation III-288, V-244–V-245
FindPeak operation V-247–V-248
PulseStats operation III-290, V-783–V-785
risetime measurements III-289–III-290
XY data III-289
liberal names
accessing waves and variables IV-68
data folders II-110
dimension labels II-94
in user functions IV-68
parsing by Igor IV-168
programming with IV-168–IV-169
quoting with data folders IV-169
rules III-501, IV-2
CleanupName function V-70
CreateDataObjectName function V-113
Light Properties dialog II-433
lights
Gizmo II-433
troubleshooting II-469
limit command history II-10
limit function V-485
line
curve fitting function III-210
Line Colors dialog II-369, II-371–II-372

line continuation character IV-2
line continuation characters IV-2
line fit III-182, V-127
    r-squared III-221
    through origin III-184
line objects
    Gizmo II-436
line size in graphs II-295
line styles II-294, II-348, III-496
    in pop-up menu controls V-766
    SetDashPattern operation V-837
line terminator II-128
linear colors
    in image plots II-400
linear convolution III-285
linear equations III-161
linear interpolation III-115
LinearFeedbackShiftRegister operation V-485
linefeed
    in data files II-129
    in delimited text files II-126, II-135
    in Igor Text files II-154
    in tables II-258
linefeed characters
    cross-platform issues III-453
    escape code for IV-14
    in strings IV-14
    saving text waves II-180
lines
    bevels III-496
    end caps III-496
    joins III-496
    miters III-496
LINESTYLEPOP V-766
linkage
    hierarchical clustering III-166, V-339
linking
    graphs in notebooks III-18
links
    checking in help files IV-258
    creating in help files IV-257
    finding in help files IV-257
ListBox controls III-416, III-426
ListBox operation V-488
    formatted text III-53
    help V-493
    tooltips V-493
ListBoxControl subtype IV-205
    keyword V-498
ListMatch function V-498
lists
    adding items V-20
    AddListItem function V-20
    AnnotationList function V-26
    appending items V-799–V-800
    AxisList function V-44
    ContourNameList function V-86
    counting items V-463
    CountObjects operation V-110
    CountObjectsDFR operation V-111
    CTabList function V-118
    DataFolderDir function V-141
    deleting items V-790, V-793, V-795
    FindListItem function V-245
    GetIndexedObjName function V-303
    GetIndexedObjNameDFR function V-304
    GetRTStackInfo function V-314
    ImageNameList function V-397
    IndexedFile function V-440
    ItemsInList function V-463
    ListBox controls III-416, III-426
    ListMatch function V-498
    ListToTextWave function V-499
    ListToWaveRefWave function V-499
    NumberByKey function V-714
    of controls V-94, V-608
    of windows V-1100
    PathList function V-738
    PICTList function V-742
    processing lists IV-172
    processing lists of waves IV-198–IV-201
    related functions V-11
    RemoveByKey function V-790
    RemoveFromList function V-793
    RemoveListItem function V-795
    ReplaceNumberByKey function V-799
    ReplaceString function V-799
    ReplaceStringByKey function V-800
    replacing items V-799–V-800
    selected column names V-316
    selected layout objects V-316
    sscanf operation V-902
    StringByKey function V-997
    StringFromList function V-998
    StringList function V-999
    stringmatch function V-1000
    TraceFromPixel function V-1042
    TraceNameList function V-1044
    VariableList function V-1066
    WaveList function V-1075
    WaveRefIndexed function V-1080
    WaveRefIndexedDFR function V-1080
    WaveRefWaveToList function V-1081
    waves in graph V-320
    WhichListItem function V-1095
    WinList function V-1098
ListToTextWave function V-499
ListToWaveRefWave function IV-198, V-499
literal numbers
    hexadecimal literals IV-12
literal strings
    text encodings III-480

live display of waves II-347–II-348
ln function V-500
Load Data Tweaks dialog
auto II-141
delimited text files II-136
general text files II-141
Load Delimited Text dialog II-128, II-133
loading 2D waves II-133
Load General Text dialog II-128, II-140
Load Igor Binary dialog II-128, II-156
Load Igor Text dialog II-128, II-153
Load Image Dialog II-157
Load Row Data procedure II-159
Load Wave operation
wave names II-142
Load Waves dialog
copy to home II-155
creating tables II-235
delimited text files II-132
fixed field text files II-138
general text files II-140
Igor Binary II-155
Igor Text II-152
Load Waves submenu II-128
LoadData operation II-155–II-156, V-500–V-505
regular expressions V-503
LOADFILE IV-279
LOADFILEINNEWINSTANCE IV-279
LOADHELPEXAMPLE IV-279
loading experiments II-26
error handling II-27
loading waves II-126–II-177
automation II-170
BMPs II-158
choosing names II-133, II-140
creating tables II-235
delimited text files II-129–II-137
drag and drop II-35, IV-280
example II-171, II-173, II-175
FBinRead operation V-219
fixed field text files II-137
FORTRAN files II-137
from row-oriented files II-159
general text files II-138–II-142
Igor binary wave files II-154–II-157
Igor Text files II-150–II-154
images II-157
JCAMP-DX files II-168
JPEG files V-390
JPEGs II-158
number of loaded waves V-189, V-294, V-464, V-515, V-592, V-658, V-1117
PNG files V-390
PNGs II-157
programming II-170
S_fileName string II-170
S_path II-170
S_waveNames string II-170
setting wave names II-176
spectroscopic data II-168
Sun Raster files II-159, V-390
TIFF files V-390
TIFF stacks II-158
TIFFs II-158
V_flag variable II-170
variables II-170
LoadPackagePreferences operation V-505
LoadPICT operation V-506–V-508
LoadWave operation II-154, V-508–V-515
backslashes II-150
column formats II-146
column-specifc settings II-145
copy to home II-24
dates II-144
escape codes II-150
example II-171
field widths II-146
loading very large files II-150
text encodings II-129, II-149, III-475, V-509
using file name in wave names II-142
wave names II-146
wave number type II-146
local functions
Static keyword V-906
local variables II-105, IV-61
automatic creation IV-61
complex keyword V-82
double keyword V-168
in macros IV-119
in user functions IV-34
initialization
in macros IV-119
in user functions IV-34
int keyword V-446
int64 keyword V-446
keywords V-13
name conflicts
in macros IV-119
in user functions IV-34
uint64 keyword V-1048
local waves IV-91, IV-96, IV-207
tracking IV-207, V-1087
type of V-1092
WaveType function V-1092
lock icon
in procedure files III-397
locking
notebooks III-5
procedure files III-397, V-642
Loess operation V-515
loess smoothing III-297
log

curve fitting function III-211
log axes II-307, II-315
loglin checkbox II-315
LogLin mode II-315
minor tick labels II-315
tick mark labels II-319
unexpected behavior II-315
log colors
for traces II-298
for traces in graphs V-616
in contour plots II-373, V-604
in image plots II-387, II-400, V-637
log function V-520
log normal curve fit V-128
$\log_{10}$ V-520
$\log_e$ V-500
logical operators IV-6, IV-41
AND IV-7, IV-41
NOT IV-41
OR IV-7, IV-41
side effects IV-7
LogLin axes II-315
loglin checkbox II-315
lognormal
curve fitting function III-212
logNormalNoise function V-521, V-523
LogRatio function III-172
LombPeriodogram operation V-521
long date
in notebooks III-13
long dimension labels II-94, V-209
long object names III-502–III-504, V-208
compatibility III-503
external operations III-504
Look for Folder button II-28
LookAt projection
Gizmo II-424
loops IV-45
break statements IV-48
continue statements IV-48
for loops IV-46
in macros IV-120
in user functions IV-45
nested IV-45
range-based for loops IV-47
lor
curve fitting function III-206
lor (Lorentzian) curve fit V-127
Lorentzian
curve fitting function III-206
low pass band
filtering III-303
low pass filters
example III-304
lower-case string conversion V-523
LowerStr function V-523
LOWESS smoothing III-297, V-515
LU decomposition V-546–V-547
Lucy-Richardson deconvolution V-404

M

M_3DParticleInfo V-366
format V-366
M_3DVertexList V-1046
M_4DTranspose V-427
M_A V-543–V-544, V-579
M_Abs V-1090
M_Acos V-1090
M_Affine V-383
M_alphaBlend V-366
M_ANOVA1 V-907
M_ANOVA2NRResults V-908–V-909
M_ANOVA2Results V-910
M_ANOVA2RMResults V-909
M_Asin V-1090
M_Atan V-1090
M_AveImage V-417
M_AverageRGBImage V-417
M_B V-543–V-544
M_BackProjection V-418
M_Balanced V-529
M_Boxy V-428
M_C V-740–V-741
M_CCBScalar V-418
M_CCBSplines V-418
M_CConjugate V-1090
M_Chunk V-420
M_Circles V-428
M_clustersCM V-259
M_CMYK2RGB V-418
M_CochranTestResults V-923
M_ColorIndex V-424
M_colors V-82
M_Combinations V-974
M_ControlCorrTestResults V-958
M_Convolution V-532
M_Corr V-533
M_Cos V-1090
M_Covar III-213, III-226, V-125, V-131, V-533
M_CrystalToRect V-1090
M_CWT V-137
M_D V-740–V-741
M_DelaunayTriangles V-428
M_Detrend V-182
M_DistanceMap V-259, V-419
M_DPSS V-171
M_DunnettMCElevations V-952
M_DunnettTestResults V-927
M_DWT V-190
M_eigenVectors V-535
M_ExtractedSurface V-419, V-432

M_FFT V-222
M_FGT V-215
M_FitConstraint III-231, V-124, V-131
M_flipped V-1090
M_FriedmanRanks V-931
M_FriedmanTestResults V-931
M_FuzzySegments V-432
M_GLCM V-375
M_GradImage V-412
M_Hartley V-419
M_Hilbert V-348
M_Hough V-421
M_HSL2RGB V-421
M_Hull V-101
M_I123 V-424
M_ICAComponents V-355
M_ICAUnMix V-355
M_Image2Gray V-418
M_ImageEdges V-370
M_ImageHistEq V-378
M_ImageLineProfile V-389
M_ImageMorph V-395
M_ImagePlane V-420
  multitasking example IV-325, IV-327
M_ImageThresh V-415–V-416
M_IndexImage V-424
M_InsertedWave V-422
M_InstantFrequency V-445
M_InterClusterDistance V-260
M_InterpolatedImage V-382, V-384
M_Inverse V-540–V-541, V-1090
M_Inverted V-422
M_JointHistogram V-466
M_KMClasses V-472–V-473
M_L_eigenVectors V-536
M_LakeFill V-419
M_leftEigenVectors V-537
M_LineProfileStdv V-389
M_Lower V-546–V-547
M_LUFactors V-546
M_Magnitude V-1090
M_MagSqr V-1090
M_matchPlanes V-422
M_matrixW V-355
M_max V-1091
M_min V-1091
M_Moments V-363
M_MovieChunk V-745
M_MovieFrame V-745
M_NNResults V-676
M_NPCCResults V-962
M_NPMCDHWResults V-963
M_NPMConResults V-963
M_NPMCSNKResults V-963
M_NPMCTukeyResults V-964
M_OffsetImage V-423
M_PaddedImage V-423
M_paddedImage V-431
M_Particle V-364, V-366
M_ParticleArea V-364, V-366
M_ParticleMarker V-363, V-365
M_ParticlePerimeter V-364, V-366
M_PCA V-356
M_Phase V-1091
M_PhaseLUT V-434
M_PixelatedImage V-383
M_product V-548
M_ProjectionSlice V-423
M_Pt V-546–V-547
M_R V-740–V-741
M_R_eigenVectors V-536
M_RawCanny V-371
M_rawMoments V-366
M_Reconstructed V-404
M_ReducedWave V-423
M_RegMaskOut V-402
M_RegOut V-402
M_RemovedBackground V-403
M_Resampled V-972
M_RGB2Gray V-424
M_RGB2HSL V-424
M_RGB2XYZ V-424
M_RGBOut V-418
M_rightEigenVectors V-537
M_ROIMask V-367, V-374
M_RotatedImage V-405
M_ScaledPlanes V-425
M_ScatterMesh V-385
M_ScheffeTestResults V-975
M_SeedFill V-409
M_SelectColor V-425
M_ShadedImage V-426
M_Shrunk V-426
M_shrunkBox V-426
M_Sin V-1091
M_Skeleton V-413
M_SphericalTriangulation V-899
M_sqrt V-1091
M_Stack V-427
M_StackDot V-428
M_StatsQuantilesSamples V-973
M_StdvImage V-417
M_STFT V-994
M_SumDimension V-1007
M_SumPlanes V-427
M_SV V-544
M_TDLinearSolution V-544
M_TetraPath V-1046
M_TukeyCorrTestResults V-958
M_TukeyMCElevations V-952
M_TukeyMCSlopes V-952
M_TukeyTestResults V-983

M_U V-583–V-584
M_UnwrappedPhase V-433
M_Upper V-546–V-547
M_V V-579, V-583
M_VolumeTranspose V-427
M_VoronoiEdges V-387, V-428
M_VT V-584
M_WaveStats V-973, V-1082–V-1083
  format V-1085
M_WaveStatsSamples V-973
M_Weights1 V-677
M_Weights2 V-677
M_Wigner V-1095
M_WindowedImage V-435–V-436
M_x V-540, V-546, V-580, V-583
M_xProjection V-428
M_XYZ2RGB V-428
M_yProjection V-428
M_zProjection V-428, V-430
Macintosh
  creator code for Igor III-449
  date system II-245, II-256
  dot-underscore files V-441
  file permissions II-30
  memory management III-512
  system requirements III-513
  system version info V-360
  XOP compatibility III-512
Macintosh System Requirements III-513
MacLab data acquisition package IV-312
Macro Execute Error dialog
  during experiment load II-27
Macro keyword IV-118, V-523
macro submenus in Windows menu II-48
MacroInfo function V-523
MacroList function V-524
MacRoman text encoding III-460–III-461, III-481
MacroPath function V-525
macros IV-116–IV-124
  $ operator IV-121
  aborting IV-124
  based on history (example) I-59
  body code IV-120
  calling from a user function IV-202
  compared to functions IV-116
  conditional statements IV-120
  default values V-715, V-1005
  DelayUpdate operation V-153
  deleting II-48
  DoUpdate operation IV-123, V-168
  DoXOPIdle operation V-171
  errors IV-122
  exists function V-207
  flow control IV-120
  initialization of local variables IV-119
  local variable declaration IV-119
  locating a window macro II-48
  loops IV-120
  MacroInfo function V-523
  MacroList function V-524
  menus showing IV-121
  missing parameter dialog IV-121
  names IV-118
  parameter lists IV-119
  parameters III-170, IV-10
  path to V-525
  PauseUpdate operation IV-123, V-739
  procedure type IV-118
  ProcedureText function V-779
  Prompt statements IV-121, V-782–V-783
  recreation macros V-168
  ResumeUpdate operation IV-123, V-809
  retrieve code
    ProcedureText function V-779
  return statements IV-120
  runtime stack information V-314
  S_ variables IV-123
  scope of variables II-103–II-105, IV-119, IV-123
  Silent operation IV-122, V-871
  Sleep operation V-871
  Slow operation IV-122, V-877
  style macros II-48, II-350–II-352, V-171
  subtype II-47–II-48, IV-118, V-66, V-763, V-858
  syntax IV-118–IV-120
  updates IV-123
  V_ variables IV-123
  variables
    scope II-103–II-105, IV-119, IV-123
  wave parameters IV-121
  window recreation II-47–II-48, II-350
magnification
  command window II-12
  history area II-12
  in command line II-53
  in dialogs
    text areas II-53
  in help II-53
  in help files II-53
  in history area II-53
  in notebooks II-53
  in page layouts II-477
  in procedure windows II-53
  setting default II-53
magnitude III-274–III-275, V-1090
magnitude squared V-1090
  of complex number V-525
magsqr function V-525
  example II-81
mailing list II-4
main transformation
  Gizmo II-436
major ticks

in user tick waves II-314
Make operation V-526
automatic creation of Wave IV-72
examples II-68
in user functions IV-72
overwriting caveats II-68
Make Waves dialog II-67
MakeIndex
example III-135
MakeIndex operation III-134–III-135, V-527
applications III-134
making waves II-65, II-67, II-92, V-526
MandelbrotPoint function V-528
map projections
Project operation V-781
MarcumQ function V-529
margins
in graphs II-288
in notebooks III-6
sizes in page layouts II-478
marker size as f(z) II-299
MARKERPOP V-766
markers II-291
as f(z) II-298
box plots V-596
centering in annotations III-43
colors II-292
fill colors II-292
in annotations III-55
in graphs II-288, II-291, II-299
in pop-up menu controls V-766
numeric codes II-300
size in annotations III-43
stroke color II-292
table of II-300
violin plots V-651–V-652
width in annotations III-43
MarkPerfTestTime operation V-529
marquee
in page layouts II-489
marquee menus IV-137
as input for procedures IV-163
marquee2mask procedures III-379
marquees
in graphs II-285, V-309–V-311, V-852
in page layouts I-41, II-479, II-482, V-309–V-311, V-852
Marr–Hildreth edge detector V-370
mask wave in curve fitting III-198, III-201
matching characters III-408
Matlab dynamic libraries II-163
Matlab files
loading II-163, V-589
loading as HDF5 II-165
MLLoadWave64Support II-164
version 7.3 II-165
matrices
addition III-138
analysis
condition V-531
continuous wavelet transform V-137
convolution V-532
CWT operation V-137
determinant V-533
discrete wavelet transform V-189
DWT operation V-189
eigenvalues V-534
eigenvectors V-534
FFT V-222–V-228
Gauss-Jordan V-540
IFFT V-357–V-359
least squares V-542–V-544
linear equations V-542–V-544
LU decomposition V-546–V-547
back substitution V-546
multiply V-548–V-549
rank V-578
related operations V-3–V-4, V-7
Schur factorization V-579
solving V-579
SV decomposition V-584
back substitution V-583
trace V-585
transpose V-585
balancing V-529, V-578
Bartlet window V-436
Bartlett window V-436
Blackman window V-436
built from waveforms II-97
columns
extracting V-420
flipping V-419
summing V-427
summing all V-427
combining V-82
Concatenate operation V-82
condition V-531
converting to waveform II-98
correlation V-532
covariance V-532
dot product V-534
efficient execution III-140, V-550
exporting
BMP files V-405
JPEG files V-405
PhotoShop files V-405
PICT files V-405
PNG files V-405
QuickTime files V-405
raw PNG files V-408
SGI files V-405
Targa files V-405

TIFF files V-405, V-408
Extract operation V-213
extracting a column II-97
extracting a row II-97
FFT of II-98
filling from 1D wave V-419
from XYZ data V-373
Hamming window V-436
Hanning window V-436
Hartley transform V-419
Hough transform V-421
image filtering V-372, V-539
in Igor Text files II-151–II-153
indexing V-421
interpolation V-87, V-458
inverse of V-540–V-541
Kaiser window V-437
LAPACK routines III-138
loading
from delimited text files II-133
from general text files II-140
loading from Excel file II-162
making from 1D waves in tables II-267
MatrixGLM operation V-541
MatrixOp operation III-140, V-550
maximum
chunk location V-1085
column location V-1084
layer location V-1085
row location V-1084
minimum
chunk location V-1085
column location V-1084
layer location V-1085
row location V-1084
multiplication III-138
by scalar III-138
MatrixMultiply operation V-548
MatrixMultiplyAdd operation V-549
offsetting V-423
padding V-423
example V-433
plane extraction V-426
planes
summing all V-427
printing V-769
redimensioning II-98
reshaping 1D to 2D V-789
resizing V-423
Reverse operation V-809
rotating
columns V-425
rows V-425
rows
extracting V-420
flipping V-420
summing V-427
summing all V-427
saving
as delimited text II-178
shifting V-423
smoothing V-515
speeding up III-140, V-550
splitting V-901
SplitWave operation V-901
summing
sum V-427
swap diagonal quadrants V-427
terminology II-92
windowing V-435
matrix data
converting from XYZ data II-367
matrix multiplication V-548–V-549
MatrixOp operation III-144
matrix of Z values
Gizmo II-406
matrix4x4 objects II-469
MatrixBalance operation V-529
MatrixCondition function V-531
MatrixConvolve operation V-532
matrixCorr function V-532
matrixDet function V-533
matrixDot function V-534
MatrixEigenV operation V-534
MatrixFilter operation V-539
MatrixGaussJ operation V-540
MatrixGLM operation V-541
MatrixInverse operation V-541
MatrixLinearSolve operation V-542
MatrixLinearSolveTD operation V-543
MatrixLLS operation V-544
MatrixLUBkSub operation V-546
MatrixLUD operation V-546
MatrixLUDTD operation V-547
MatrixMultiply operation V-548
MatrixMultiplyAdd operation V-549
MatrixOp
Cholesky decomposition V-555
cross-covariance V-556
decimation V-557
fast cosine transform V-571
fast sine transform V-571
fast staggered cosine transform V-572
fast staggered sine transform V-571–V-572
Kronecker product V-560
MatrixOp operation V-550
data types III-145
dot product III-144
examples III-148
functions by category III-149
Hermitian transposition III-144
matrix multiplication III-144

matrix transposition III-144
memory allocation V-574
multithreading III-148
operators III-143
optimization III-148
quaternions III-146, V-573
using III-140–III-151
wave dimensions III-143
MatrixReverseBalance operation V-578
MatrixSchur operation V-579
MatrixSolve operation V-579
MatrixSparse operation V-580
ADD operation III-157
index data type III-156
inputs III-155
list of operations III-154
MM operation III-157
MV operation III-158
operation data type III-155
operations III-156
SMSM operation III-158
TOCOO operation III-159
TOCSC operation III-159
TOCSR operation III-160
TODENSE operation III-160
transformations III-156
TRSV operation III-161
MatrixSparse operations
example III-153
MatrixSVBkSub operation V-583
MatrixSVD operation V-584
matrixTrace function V-578, V-585
MatrixTranspose operation V-585
max function V-586
MAX_OBJ_NAME V-14
MAX_UNITS V-14
MAX_WIN_PATH V-14
max3D filter V-372
MaxBytesReadingWave II-35
MAXCMDLEN V-14
maximized windows V-320
MDI frame IV-286
maximum among several waves
WavesMax user-defined function III-173
maximum location in wave V-415, V-1084
maximum of two numbers V-586
maximum of wave V-1091
MBCS III-462
formatted text notebooks III-472
MD4 hash algorithm V-338, V-1073
MD5 hash algorithm V-338, V-1073
MDI frame window IV-285
mean function III-121, V-586
subranges III-122
mean of wave segments
FindSegmentMeans user-defined function III-174
mean of waveform data III-120
measurements
EdgeStats operation V-190–V-192
PulseStats operation V-783–V-785
median
box plots II-331
Median function III-133
median function V-586
median smoothing III-296
median3D filter V-372
memory
deallocating IV-205, V-1070
fragmentation III-512
free V-359
management III-512
virtual III-512
menu bar names II-44
menu definitions IV-126–IV-141
(character IV-134
! character IV-134
& character IV-135
- character IV-134
/ character IV-134
; character IV-134
accelerators IV-135
BuildMenu operation IV-130
contextualmenu IV-127
creating a new menu IV-129
creating submenus IV-127
DataBrowserObjectsPopup menu IV-138
disabling items IV-134, V-851
DoIgorMenu operation V-166
dynamic IV-127
dynamic menu items IV-129
extending built-in menus IV-128
function keys IV-136
GetKeyState function V-304
GraphPopup menu IV-138
hideable IV-127
independent modules IV-241
keyboard shortcuts IV-134, IV-136, V-304
marking items IV-134
marquee menus IV-137
menus and multiple procedure files IV-131
multiple menu items IV-131
operation queue IV-278
optional menu items IV-130
rebuilding from procedure V-54
regular modules IV-238
separating items IV-134
SetIgorMenuMode operation V-851
special characters IV-133–IV-136, IV-145
enabling and disabling IV-135
Windows IV-134–IV-135

specialized menu items IV-132
examples IV-132
syntax IV-126
TablePopup menu IV-138
trace menus IV-137
WindowBrowserWindowsPopup menu IV-140
Windows IV-134–IV-135
Menu keyword IV-126, V-589
menus
activating V-166
consolidating items into a submenu IV-131
disabling items V-851
GetKeyState function V-304
hiding V-346
include statements IV-167
information about V-306
invoking V-166
packages III-401
pop-up menu controls III-416, III-426–III-428
programming V-166, V-306, V-346, V-869
relation to commands I-7
relation to dialogs I-7
showing V-869
showing macros IV-121
why the menu bar changes II-44
Mercator projection V-781
Transverse V-781
MERGEEXPERIMENT IV-279
merging experiments II-19
Mersenne Twister V-196, V-323–V-324, V-853
metafiles III-102
meteorological wind barbs V-614
Metropolis algorithm V-729
MexHat wavelet transform V-140
microphone
recording from IV-312
Microsoft Visual C++ IV-208
MIME-TSV files IV-281–IV-283, IV-287, IV-289
min function V-589
min3D filter V-372
minidump files IV-341
minimization III-343–III-348
1D functions III-343
1D nonlinear functions III-344, V-728
bracketing extrema III-345
Brent's method V-728
caveats III-347
dogleg method V-726, V-728
finite differences V-728
finite differences method V-726
function format V-727
line search method V-726, V-728
More-Hebdon method V-726, V-728
multidimensional functions III-343
multidimensional nonlinear functions III-346, V-728
multivariate functions III-346, V-728
Optimize operation V-725
output variables V-730
output waves III-347, V-730
quasi-Newton method V-728
references III-349, V-731
secant (BFGS) method V-726, V-728
stopping tolerances III-347
tolerances III-347, V-729
setting V-727
univariate
stopping criterion V-728
univariate functions III-344, V-728
user-defined functions
1D III-344
multidimensional III-346
minimized windows
MDI frame IV-286
minimum location in wave V-415, V-1084
minimum of two numbers V-589
minimum of wave V-1091
Minkowski difference V-754
Minkowski sum V-754
Minkowski vector dissimilarity V-339
minor ticks
in user tick waves II-314
mirror axis in graphs II-307–II-308
Misc pop-up menu in page layouts II-483
miscellaneous file
in experiments II-19
Miscellaneous Settings dialog III-500
autosave II-36
Default Data Precision II-239
HDF5 default compression II-17
Loaded Igor Binary Data II-24
Repeat Wave Style Prefs in Graphs II-348
Save and Restore Recent Colors III-498
waves II-68
Missing Folder dialog II-28
missing folders II-28
missing parameter dialog IV-121
equivalent for user functions IV-144
missing parameters
in functions V-167
in macros V-782–V-783
missing values II-83
in analysis III-112
in delimited text files II-129, II-132, II-136
in general text files II-139, II-141
in graphs II-284, II-303
in Igor Text files II-151
NaNs II-247
removing by interpolation III-113
working around III-113
Missing Wave File dialog II-29
miters

for lines and traces III-496
mitres
for drawing tools V-840
for traces V-616
MLLoadWave
Matlab dynamic libraries II-163
MLLoadWave64Support II-164
MLLoadWave operation II-163, V-589
MLLoadWave64Support II-164
mod function V-592
modal and modeless user interface IV-144
modal Data Browser II-119
modDate function V-592
modeless dialogs IV-158
modified
events in hook functions IV-299
Modify Annotation dialog III-35
Dynamic pop-up menu III-38
for page layouts II-494
Insert: group III-35
Special pop-up menu III-36
Modify Axis dialog II-306–II-312
Auto/Man Ticks tab II-308
Axis Label tab II-318
Axis Range tab II-286–II-288
autoscaling modes II-287
Quick Set buttons II-287
Axis tab II-307–II-308
date/time items II-316
draw between II-307
global controls II-306
Label Options tab II-311–II-312
live update II-318
log axes II-315
tick marks II-315
manual ticks II-312
computed manual ticks II-312
date/time axes II-317
user ticks from waves II-314
mirror axes II-307
multiple axis selection II-306
Tick Options tab II-310
Ticks and Grids tab II-308–II-310
Modify Columns dialog II-253
Modify Contour Appearance dialog II-368–II-370
Label Tweaks II-378
Modify Draw Environment dialog III-65
Modify Graph dialog II-288–II-290, III-36
Modify Image Appearance dialog II-387–II-388
Modify Objects dialog II-487
Modify operation V-593
Modify Polygon dialog III-71
Modify Trace Appearance dialog II-112, II-290–II-306
customize at point II-306
Set as f(z) II-298
ModifyBoxPlot operation V-593
ModifyBrowser operation V-600
modal Data Browser II-120
ModifyCamera operation V-600
ModifyContour operation V-600–V-606
ModifyControl operation V-606
ModifyControlList operation V-608
ModifyFreeAxis operation V-609
ModifyGizmo operation V-611
ModifyGraph operation V-611–V-635
axes appearance V-626
colors V-634
general graph window settings V-611
live keyword II-348
traces
customize at point V-625
traces appearance V-613
ModifyImage operation V-635–V-639
ModifyLayout operation V-639–V-640
ModifyPanel operation V-640
ModifyProcedure operation V-642
ModifyTable operation V-645–V-649
multidimensional waves II-263
ModifyViolinPlot operation V-649
ModifyWaterfall operation II-326, V-657
ModuleName keyword IV-54, V-658
ModuleName pragma IV-54, IV-236
modules IV-236
modulus functions
mod V-592
undone III-316, V-1050
monitors
dimensions, platform-related III-455
number, depth, and size V-359
resolution V-832
More Extensions folder I-6
More Help Files folder II-2
More Levels dialog II-369
Morlet wavelet transform V-140
complex V-140
morphological operations
3D V-395
multidimensional V-395
mouse
cross-platform issues III-452
GetMouse operation V-312
mouse wheel
panning in graphs axes
panning using mouse wheel II-286
rotation in Gizmo II-424
scaling graph axes II-286
move
data folders V-658
numeric variables V-665
string variables V-663
waves V-665

windows V-666
with Data Browser II-115
Move Backward II-481
Move Forward II-481
MoveDataFolder operation V-658
converting free data folder IV-99
MoveFile operation V-659
MoveFolder operation V-661
warning V-661
MoveString operation V-663
MoveSubwindow operation V-663
MoveVariable operation V-665
MoveWave
free waves IV-96
MoveWave operation V-665
MoveWindow operation V-666
movies IV-245
AddMovieAudio operation V-21
AddMovieFrame operation V-21
CloseMovie V-71
codecs V-683
compression factor V-683
creatiing IV-245
extracting frames IV-246
from pictures IV-246
MP4 V-683
NewMovie operation V-683
of graphs IV-245
playing IV-245
PlayMovie operation V-744
PlayMovieAction operation V-745
related operations V-6
moving
a window on-screen II-50
all windows on-screen II-50
moving average III-295, V-878
moving cursor calls function IV-339–IV-340
MP4 movies V-683
MPFXEMGPeak function V-667
MPFXExpConvExpPeak function V-668
MPFXGaussPeak function V-669
MPFXLorentzianPeak function V-670
MPFXVoigtPeak function V-671
MPR filter V-789
multidimensional data
copy/paste in tables II-265–II-270
multidimensional waves II-92–II-99
3D copy and paste II-269
analysis II-95
average 3D filter V-372
averaging V-417
beams
extracting V-420
built from matrices II-97
chunk indexing in assignments V-1011
chunk numbers in assignments V-811
chunks II-92, II-95
maximum location V-1085
minimum location V-1085
columns
extracting V-420
flipping V-419
indexing in assignments V-1119
maximum location V-1084
minimum location V-1084
names II-261
numbers in assignments V-785
setting values from a wave V-423
styles in tables II-237
summing V-427
summing all V-427
concatenating V-82
create-paste in tables II-269
creating II-92–II-93, V-526
in tables II-234
cutting columns in tables II-268
decimation II-98
deleting points II-92
DimDelta function V-160
dimensions
how many? V-1072
labels II-93–II-94, V-240, V-298, V-838
names II-92
numbers II-92
DimOffset function V-160
DimSize function V-160
duplicating II-93
editing in tables II-261–II-270
extracting
matrix II-97
matrix from a 3D wave II-269
row slice II-97
FFT of II-98
filling from 1D wave V-419
format in text file V-814
FuncFitMD operation V-276
gaussian 3D filter V-372
GetDimLabel function V-298
Hartley transform V-419
Hough transform V-421
hybridmedian filter V-372
in Igor Text files II-151–II-153
index columns in tables II-242
index values V-160
indexing II-95–II-97, V-421
initial values II-92
insert-paste in tables II-266–II-267
inserting images V-422
inserting points II-92
interpolation V-87, V-458–V-459, V-461
interpolation, not II-96
labels II-93–II-94

example II-82
FindDimLabel function V-240
GetDimLabel function V-298
in delimited text files II-131
in tables II-262
length limit II-94, II-244
naming conventions II-94
SetDimLabel function V-838
viewing in tables II-235
wave indexing II-82
layers II-92, II-95
indexing in assignments V-1119
maximum location V-1085
minimum location V-1085
numbers in assignments V-786
matrix to matrix conversion II-98
maximum rank 3D filter V-372
median 3D filter V-372
minimum rank 3D filter V-372
number of points V-160
padding
example V-433
pixels
inverting V-422
planes
extracting V-420, V-426
example V-433
flipping V-420
inserting V-422
matching V-422
removing V-423
scaling V-425
summing V-427
summing all V-427
point finding 3D filter V-372
polynomial function V-749
projection slice V-423
redimensioning II-92–II-93, II-98
replace-paste in tables II-266
rows
extracting V-420
flipping V-420
maximum location V-1084
minimum location V-1084
setting values from a wave V-423
summing V-427
summing all V-427
saving
as delimited text II-179
as Igor Text II-179
in text files II-181
shrinkBox V-426
spherical interpolation V-899
splitting V-901
stacking V-427
storing into a subrange II-97
storing matrix as 3D layer II-96
styles in tables II-254
subset of II-93
surface extraction V-419
swap diagonal quadrants V-427
terminology II-92
transpose 4D wave V-427
transpose volume V-427
treating as 1D II-99
vol2surf V-428
voronoi tesselation V-428
wave assignments II-96–II-97
WaveDims function V-1072
waveform to matrix conversion II-98
X projection V-428
Y projection V-428
Z projection V-428
multiple return statements IV-36
multiplication IV-6
quaternion II-427
multitasking IV-329–IV-339
aborting threads IV-337
curve fitting III-249–III-250
data folders IV-330
examples IV-331–IV-339
free data folders example IV-325
free waves example IV-327
HDF5 II-206
MatrixOp operation III-148
MultiThread keyword V-673
Multithread keyword IV-323–IV-328
MultiThreadControl operation V-674
network operations IV-271
preemptive IV-106, IV-329–IV-339
processor count V-1033
queues IV-330
return value V-1033
starting threads V-1033
structures example IV-328
TBB IV-323
thread groups
creating V-1031
data folders V-1031
posting data to V-1031
releasing V-1032
stopping V-1032
ThreadGroupCreate function V-1031
ThreadGroupGetDF function V-1031
ThreadGroupGetDFR function V-1031
ThreadGroupPutDF operation V-1031
ThreadGroupRelease function V-1032
ThreadGroupWait function V-1032
ThreadReturnValue function V-1033
ThreadSafe keyword V-1033
ThreadStart function V-1033
ThreadStart operation V-1033

user functions IV-106, IV-329–IV-339
MultiThread
Mandelbrot demo V-528
MultiThread keyword V-673
Multithread keyword IV-323–IV-328
free data folders example IV-325
free waves example IV-327
structures example IV-328
MultiThreadControl operation V-674
multithreading
curve fitting III-249
HDF5 II-206
multivariate functions
complex curve fitting III-248
curve fitting III-200, III-260, V-276
Gauss2D V-291
mushroom cloud icon (it's a tree, really) III-65

N

n V-465
name spaces III-502
NameOfWave function V-675
example IV-200
names III-501–III-504
$ operator IV-18, IV-62
allowed characters III-501, IV-2
annotations III-39, III-53, V-26
case insensitive III-501
CheckName function V-68
CleanupName function V-70
column names II-241
conflicts III-505
HDF5 III-505
ContourNameList function V-86
ControlNameList function V-94
CreateDataObjectName function V-113
creating in tables II-239, II-248
CTabList function V-118
data folders II-109
dimension labels II-94
FontList function V-256
FunctionList function V-284
graphs II-277, II-350
ImageNameList function V-397
in graphs IV-20
ContourNameToWaveRef function V-87
ImageNameToWaveRef function V-398
in Igor binary wave files II-155
in page layouts II-477, IV-20
instance names IV-20, V-613
layers III-68
length III-501
liberal rules III-501, IV-2
loading
delimited text II-133
general text II-140
local variables
in macros IV-119
in user functions IV-34
long object names V-208
macro names IV-118
MacroList function V-524
name spaces III-502
notebooks III-25
objects II-486
OperationList function V-725
parsing by Igor IV-168
paths
IndexedDir function V-438
pictures III-509–III-510
programming with liberal names
IV-168–IV-169
quoting III-501
related functions V-11
Rename Objects dialog III-504
Rename operation II-72, V-796
RenameDataFolder operation V-796
RenamePath operation V-797
RenamePICT operation V-797
RenameWindow operation V-797
renaming with Data Browser II-115
rulers III-11
standard rules III-501
suffixes in tables II-241, II-254
table names II-240
trace names V-613
UniqueName function V-1048
uniqueness III-502
user function names IV-31
using $string IV-62
using $stringName IV-18
variables II-102
waves II-63, II-65
in tags III-38
window names II-45
namespaces
independent modules IV-238, IV-242
regular modules IV-236
NaN (Not a Number) function V-676
NaNs II-83
as missing values II-247
comparison with IV-6
detecting V-715
entering in tables II-247
in analysis III-112
in curve fitting III-232–III-233
in delimited text files II-129
in error waves II-304
in general text files II-139
in Gizmo II-453
in graphs II-284, II-303

in Igor Text files II-151
in tables II-247
in WaveStats operation III-124
not an integer II-83
number of V-1084
removing
by interpolation III-114
by median smoothing III-114
from waves V-1092
removing from waves III-113
replacing in waves III-113
working around III-113
zapping V-570
National Instruments data acquisition package IV-312
natural logarithm function V-500
navigation
Go Back and Go Forward II-52
navigation bar
in procedure windows III-397
NBit
HDF5 compression II-213
negation IV-6
negation operator IV-6
nested datatypes
HDF5 II-211
nested loops IV-45
network
UNC paths III-451
Unix paths III-452
networking
aborting operations IV-270
multitasking IV-271
neural networks
NeuralNetworkRun operation V-676
NeuralNetworkTrain operation V-676
NeuralNetworkRun operation V-676
NeuralNetworkTrain operation V-676
neurons
ImageSkeleton3D operation V-413
New Fit Function dialog III-190
New Free Axis dialog II-278
New Graph dialog II-277, II-349
New Graph dialog graphs
New Graph dialog II-278
New Notebook dialog III-3
New Page Layout dialog II-476
New Symbolic Path
example II-22
New Symbolic Path dialog II-22
New Table dialog II-234–II-235
New window II-45
NewDataFolder operation V-678
NEWEXPERIMENT IV-279
NewFIFO operation V-678
NewFIFOChan operation V-678
NewFreeAxis operation V-470, V-679
NewFreeDataFolder function V-680
NewGizmo operation V-681
NewImage operation V-681
NewLayout operation V-682
newline
in regular expressions IV-184
NewMovie operation IV-245, V-683
NewNotebook operation V-684
example III-26
text encodings V-685
NewPanel operation V-687
control panel units III-444
points versus pixels III-444
NewPath
platform-related issues III-449
NewPath operation V-690
example II-22, II-175
in experiment files II-28
NewtCamera operation V-678
NewWaterfall operation II-326, V-691
Nicolet WFT files II-128
NIDAQ Tools IV-312
NIGPIB2 XOP IV-312
noise functions
enoise V-195
gnoise V-323
LinearFeedbackShiftRegister operation V-485
Mersenne Twister V-196, V-324
SetRandomSeed operation V-853
Xoshiro256** V-196, V-324
nonlinear least squares curve fitting III-179
norm function V-692
normal ruler in notebooks III-9, III-11
Normal+ ruler III-12
normalization
of waves II-79
Unicode V-693
normalized Gaussian function V-290
NormalizeUnicode function V-693
normals
Gizmo II-432
NOT
logical operator IV-41
Not a Number function V-676
notarization
Igor extensions III-512
notch filters
example III-310
notched box plots II-335
note function V-694
Note operation V-694
notebook files
autosave II-37
Notebook operation V-695–V-711
accessing contents V-710

byte order marks V-697
document property parameters V-696
example III-26–III-27
miscellaneous parameters V-698
paragraph property parameters V-700
pictures III-26
selection parameters V-702
setting contents V-711
text property parameters V-705
writeProtect V-697
writing
graphics parameters V-705
special character parameters V-709–V-710
text parameters V-711
notebook operation
autoSave V-698
NotebookAction operation V-711
Notebooks
recreating subwindows V-711
notebooks III-2–III-32
accessing contents V-710
actions III-14–III-18, V-711, V-893, V-895
commands III-16–III-17
editing III-16
help text III-15
helper procedures III-17
NotebookAction operation V-711
pictures III-15
SpecialCharacterInfo function V-893
SpecialCharacterList function V-895
styles III-15
adopting II-25, V-696
adopting programmatically V-23
aligning pictures III-9
as subwindows III-91
as worksheets III-4
auto-save V-698
automation III-25–III-30
background color III-6
byte order marks V-697
changeableByCommandOnly III-11
character properties III-8
converting to UTF-8 III-489
creating derived rulers III-12
creating new rulers III-11
dates III-13, III-20
Default button III-9
default tab width III-6
default tabs III-6, V-696
document info icon III-5
document properties III-6, V-696
embedding HTML code III-23
examples III-23
HTMLCode ruler III-23
executing commands from III-4
experiments III-3, III-25
exporting III-20–III-21
external text editor II-56
File Information dialog III-25
file names III-25, V-686
finding
pictures V-702
rulers III-12
text III-24, V-702
fonts III-8–III-9
footers III-6, III-20
programming III-26, V-698
formatted III-2
generating commands III-29
Go Back and Go Forward II-52
graphs III-18
headers III-6, III-20
programming III-26, V-698
hiding III-4, V-699
HTML III-21
cascading style sheets III-22
character formatting III-23
graphics III-23
JPEG III-23
picture frames III-23
PNG III-23
HTML 4.01 specification III-22
paragraph formatting III-22
.ifn file extension III-2
Igor object pictures III-18, III-28
importing III-20
in line III-9
indentation III-7–III-8
Insert Page Break III-20
inserting pictures III-13, V-706
justification of text III-7–III-8
killing III-4
linking graphs III-18
list of V-1098, V-1100
locking III-5
magnification II-53
making a new notebook II-45
margins III-6
names II-45, III-25, V-686
NewNotebook operation V-684
normal ruler III-9, III-11
Notebook operation V-695–V-711
NotebookAction operation V-711
opening III-3
as RTF III-21
OpenNotebook operation V-722
page breaks III-19
page layouts III-18
page numbers III-13, III-20
page setups III-30
paragraph properties III-7, V-700
picture compatibility III-19

pictures III-13, III-18–III-19, V-705
type of III-458
updating III-28, V-699, V-709
plain III-2
styles III-8
tabs III-8
platform-related issues III-458
preferences III-30
printing III-20, V-775
programming III-25–III-30
examples III-26
read-only property III-10
recreation macros III-91
redefining rulers III-12
references to II-24, III-3
removing rulers III-12
replacing text III-24
retrieving text III-28
RTF III-20
Ruler pop-up menu III-11
rulers III-5, III-7, III-11–III-12, V-700
fonts III-7, III-12
names III-11
text color III-7, III-12
text sizes III-7, III-12
text styles III-7, III-12
SaveNotebook operation V-823
saving
as HTML III-21
as RTF III-21
saving pictures III-14, V-708
scaling pictures III-14
selections V-315, V-702
Set Text Format to Ruler Default III-9
shortcuts III-32
showing III-4
spacing III-7–III-8
special character names III-14
special characters III-13, V-699, V-709–V-710
SpecialCharacterInfo function V-893
SpecialCharacterList function V-895
subscripts III-9
superscripts III-9
tab characters III-7–III-8
tables III-18
template files III-30
text
color III-8
formats III-9
inserting V-711
properties V-705
retrieving III-28
sizes III-8–III-9
styles III-8
text color III-9
TEXT files III-2
text formats III-9
text size III-9
text style III-9
times III-13, III-20
titles II-45, V-686
transferring rulers III-12
.txt file extension III-2
unlocking III-5
updating
pictures III-18
special characters III-14, V-699, V-709
vertical offsets III-8–III-9
window names V-1048
window titles III-13, III-20, III-25
wintype function V-1103
WMT0 files III-2
write-protect V-697
write-protect icon III-5
write-protect property III-10
zooming II-53
notes
data folder notes II-120
in windows V-320
null
in strings IV-16
num2char function V-713
num2istr function V-713
num2str function II-73, V-714
number functions V-7
number-to-string conversion IV-260, V-713–V-714, V-902
NumberByKey function IV-173, V-714
numeric expressions
continuation characters IV-35, IV-113
hexadecimal literals IV-12
numeric formats
commas in tables II-255
dates in tables II-245, II-256
hexadecimal in tables II-257
in delimited text files II-133
in tables II-255
octal in tables II-257
pasting in tables II-249
precision in tables II-245
times in tables II-256
numeric precision II-104
APMath operation V-27
arbitrary V-27
changing II-72
copying from table II-252
default for waves II-67
expression evaluation IV-38
in functions IV-31
in Igor Text files II-151
in tables II-239, II-245, II-255

integer expressions in user functions IV-38, IV-113
of calculations IV-8
of waves II-66, II-68, V-788, V-1073, V-1092
Redimension operation V-788
saving waves II-179
numeric types IV-8
changing II-72
coercion in user functions IV-111
of functions IV-11
of waves V-1073, V-1092
numeric variables II-104–II-105
complex II-104, V-1065
copying II-115
default values V-715
deleting II-104
dependency assignments IV-231
global II-104, III-417–III-418, III-428–III-429, V-1065
in operation flags V-15
initializing II-104, V-1065
killing II-104, II-117
KillVariables operation V-471
MoveVariable operation V-665
moving to data folder II-115
names
CheckName function V-68
numeric type II-104
precision II-104
renaming II-115, III-504, V-796
Set Variable controls III-417, III-428
Slider controls III-418, III-429
UniqueName function V-1048
ValDisplay operation V-1060–V-1064
Variable declaration II-104, V-1065
VariableList function V-1066
numpnts function V-714
use DimSize for multidimensional waves V-160
numtype function V-715
NumVarOrDefault function V-715
example IV-147
saving parameters IV-147
NVAR keyword IV-65, V-715
/Z flag IV-67
automatic creation IV-70
automatic creation with rtGlobals IV-70
checking in debugger IV-213
example IV-69
explicit creation IV-70
failures IV-67
NVAR_Exists function V-716
use with $ IV-62
use with data folders IV-69, IV-249
NVAR_Exists IV-67, V-716
Nyquist frequency
filtering III-300, III-312
smoothing V-879

O

object list
Gizmo II-416–II-417
object names
long names III-502–III-504
object references
FUNCREF keyword V-278
HDF5 II-208
in tables II-258, II-270
NVAR keyword V-715
STRUCT keyword V-1002
SVAR keyword V-1010
Wave keyword V-1069
Object Status dialog IV-230
objects
broken objects IV-233
exists function V-207
Gizmo II-418
how objects relate I-3
in experiments II-16
in page layouts II-485, V-477
properties II-498
indexing in style macros IV-20
long object names V-208
name spaces III-502
names III-501–III-504, V-477
conflicts III-505
instance names IV-20
overview I-2
pictures in notebooks III-18
updating III-28
Rename Objects dialog III-504
unique names III-502
octal numbers
in tables II-245, II-255, II-257
representation of II-257
ODBC II-181
ODRPACK95 III-237
offscreen drawing objects III-65, III-68
offsetting traces in graphs II-302–II-303
log axes II-302
multipliers II-302
preventing II-302
tags III-38
undoing II-302
only guess in curve fitting III-189
opacity
color table waves II-400
image plots II-400–II-401
in Gizmo II-428
in graph traces II-298
opaque data
HDF5 II-211

Open Experiment dialog II-19
Open File dialog IV-149, V-717
    multi-selection V-718
Open File submenu II-45
Open operation IV-194, IV-196, V-716–V-721
    appending V-717
    file reference numbers V-716
    open for appending IV-196
    open for reading IV-196
    paths V-717
    reading V-717
    symbolic paths V-717
    writing V-717
OpenGL II-407
    changes to II-470
    GL_ constants II-471
OpenHelp operation V-721
opening
    data files II-126
    experiments II-19
    files II-45, IV-196
    notebooks III-3
    procedure files III-398
    RTF as notebooks III-21
OpenNotebook operation V-722
    text encodings V-723
OpenProc operation V-724
    text encodings V-724
operands IV-8
operation queue IV-278
    COMPILEPROCEDURES IV-279
    Execute/P operation V-204
    INSERTINCLUDE IV-279
    LOADFILE IV-279
    LOADFILEINNEWINSTANCE IV-279
    LOADHELPEXAMPLE IV-279
    MERGEEXPERIMENT IV-279
    NEWEXPERIMENT IV-279
    RELOAD CHANGED PROCS IV-280
OperationList function V-725
operations IV-10
    bits
        setting IV-12
    by category V-1–V-6
    definition I-5
    destination waves IV-85
    exists function V-207
    external IV-208
    flags
        expressions require parentheses V-15
    in user functions IV-111
    listing V-725
    on functions III-320
        differential equations III-322
        minimization III-343
        root finding III-338
    OperationList function V-725
    syntax IV-10
    syntax guide V-15
    trace names IV-88
operators IV-6
    ! IV-6, IV-41
    != IV-6
    $ IV-6
    %^ IV-6
    & IV-6, IV-41
    && IV-6, IV-41
    * IV-6
    + IV-6
    - IV-6
    / IV-6
    ^ IV-6
    < IV-6
    << IV-41
    <= IV-6
    == IV-6
        and roundoff error IV-8
    > IV-6
    >= IV-6
    >> IV-41
    ?: IV-6
    ~ IV-6, IV-41
    | IV-6, IV-41
    || IV-6, IV-41
    addition IV-6
    associativity IV-6
    bitwise
        << IV-41
        >> IV-41
        AND IV-6–IV-7, IV-41
        complement IV-41
        OR IV-6–IV-7, IV-41
        XOR IV-6–IV-7
    comparison IV-7
    complement IV-6
    conditional II-82, IV-6–IV-7
    decrement IV-6, IV-43
    division IV-6
    equality IV-6
    exponentiation IV-6
    greater than IV-6
    greater than or equal IV-6
    increment IV-6, IV-43
    inequality IV-6
    left shift IV-6, IV-43
    less than IV-6
    less than or equal IV-6
    logical
        AND IV-6–IV-7, IV-41
        NOT IV-6, IV-41
        OR IV-6–IV-7
    MatrixOp operation III-143

multiplication IV-6
negation IV-6
obsolete IV-8
post-decrement IV-6, IV-43
post-increment IV-6, IV-43
pre-decrement IV-6, IV-43
pre-increment IV-6, IV-43
precedence IV-6, IV-8, IV-41
right shift IV-6, IV-43
strings
substitution IV-6
subtraction IV-6
Optimize operation V-725–V-731
optional include statements IV-167
optional parameters IV-33
determining usage V-733
example IV-60
options
in operations IV-10, IV-12
OR
bitwise operator IV-6–IV-7, IV-41
logical operator IV-6–IV-7, IV-41
orthographic projection V-781
Gizmo II-422
Otsu's method III-355
outliers
box plots II-331, II-334, V-594
RemoveOutliers user-defined function III-171
Overlay drawing layer III-69
Override Experiment III-466
plain text files III-467–III-468
wave text encodings III-473
Override keyword V-731
user functions IV-106
overriding functions
Override keyword V-731

P

p function V-731
in multidimensional waves II-92–II-93, II-96
in wave assignments II-74
p2rect function V-732
packages III-401, IV-246–IV-249
lightweight IV-249
LoadPackagePreferences operation V-505
managing globals IV-249
naming IV-251
opening V-691
path to folder V-895
preferences IV-251–IV-255
loading IV-251, V-505
saving IV-251, V-825
in binary files IV-252
in experiments IV-254
private data IV-249
procedure modules IV-236
SavePackagePreferences operation V-825
WaveMetrics IV-247
Packages data folder IV-170, IV-249
packed experiments II-16
adopting files II-25
adopting files programmatically V-23
autosave II-37
HDF5 II-223
LoadData operation II-156
packed strings
adding items V-20
AddListItem function V-20
appending items V-799–V-800
counting items V-463
deleting items V-790, V-793, V-795
FindListItem function V-245
ItemsInList function V-463
NumberByKey function V-714
RemoveByKey function V-790
RemoveFromList function V-793
RemoveListItem function V-795
ReplaceNumberByKey function V-799
ReplaceStringByKey function V-800
replacing items V-799–V-800
StringByKey function V-997
StringFromList function V-998
WhichListItem function V-1095
PadString function V-732
page breaks
in notebooks III-19
page layouts II-476–II-499
$ and object names V-477
active page II-478
adding pages II-478
adjusting objects II-481
aligning
graph axes II-490
objects II-481
anchors for annotations II-494
annotation tool III-35
annotations II-483, II-494–II-496, III-34–III-53
position III-41
appending
objects II-486
pictures II-496
appending into marquee (example) I-41
AppendLayoutObject operation V-33
AppendToLayout operation V-36
arranging objects II-487
arrow tool II-481
auto-sizing objects II-481
background color II-477
bounding box II-489
changing drawing layers II-480
closing II-477

color scale bars V-74
ColorScale operation V-74
compatibility with Igor6 II-478
constrain during drag II-481
copying objects II-482, II-493
creating II-476
creating from functions V-682
Crop to Page Contents II-498
cutting objects II-482
default font II-496, V-147
DelayUpdate II-483, II-487
deleting pages II-478
drawing icon II-479
drawing layers III-68
drawing tools II-480
dummy objects II-487
dynamic updating II-476
exporting II-498, V-826
exporting section II-482
fidelity II-486
frames II-483
in notebooks III-18
info V-478
killing II-477
layers II-476, II-479–II-480
ProgBack layer II-479–II-480
ProgFront layer II-479–II-480
UserBack layer II-479–II-480
UserFront layer II-479–II-480
layout icon II-479
Layout operation V-476
LayoutInfo function V-478
LayoutPageAction operation V-480
LayoutSlideShow operation V-481
legend position III-41
legends II-483, II-495, V-484
list of V-1098, V-1100
magnification II-477
making a new layout II-45
example I-19
margins II-478
margins of V-481
marquee II-489
marquees II-482
Misc pop-up menu II-483
modifying annotations III-35
modifying objects II-487
ModifyLayout operation V-639–V-640
names II-486, V-477
instance names IV-20
names and titles II-45
NewLayout operation V-682
objects II-485
properties II-498
page setups II-478
page size II-479
page sizes II-478
page sorter II-478
pages
LayoutPageAction operation V-480
pasting color scale annotations II-494
pasting objects II-482, II-493
pasting pictures II-494
positioning annotations II-494
preferences II-498
preserve arrangement II-490
printing II-478–II-479, V-774
ProgBack drawing layer II-479–II-480
ProgFront drawing layer II-479–II-480
recreating II-477
recreation macros V-1101
related operations V-2
relation to graphs I-3
relation to tables I-3
RemoveLayoutObjects operation V-795
removing objects from II-486, V-793, V-795
resizing objects II-481
selected pages II-478
selecting multiple objects II-481
selecting objects II-481
selections V-315
size of V-480
slideshows V-481
Stack operation V-905
stacking graphs II-490
stacking objects II-482, II-487, V-905
style macros II-498
subwindow syntax III-92
subwindows III-90
textbox position III-41
textboxes II-483
thumbnails II-478
Tile operation V-1035–V-1036
tiling II-487
tiling guided tour II-488
tiling objects II-482, II-487, V-1035–V-1036
tool palette II-481–II-483
tools II-479
UserBack drawing layer II-479–II-480
UserFront drawing layer II-479–II-480
window names II-477, V-1048
window titles II-477
wintype function V-1103
zooming II-477
page numbers
in notebooks III-13, III-20
Page Setup dialog
graphs II-323, II-348
page setups
in graphs II-323, II-348
in notebooks III-30
in page layouts II-478

in tables II-271
logical paper size V-320
logical print table size V-320
platform-related issues III-450
preference in tables II-272
settings V-775
page sorter
in page layouts II-478
pages
in page layouts II-478
sizes in page layouts II-478
palette color
TIFF files II-158
Panel subtype IV-205
keyword V-732
PanelResolution function III-457, V-732
PanelResolution keyword III-456
panels III-442–III-446
aborts IV-160
as modeless dialog IV-158
background color III-443, V-640
control panel units III-444
ControlNameList function V-94
default control appearance V-147
default font V-149
drawing layers III-68
expansion factor III-443
floating III-443, V-687–V-688
from user function IV-158
list boxes V-488
list of V-1098, V-1100
making a new panel II-45
ModifyPanel operation V-640
names and titles II-45
NewPanel operation V-687
notebook subwindows III-91
PanelResolution function III-457
PauseForUser operation IV-156
points versus pixels III-444
preferences III-445
progress windows IV-156
recreation macros V-1101
resolution of III-443, III-456, V-732
screen dumps V-828
shortcuts III-446
Slider operation V-874
subwindows III-82
window names V-1048
wintype function V-1103
panning graphs II-286
examples I-35
fling mode II-286
paragraph properties
in notebooks III-7
parameter lists
in macros IV-119
in user functions IV-32
inline in user functions IV-33
optional IV-33, IV-60, V-733
parameters
bits
setting IV-12
complex IV-32
complex in user functions IV-112
curve fitting III-179
declaration
in macros IV-119
in user functions IV-32
double in user functions IV-112
expressions IV-12
for functions IV-10
for macros IV-10
in commands IV-2, IV-11–IV-21
inline in user functions IV-33
int in user functions IV-33
int64 in user functions IV-33
optional IV-33, IV-60, V-733
ParamIsDefault function V-733
pass-by-reference IV-58–IV-59
pass-by-value IV-58
saving for reuse IV-147
string IV-32
string substitution IV-18–IV-19
uint64 in user functions IV-33
waves in macros IV-121
parametric surface plot
data format II-452
ParamIsDefault function V-733
ParseFilePath function V-733
ParseOperationTemplate operation V-736
parsing
liberal names IV-168
particle analysis
images V-363
Parzen window function V-183, V-226, V-1097
pass-by-reference IV-58–IV-59
waves IV-60
pass-by-value IV-58
passwords
in URLs IV-267–IV-268
security IV-270
URLRequest operation V-1054
pasting
data in tables II-239
in page layouts II-482, II-493
in tables II-248
path plot
data format II-451
path plots
Gizmo II-454
Path Properties dialog
Gizmo II-455

Path Status dialog II-23
PathInfo operation V-737
PathList function V-738
paths
cross-platform path separators III-451
desktop V-895
documents V-895
extracting V-733
HDF5 II-221
HFS V-734
length limit under Windows III-451
manipulating V-733
Open operation V-717
packages V-895
ParseFilePath function V-733
path separators III-455
platform-related issues III-449
Posix V-734
preferences V-895
SpecialDirPath function V-895
temporary V-895
to functions V-287
to macros V-525
UNC V-734
UNC paths III-451
UniqueName function V-1048
UNIX V-734
Unix paths III-452
user files V-895
PATTERNPOP V-766
patterns III-498
Paul wavelet transform V-140
pause Igor
Sleep operation V-871
PauseForUser
control panel example IV-156
cursor example IV-152, IV-154
PauseForUser operation IV-152, V-738
alternative to IV-154
examples IV-152
PauseUpdate operation IV-123, V-739
PCA operation V-739
pcsr function V-741
PDFs
blurry images III-96, III-103
embedding fonts III-99
exporting graphics III-96, III-103
importing graphics III-510
missing PostScript fonts III-99
Symbol font III-493
peaks
detection
FindAPeak operation V-246
FindPeak operation III-290–III-292, V-247–V-248
Multi-peak Fit experiment III-290
Technical Notes III-290
EstimatePeakSizes operation V-203
fitting
MPFXEMGPeak function V-667
MPFXExpConvExpPeak function V-668
MPFXGaussPeak function V-669
MPFXLorentzianPeak function V-670
MPFXVoigtPeak function V-671
Pearson correlation coeffient III-222, III-233
pencil icon
in notebooks III-5
in procedure windows III-397
percent encoding IV-268
URLRequest operation V-1058
percent-encoding
URL function V-1053
URLDecode function V-1053
percentiles
smoothing III-296, V-878
performance testing IV-340, V-529
GetRTLocation V-313
GetRTLocInfo V-314
periodic functions
cos V-109
cot V-110
csc V-115
csch V-115
fresnelCos V-264
fresnelCS V-264
fresnelSin V-264
sawtooth V-831
sec V-832
sech V-832
sin V-871
sinc V-871
tan V-1023
periodograms III-279
calculation V-182
perspective projection
Gizmo II-423
phase III-274–III-275, V-1091
continuous III-316
unwrapping III-274, III-374, V-433
ImageUnwrapPhase operation V-433
Unwrap operation V-1050
PhotoShop files
exporting V-405
file info V-372
Pi function V-742
PICTInfo function V-742
PICTList function V-742
PICTs
DrawPICT operation V-176
exporting V-405
exporting file III-98, III-105, V-826
file info V-372

importing III-509–III-510
in page layouts II-496
LoadPICT operation V-506–V-508
saving V-826
HiRes V-826
PostScript V-826
picture formats III-449, III-509
picture gallery III-510
SavePICT operation V-827
Picture keyword V-743
pictures III-509–III-511
aligning in notebooks III-9
cross-platform
in notebooks III-458
deleting (killing) III-511
DrawPICT operation V-176
exporting tables II-271
finding in notebooks V-702
gray boxes III-450, III-510
Igor object pictures III-18
importing III-509–III-510
in annotations III-54
in independent modules IV-244
in notebooks III-13, III-18–III-19, V-699, V-702, V-705, V-709–V-710
in page layouts II-494, II-496
inserting in notebooks III-13, V-706
KillPICTs operation V-470
LoadPICT operation V-506–V-508
movies from IV-246
names III-509–III-510
CheckName function V-68
naming rules III-501
Notebook operation III-26
PICTInfo function V-742
PICTList function V-742
picture formats III-449, III-509
platform compatibility III-19
related functions V-12
renaming III-504, V-797
SavePICT operation V-826–V-827
saving from notebooks III-14, V-708
scaling in notebooks III-14
UniqueName function V-1048
unnamed III-511
updating Igor object pictures III-28
updating in notebooks III-28
Pictures dialog III-510
pie wedge objects
Gizmo II-447
pitfalls
constrained curvefitting III-231
PixelFromAxisVal function V-743
pixels
AxisValFromPixel function V-45
image plots II-386, II-388
in panels III-456
inverting V-422
logical screen dimensions III-455
matching V-422
PixelFromAxisVal function V-743
versus points in panels III-444
Place Picture III-510
plain text
external text editor II-56
plain text files
byte order marks III-471
Override Experiment III-467–III-468
text encoding conversion errors III-469
text encodings III-466
UTF-8 III-470
planes
extracting V-420, V-426
matching V-422
scaling V-425
summing V-427
summing all V-427
platform-related issues III-448–III-458
backslash in file paths III-451
procedures III-455
experiment files III-448
file compatibility III-448–III-449
file extensions III-448
file names III-450
file paths in procedures III-455
file system III-450
folder names III-450
Macintosh file type III-448
notebook pictures III-19
notebooks III-458
page setup compatibility III-450
path separators III-451
Paths III-449
picture compatibility III-449
pictures in notebooks III-458
PNG graphic format III-450
symbolic path III-449
text encodings III-453
transferring files III-448–III-449
UNC paths III-451
Unix paths III-452
window position III-455
Windows-specific III-448
PlayMovie operation IV-245, V-744
PlayMovie without QuickTime installed V-744
PlayMovieAction operation IV-246, V-745
PlaySnd operation IV-245, V-746
PlaySound operation IV-245, V-747
plot area in graphs II-279, III-40
affected by annotations III-41
plot pane
Data Browser II-116

plot relative drawing III-67
PNGs III-97
  Convert to PNG III-458
  converting to III-19, III-450
  creating III-458
  cross-platform compatibility III-450
  exporting III-450, V-405
  file info V-372
  HTML graphics III-23
  importing III-509, V-390
  in notebooks III-19
  loading II-157
  on Clipboard III-97–III-98
  PNG versus raw PNG II-157
  raw PNG files V-408
  resolution III-458
  saving V-826
pnt2x function V-748
point column in tables II-252
  hiding V-649
  multidimensional waves II-262
point number-to-x value conversion V-748
point numbers II-63
  BinarySearch function V-51
  BinarySearchInterp function V-51
  fractional point numbers II-78
  increment II-76
  indexing II-74, II-76
  p function V-731
  pnt2x function V-748
  relation to X values II-63
  x2pnt function V-1114
point scaling II-64
  setting V-854
Point structure IV-103, V-749
point3D filter V-372
PointF structure V-749
points
  versus pixels III-455
  versus pixels in panels III-444, III-456
points versus pixels
  NewPanel operation III-444
Poisson window function V-183, V-226, V-1097
poissonNoise function V-749
polar graph macros III-73
polar-to-rectangular conversion V-732
poles and zeros III-301
poly
  curve fitting function III-210
poly curve fit function
  1D V-127
  2D V-128
poly function V-749
poly_XOffset V-127
  curve fitting function III-210
poly2D
  curve fitting function III-212
Poly2D curve fit function
  example III-202
poly2D function V-749
PolygonArea function V-750
PolygonOp operation V-751
polygons
  area V-754
  BezierToPolygon operation V-50
  difference V-754
  even-odd rule III-72
  exclusive OR V-754
  fill rules III-72
  FindPointsInPoly operation V-248
  intersection V-754
  Minkowski difference V-754
  Minkowski sum V-754
  PointsInPoly V-754
  PolygonArea function V-750
  PolygonOp operation V-751
  union V-754
  Voronoi polygons V-384, V-387, V-899
  winding rule III-72
polynomials
  2D series function V-749
  chebyshev function V-63
  chebyshevU function V-64
  curve fitting III-210, III-265–III-267
    two-dimensional III-212, V-403
  FindRoots V-251
  FindRoots operation V-248
  hermite function V-345
  hermiteGauss function V-346
  laguerre function V-474–V-475
  LaguerreA function V-475
  legendreA function V-484
  roots of III-338
  series function V-749
  x offset III-210, V-127
  ZernikeR function V-1120
polyOpWaveX V-751–V-752
pop-up menu controls
  colors V-766
  fill patterns V-766
  line styles V-766
  marker styles V-766
  menu items III-427
  mode III-427
  programming III-426–III-428
  update problems V-94
  updating III-428
  using III-416
  value keyword III-427
pop-up menus
  CTabList function V-118
  DataBrowserObjectsPopup menu IV-138

example of creating IV-162
GraphPopup menu IV-138
in macro dialogs V-782–V-783
in simple input dialogs IV-145
independent modules IV-241
special characters IV-133–IV-136, IV-145
Windows IV-134–IV-135
TablePopup menu IV-138
TraceNameList function IV-145
WaveList function IV-145
WindowBrowserWindowsPopup menu IV-140
popup keyword V-755
in Prompt statements IV-145
PopupContextualMenu
example IV-162
popupcontextualmenu V-756
PopupContextualMenu operation V-756
PopupMenu operation III-426–III-428, V-761
value keyword III-427, V-763
PopupMenuControl subtype IV-205, V-763
keyword V-768
Porter-Duff
ImageComposite operation V-368
position
managing windows II-50
moving windows to preferred II-50
retrieving all windows II-50
retrieving windows II-50
window III-455
positional lights
Gizmo II-434
Posix paths V-734
PossiblyQuoteList function IV-169
PossiblyQuoteName function V-768
example IV-168
POST method IV-276
URLRequest operation V-1054, V-1058
poster-sized graphs II-323
PostScript
exporting
Macintosh OS X III-100
Windows OS III-106
exporting file III-98, III-105
fonts
embedding III-99, III-105
exporting
Macintosh OS X III-99–III-100
Windows OS III-105–III-106
language level III-97, III-103
power
curve fitting function III-211
power law curve fit V-128
power spectra III-279
power spectral density III-279
MultiTaperPSD operation V-672
pragmas IV-52
DefaultTab III-406
DefaultTab keyword V-150
hide III-402, IV-54
hide keyword V-346
IgorVersion keyword V-362
IndependentModule IV-55, IV-238
IndependentModule keyword V-437
ModuleName IV-54, IV-236
ModuleName keyword IV-54, V-658
pragma keyword V-17
rtFunctionErrors IV-55
rtGlobals IV-52, IV-65
rtGlobals keyword V-811
TextEncoding pragma IV-55
version IV-54
version keyword V-1068
pre-decrement operator IV-6, IV-43
pre-increment operator IV-6, IV-43
precedence
in conditional statements IV-41
of operators IV-6, IV-8
precomposed characters
Unicode V-693
predefined symbols IV-110
prediction bands
for curve fitting III-226
preferences III-516–III-517
auto-trace destination waves III-196
capturing III-516–III-517
category plots II-363–II-364
column styles II-272
command window II-12
contour plots II-380–II-381
Curve Fitting dialog III-201
dashed lines III-496
Data Browser II-119
directory III-516
graphs II-348–II-349, II-363, II-380, II-403
Igor Pro 8.ini file III-516
image plots II-403–II-404
in page layouts II-498
in procedure windows III-407
in procedures IV-203, V-768
load waves (example) II-172
notebooks III-30
packages IV-251–IV-255
loading IV-251, V-505
saving IV-251, V-825
in binary files IV-252
in experiments IV-254
path to folder V-895
Preferences operation IV-203, V-768
tables II-272
using III-516
vs style macros II-350–II-351
wave styles II-348

XY Plots II-348
Preferences operation IV-203, V-768
example IV-204
preserve arrangement
page layouts II-490
Prewitt compass gradient filters V-370
PrimeFactors operation V-769
principle component analysis V-739
Print operation V-769
structure elements V-770
Print Preview
for graphs II-323
printers
listing available V-775
printf operation IV-259–IV-261, V-770–V-773
conversion specifications IV-260, V-770–V-772
engineering units V-771
WaveMetrics extension V-771
PrintGraphs operation V-773–V-774
printing
Gizmo II-464
graphs II-323, II-348
notebooks III-20
page layouts II-478–II-479
poster-sized graphs II-323
PrintSettings operation V-775
procedure windows III-405
related operations V-6
selection from table II-271
settings V-775
structure elements V-770
tables II-271, V-779
to history area V-769–V-770
PrintLayout operation V-774
PrintNotebook operation V-775
example III-27
PrintSettings operation V-775
PrintTable operation V-779
private
static functions IV-105
problems II-4
Proc keyword IV-118, V-779
Proc Pictures IV-56–IV-58
creating IV-57
global IV-57, V-781
ProcGlobal keyword IV-57, V-781
using in commands IV-57
procedure declarations
End keyword V-194
EndMacro keyword V-195
Function keyword V-279, V-1005
Macro keyword V-523
Picture keyword V-743
Proc keyword V-779
Window keyword V-1097
procedure files III-396
adopting II-25, III-403
adopting all II-25
adopting programmatically V-23
autosave II-37
auxiliary III-396, III-398
converting to UTF-8 III-489
creating III-397–III-398
cross-platform issues III-454
DefaultTab keyword V-150
DefaultTab pragma III-406
easy access III-401
external text editor II-56
global III-396, III-399
hidden III-402
changes in Igor functionality III-403
creating III-402
hiding IV-54
Igor Pro User Files folder III-399–III-400
in experiments II-19, III-396, III-398, III-400, III-403
include statements III-400–III-401
inserting text III-403
invisible III-402
changes in Igor functionality III-403
creating III-402
lock icon III-397
locking III-397, V-642
opening III-398
packages III-401
ProcedureVersion function V-780
read-only III-397, V-642
references to II-24
rtGlobals automatic in new III-398
shared III-396, III-398, III-400
TextEncoding pragma IV-55
unlocking III-397
UTF-8 IV-56
version control IV-166
versions IV-54
write-protect V-643
procedure modules IV-236
procedure subtypes
ButtonControl keyword V-57
CameraWindow keyword V-58
CheckBoxControl keyword V-67
CursorStyle keyword V-124
FitFunc keyword V-255
GizmoPlot keyword V-323
Graph keyword V-325
GraphMarquee keyword V-325
GraphStyle keyword V-325
GridStyle keyword V-334
Layout keyword V-478
LayoutMarquee keyword V-480
LayoutStyle keyword V-483
ListBoxControl keyword V-498

Panel keyword V-732
PopupMenuControl keyword V-768
SetVariableControl keyword V-59, V-858
SliderControl keyword V-877
TabControl keyword V-1014
Table keyword V-1014
TableStyle keyword V-1015
procedure windows III-396–III-412
built-in III-396
CloseProc operation V-72
closing III-399
closing programmatically V-72
code marker comments III-408
color III-406
command line completion IV-3
default tabs III-405
executing commands from III-4
experiment recreation macros II-26
finding text III-404
fonts III-406
footers III-405
Go Back and Go Forward II-52
headers III-405
hiding III-399, V-642
HideProcedures operation V-347
include statements IV-166
indentation III-405
independent modules IV-239
initialization commands II-27
killing III-399
magnification II-53
making a new procedure window II-45
ModifyProcedure operation V-642
names and titles II-45
new window (example) I-59
OpenProc operation V-724
preferences III-407
printing III-405
procedures navigation bar III-397
ProcedureVersion function V-780
replacing text III-405
rtGlobals statements IV-65
showing III-398
DisplayProcedure operation V-163
syntax coloring III-407
templates III-397
text sizes III-406
text styles III-406
write-protect icon III-397
zooming II-53
procedures
aborting IV-49, IV-51, IV-112, V-18–V-19, V-1047
auto-compiling III-404, IV-26
bitwise and logical operators IV-41
case statements IV-43
Constant keyword V-85
Strconstant keyword V-996
comparisons IV-41
compiling III-397, IV-26
creating III-397
cross-platform issues
file extensions III-455
file types III-455
debugger IV-212–IV-227
debugging
using print statements IV-212
enabling preferences IV-203
experiment initialization commands IV-204
experiment recreation II-26
file path separators III-455
finding III-397, III-404
global IV-25
Igor Procedures IV-25
include statements IV-166
indentation IV-26
IndependentModule keyword V-437
local variable declaration IV-34
logical operators IV-7
loops IV-45
MacroList function V-524
menu definitions IV-126–IV-141, V-54
ModuleName keyword IV-54, V-658
modules IV-236
names IV-31
operation queue IV-278
organizing IV-24–IV-25
overview I-5
parameter declarations IV-32
parameter lists IV-32
parameters IV-10
pause for user IV-152
PauseForUser operation V-738
ProcedureText function V-779
ProcedureVersion function V-780
processing lists of waves IV-198–IV-201
programming with liberal names
IV-168–IV-169
retrieve code
ProcedureText function V-779
saving parameters for reuse IV-147
scanning IV-26
subtypes IV-32, IV-204–IV-205
switch statements IV-43
Constant keyword V-85
Strconstant keyword V-996
User Procedures IV-25
using cursors IV-163
using marquee menus IV-163
using polygons for input IV-164
utility procedures IV-25
WaveMetrics Procedures IV-25
writing utility procedures IV-167

procedures navigation bar III-397
ProcedureText function V-779
ProcedureVersion function V-780
ProcGlobal keyword IV-57, IV-244–IV-245, V-781
  independent modules IV-238
  pop-up menus IV-242
  regular modules IV-236
profiling IV-340
  GetRTLocation V-313
  GetRTLocInfo V-314
ProgAxes drawing layer III-68
ProgBack drawing layer III-68
  in page layouts II-479–II-480
ProgFront drawing layer III-68–III-69
  in page layouts II-479–II-480
program name
  under Windows III-448
programming
  analysis procedures III-170–III-175
  annotations III-52
  AppleScript execution V-205
  closing files IV-195
  commands IV-2–IV-21
  conditional compilation IV-108
  controls III-419–III-442
  debugging IV-212–IV-227
  displaying help topics V-163
  drawing tools III-73–III-77
  examples III-171–III-175
  Execute operation V-204
  Execute/P operation V-204
  ExecuteScriptText operation V-205
  files IV-194
  finding files IV-195
  functions
    user-defined IV-30–IV-114
  generating notebook commands III-29
  GetRTStackInfo function V-314
  interaction IV-144–IV-164
  keywords
    #define V-16
    #if-#elif-#endif V-16
    #if-#endif V-16
    #ifdef-#endif V-17
    #ifndef-#endif V-17
    #include V-17
    #pragma V-17
    #undefine V-18
    Constant V-85
    DefaultTab V-150
    DoPrompt V-167
    hide V-346
    IgorVersion V-362
    IndependentModule V-437
    Menu V-589
    ModuleName IV-54, V-658
    Override V-731
    popup V-755
    ProcGlobal V-781
    Prompt V-782
    root V-810
    rtGlobals V-811
    Static V-906
    Strconstant V-996
    Submenu V-1006
    TextEncoding V-1027
    version V-1068
  loading files in folder (example) II-175
  loading waves II-170
    examples II-171, II-173
  macros IV-116–IV-124
  menus IV-126–IV-141
  notebooks III-25–III-30
    examples III-26
  opening files IV-195
  overview I-8, IV-24–IV-27
  predefined symbols IV-110
  related functions V-11
  related operations V-5
  retrieving text from notebooks III-28
  runtime stack information V-314
  SetIgorOption operation V-851
  syntax coloring III-407
  techniques IV-166–IV-209
  text encodings III-480
  Unicode III-480
  updating in notebooks III-28
  user interaction IV-144–IV-164
  user-defined functions IV-30–IV-114
  UTF-8 III-480
  waves as parameters III-170
  writing to text files IV-196
progress windows IV-156
Project operation V-781
projections
  Gizmo II-422
  Project operation V-781
Prompt statements V-782–V-783
  help for IV-148
  in macros IV-121
  in user functions IV-144
  location of IV-147
  pop-up menus IV-145
proportional weighting
  curve fitting III-199
prototype functions IV-107
Provide Wave Names II-133, II-140
proxy servers IV-276
  URLRequest operation V-1056
Pseudo-Coifman wavelet transform V-189
pseudorandom numbers
  LinearFeedbackShiftRegister operation V-485

pseudorandom sequences
LinearFeedbackShiftRegister operation V-485
public functions IV-236, IV-244
independent modules IV-238
regular modules IV-236
pulse measurements
EdgeStats operation III-289
EstimatePeakSizes operation V-203
FindLevel operation V-242–V-244
FindLevels operation V-244–V-245
FindPeak operation V-247–V-248
PulseStats operation III-290
pulse statistics
EdgeStats operation V-190
PulseStats operation V-783
PulseStats operation V-783–V-785
NaN results V-784
PUT method
URLRequest operation V-1054
PutScrapText operation V-785

Q

q function V-785
in multidimensional waves II-92–II-93, II-96
qcsr function V-785
Qt
graphics technology III-506
SVG III-507
quad objects
Gizmo II-438
quadric objects
Gizmo II-467
qualified names IV-237
independent modules IV-238–IV-239
triple names IV-242–IV-243
quartiles
box plots II-331
Quartz
font embedding III-99
graphics technology III-507
quaternion
Gizmo II-427
multiplication II-427
quaternions
convert to rotation matrix V-573
in MatrixOp III-146, V-573
spherical linear interpolation V-573
queues
multitasking IV-330
quick append II-348
QuickTime IV-245
file info V-372
QuickTime files
exporting V-405
QuickTime movies
NewMovie operation V-683
related operations V-6
quit Igor hook function IV-292
Quit operation V-786
Quit Scan button IV-122
quotation marks
for liberal names III-501
in delimited text files II-135
saving text waves II-180
quoted strings
in delimited text files II-132, II-135

R

r function V-786
in multidimensional waves II-92–II-93, II-96
r-squared III-221
r2polar function V-786
example II-81
radio button controls
programming III-424
using III-416
random functions
gnoise V-323
LinearFeedbackShiftRegister operation V-485
Mersenne Twister V-323, V-853
SetRandomSeed operation V-853
random numbers
enoise V-195
Range-Based For Loop V-259
range-based for loops V-259
in user functions IV-47
ranges of interest
curve fitting to III-197
example III-197
in Duplicate Waves dialog II-70
using cursors in graphs II-320
ratio of integers V-786
RatioFromNumber operation V-786
raw PNG II-157
read-only
ModifyProcedure operation V-642
notebooks III-10
readme
data folder notes II-120
ReadVariables operation V-788
real
columns in tables II-241
suffix in tables II-241
real component function V-788
real function V-788
example II-81
real number type II-66
Recent Colors III-497
Recent Windows submenu II-46
recreating

graphs II-350
page layouts II-477
tables II-241
recreation macros II-47–II-48, II-350, V-1101
deleting II-48
DoWindow operation V-168
Gizmo II-471
notebook subwindows III-91
Rect structure IV-103, V-787
rectangular-to-polar conversion V-786
RectF structure V-787
rectification
images V-384
Redefine Ruler from Selection III-12
redefining
rulers III-12
Redimension operation II-72, II-98, V-788
Redimension Waves dialog II-72
from tables II-267, II-269
redirects
URLRequest operation V-1055
reduced major axis curve fitting III-237
references
convolution V-103
curve fitting III-267, V-134
HDF5 II-208
to files and folders II-24
to global procedure files III-400
to Igor binary wave files II-24, II-155–II-156
why it's bad II-156
to notebooks III-3
to procedure files III-398, III-400
reflection
Gizmo II-432
region of interest III-378
creating V-374
creating ROI wave III-378
example V-375
masking V-367
objects V-374
statistics V-414
regular expressions IV-176–IV-194
alternation IV-183
assertions IV-190–IV-192
lookahead IV-190
lookbehind IV-191
multiple IV-191
atomic grouping IV-188
back references IV-189
backslashes IV-179–IV-181
generic character types IV-181
nonprinting characters IV-179
simple assertions IV-181
brackets IV-182
character classes IV-178, IV-182
characters
circumflex IV-181
dollar IV-181
dot IV-182
newline IV-184
period IV-182
vertical bar IV-183
circumflex character IV-181
comments IV-193
dollar character IV-181
dot character IV-182
full stop IV-182
greedy IV-187
Grep operation IV-176, V-327
GrepList function V-333
GrepList operation IV-176
GrepString function IV-177, V-334
LoadData operation V-503
match option settings IV-184
metacharacters IV-178
newline IV-184
period character IV-182
posessive qualifiers IV-188
POSIX character classes IV-183
quantifiers IV-186
recursive patterns IV-193
references IV-194
repetition IV-186
SplitString function V-900
SplitString operation IV-177
subpatterns IV-186
conditional IV-192
named IV-186
subroutines IV-194
vertical bar character IV-183
regular modules IV-236
control action procedures IV-237
hook functions IV-237
ProcGlobal keyword IV-236
ProcGlobal keywords IV-244
public functions IV-236
qualified names IV-237
user-defined menus IV-238
within independent modules IV-242
RELOAD CHANGED PROCS IV-280
remainder function V-592
Remez Exchange III-311
Remez operation V-789
Remove Columns dialog II-242
Remove from Graph dialog II-283
Remove Objects dialog II-486
Remove operation V-790
Remove Ruler dialog III-12
RemoveByKey function V-790
RemoveContour operation V-791
RemoveEnding function V-792
RemoveFromGizmo operation V-792

RemoveFromGraph operation V-792
RemoveFromLayout operation V-793
RemoveFromList function V-793
RemoveFromTable operation V-794
RemoveImage operation V-794
RemoveLayoutObjects operation V-795
RemoveListItem function V-795
RemoveNaNsXY function III-113
RemoveOutliers function III-171
RemovePath operation V-796
Rename Objects dialog II-72, III-504
Rename operation V-796
    renaming waves II-72
RenameDataFolder operation V-796
RenamePath operation V-797
RenamePICT operation V-797
RenameWindow operation V-797
renaming
    waves in tables II-234, II-239
    with Data Browser II-115
ReorderImages operation V-797
reordering traces II-297
ReorderTraces operation V-798
repeat end effect method III-299
repeating sliders III-418, V-875, V-877
Replace Text dialog III-24
replace-paste II-248
ReplaceNumberByKey function V-799
ReplaceString function V-799
ReplaceStringByKey function V-800
ReplaceText operation V-801
ReplaceWave operation V-801
    examples II-114, II-284
replacing
    in notebooks III-24
    in tables II-251
    replace text shortcut III-24
    table values II-251
    text in multiple windows II-55
    text in procedure windows III-405
    text using find bar II-54
    traces in graph II-114
ReplicateString function V-802
Resample operation V-803–V-808
reserved characters
    in URLs IV-268
residuals in curve fitting III-184, III-217
resolution
    of panels III-456
    screen III-507
restoring
    images V-404
ResumeUpdate operation IV-123, V-809
Retina
    graphics technology III-507
Retina displays III-507
Retry button IV-122
Return key
    in tables II-243
return keyword V-809
return statements
    in macros IV-120
    in user functions IV-35
    multiple return statements IV-36
Reverse operation V-809
reverting
    experiments II-20
RGB conversions
    cmap2rgb V-418
    CMYK2RGB V-418
    hsl2rgb V-421
    rgb2gray V-424
    rgb2hsl V-424
    rgb2i123 V-424
    rgb2xyz V-424
    xyz2rgb V-428
RGB images
    exporting V-408
    TIFF files II-158
RGB waves II-400–II-401
    color tables II-400
RGBA
    in Gizmo II-428
RGBA images
    exporting V-408
    TIFF files II-158
RGBA values IV-13
RGBA waves II-400–II-401
    color tables II-400
RGBAColor structure V-810
RGBColor structure IV-103, V-810
ribbon plot
    data format II-451
ribbon plots
    Gizmo II-462
Richardson-Lucy deconvolution V-404
Riemann window function V-183, V-227, V-1097
Riemann zeta function V-1120
right-shift operator IV-6, IV-43
rightx function V-810
risetime measurements III-289–III-290
RMA curve fitting III-237
Robert's row and column edge detector V-370
Romberg integration V-448
root keyword V-810
roots
    finding III-338–III-343
    FindRoots operation V-248
    of nonlinear 1D functions III-339
    of nonlinear 2D functions III-341, III-343
    of polynomials III-338
    references III-349

Rotate dialog III-316
Rotate operation III-316, V-810
X scaling change III-316
Rotate to Match II-416
rotated text III-63
rotating
annotations III-40
drawn objects III-63
rotation
Gizmo II-416, II-424
arrow keys II-424
mouse wheel II-424
rotation matrices
convert from quaternion V-573
rotation tool
Gizmo II-415
round function V-811
rounding
integer wave calculations IV-9
rounding functions V-7
abs V-19
cabs V-58
ceil V-59
floor V-255
mod V-592
round V-811
sign V-870
trunc V-1047
roundoff error IV-8
and equality operator IV-8
row column in tables
hiding V-649
row indices
in tables II-261
row labels
in delimited text files II-134
row major
HDF5 II-204
row numbers
p function V-731
row position waves
in delimited text files II-134
row-major order II-99, V-294
rows
extracting V-420
flipping V-420
in multidimensional waves II-92, II-95
in waveform data II-62
maximum location V-1084
minimum location V-1084
relation to X values II-63
summing all V-427
RRect radius drawing setting III-64
RTF
margins III-6
notebooks III-20
opening notebooks III-21
saving notebooks III-21
rtFunctionErrors pragma IV-55
rtGlobals IV-52, IV-65
automatic in new procedure files III-398, IV-65
converting to rtGlobals=1 IV-114
pragma keyword V-811
rtGlobals=0 IV-114
rtGlobals=1 IV-65–IV-67
strict wave reference mode IV-75
rug plot II-336, II-340
rug plots II-340
rulers
creating derived rulers III-12
creating new rulers III-11
finding where used III-12
fonts in notebooks III-7, III-12
HTMLCode III-23
in notebooks III-5, III-7, III-11–III-12
names III-11
naming rules III-501
redefining III-12
removing III-12
Ruler pop-up menu III-11
text color in notebooks III-7, III-12
text sizes in notebooks III-7, III-12
text styles in notebooks III-7, III-12
transferring III-12
Run Autosave Now II-39
Runge–Kutta–Fehlberg method V-454
runtime lookup of globals IV-65–IV-67
converting from direct reference IV-114
example IV-69
failures IV-67
runtime stack
information about V-314
runtime vs compile time IV-64
runtime wave type checking IV-53

S

s function V-811
in multidimensional waves II-92–II-93, II-96
S_ variables
in macros IV-123
in user functions IV-61
S_aliasPath V-301
S_BrowserList II-120
S_columnName V-307
S_columnWidths V-91
S_creator V-302
S_CursorAInfo IV-340
S_CursorBInfo IV-340
S_dataFolder V-91, V-316
S_Filename V-268

S_fileName IV-149, V-105–V-106, V-112, V-265, V-294, V-394, V-464, V-515, V-592, V-660, V-662, V-706, V-709, V-718, V-891, V-1057, V-1117
  loading waves (example) II-171
  LoadWave operation II-170
  Open operation V-718, V-720
S_fileType V-302
S_fileVersion V-302
S_firstColumnPath V-307
S_font V-588
S_graphName V-307
S_headers V-1057
S_Info III-234
S_info V-119, V-229, V-265, V-394, V-507, V-517–V-518, V-747, V-850, V-891
S_marqueeWin V-310
S_Name V-844
S_name V-150, V-154, V-162, V-193, V-312, V-681, V-683, V-688, V-692, V-702, V-706, V-709
S_outputFullPath V-1052
S_path V-105–V-106, V-112, V-155–V-156, V-265, V-294, V-301, V-394, V-464, V-515, V-592, V-660, V-662, V-737, V-818, V-847, V-891, V-1117
  LoadWave operation II-170
S_pictureInfo V-722
S_recreation V-90, V-172
S_selection V-316, V-757–V-759
S_serverResponse V-1057
S_SoundInName V-889
S_tableName V-307
S_title V-90
S_traceName V-307
S_TraceOffsetInfo V-625
S_UserData V-90
S_Value V-208–V-209, V-827
S_value V-45, V-89, V-91, V-93, V-166, V-307, V-319–V-321, V-328–V-329, V-766, V-776, V-900, V-1117
S_waveNames V-294, V-394, V-464, V-515, V-592, V-891, V-902, V-1117
  loading waves (example) II-171
  LoadWave operation II-170
S_worksheetName V-1117
S_xWave V-326
S_yWave V-326
same aspect
  printing graphs II-323
Save and then kill button III-4
save as template II-21
Save Delimited Text dialog II-178, II-180
Save EPS File dialog III-98, III-105
  for page layouts II-498
Save Experiment dialog II-18
Save File dialog IV-151, V-718
Save Graphics
  pictures in notebooks III-14
Save operation V-812
Save PICT File dialog III-98, III-105
  for page layouts II-498
save save II-29
Save Waves submenu II-177
SaveData operation V-815
SaveExperiment operation V-819
  compression II-214
SaveGizmoCopy operation V-821
SaveGraphCopy operation V-821
SaveNotebook operation V-823
  text encodings V-823
SavePackagePreferences operation V-825
SavePICT operation V-826
  PictGallery V-827
  Gizmo II-465
SaveTableCopy operation V-829
saving
  pictures from notebooks V-708
saving data
  SaveData operation V-815
saving experiments II-16–II-19, II-29
  errors II-30
  SaveExperiment operation V-819
  Spotlight II-30
saving graphs
  save graph copy II-323
  SaveGraphCopy operation V-821
  with waves II-323, V-821
saving notebooks
  as HTML III-21
  as RTF III-21
  SaveNotebook operation V-823
saving pictures
  from notebooks III-14
saving tables
  save table copy II-270
  SaveTableCopy operation V-829
saving waves II-177–II-181
  64-bit capable wave record II-35
  appending II-179
  archiving V-815
  as image files II-180
  BigWaveLoadMode II-35
  carriage return II-180
  column labels II-178
  delimited text files II-178
  escape characters II-180
  FBinWrite operation V-220
  from Data Browser II-117
  general text files II-179
  graphics V-405
  Igor binary wave files II-179
  Igor Text files II-179

images V-405
ImageSave operation V-405
linefeed II-180
MaxBytesReadingWave II-35
multidimensional waves II-181, V-814
numeric precision II-179
quotation marks II-180
row labels II-178
Save operation V-812
SaveData operation V-815
saving huge waves II-35
table formatting V-813
tabs II-180
text encodings II-181
text waves II-180
use table formatting II-179
UseNewDiskHeaderBytes II-35
UseNewDiskHeaderCompress II-35
wfprintf operation V-1093
with Gizmo plot V-821
with graphs II-323, V-821
Savitzky-Golay smoothing III-294, V-878
sawtooth function V-831
ScaleOffset
HDF5 compression II-213
ScaleToIndex function V-832
scaling pictures
in notebooks III-14
in page layouts II-481
with drawing tools III-63
scanning
procedures IV-26
Scatter Properties dialog
Gizmo II-456
schemes
in URLs IV-267
URLRequest operation V-1054
scientific notation
axis labels II-319
prevention in graph labels II-319
tick mark labels II-308
forcing II-311
scientific numeric format
in tables II-255
screen
dimensions, platform-related III-455
resolution III-507
resolution of panels III-456
screen dumps V-828
screen preview
for EPS III-97, III-103
ScreenResolution function V-832
scripts
calling Igor from IV-265
scrolling graphs (examples) I-35
scrolling mode
in control panels V-319, V-866
in graphs V-319, V-321, V-866
Search Backwards III-24
Search Selected Text Only III-24, III-405
searching
Igor files II-3
sec function V-832
sech function V-832
Secs2Date function V-833
Secs2Time function V-833
Secure Socket Layer IV-276
security
for passwords IV-270
Select All
in Modify Columns dialog II-253
in tables II-243
Select Control III-419
Select Current Folder button II-28
selected pages
in page layouts II-478
selecting
cells in tables II-243, V-315
controls III-419–III-420
drawing objects III-63
multiple controls III-420
objects in page layouts V-315
Select All in tables II-243
text in notebooks V-315
SelectNumber function V-834
SelectString function V-834
Send to Back II-481
serial number
IgorInfo function V-360
serial port
data acquisition IV-312
series III-109
SumSeries operation V-1008
Set as f(z) dialog II-298
Set Text Format dialog III-8
Set Variable controls
programming III-428–III-429
SetActiveSubwindow operation V-835
SetAxis operation V-835
SetBackground operation IV-233, IV-323, V-836
SetDashPattern operation V-837
SetDataFolder operation V-837
SetDimLabel operation V-838
SetDrawEnv operation III-74, V-838–V-843
grouping with gstart and gstop III-74
save III-74
SetDrawLayer operation III-74, V-844
SetEnvironmentVariable function V-844
SetFileFolderInfo operation V-845
SetFormula operation IV-233–IV-234, V-847
SetIdlePeriod operation V-848
SetIgorHook operation V-848

SetIgorMenuMode operation V-851
SetIgorOption operation V-851
enable debugger for independent modules IV-239
PanelResolution keyword III-456
Procedure Window submenu IV-239
syntax coloring III-407
SetMarquee operation V-852
SetProcessSleep operation V-852
SetRandomSeed operation V-853
SetScale operation V-853–V-854
dates V-854
setting X scaling II-63
SetVariable operation III-428–III-429, V-854–V-1064
example IV-159
formatted text III-53
SetVariableControl subtype IV-205, V-858
keyword V-59, V-858
SetWaveLock operation V-858
SetWaveTextEncoding operation III-477, V-859
SetWindow operation V-865
SGI files
exporting V-405
file info V-372
SHA-1 hash algorithm V-1073
SHA-224 hash algorithm V-338, V-1073
SHA-256 hash algorithm V-338, V-1073
SHA-384 hash algorithm V-338, V-1073
SHA-512 hash algorithm V-338, V-1073
shading
Gizmo II-433
Shapiro-Wilk test V-976
shared procedure files III-396, III-400
Igor Pro User Files folder III-400
shared text files II-56
shared waves II-87
Shen–Castan edge detector V-370
Shift JIS text encoding III-460–III-461, III-481
backslash characters III-484
history area III-470
Shift-Escape
aborting procedures IV-51
shininess
Gizmo II-429, II-432, II-472
shoelace algorithm V-750
short date
in notebooks III-13
short-time Fourier Transform V-994
shortcuts
axes II-353–II-354
command window II-13
contour plots II-382–II-383
controls III-446
CreateAliasShortcut operation V-111
creating V-111
data browser II-122
debugger IV-226
drawing tools III-78
graphs II-353–II-354, II-383, II-404, III-446
help II-5
Igor Tips II-5
image plots II-404
page layouts II-499
panels III-446
procedure windows III-411
templates II-5, III-397
traces II-353–II-354
windows II-60
Show Axis Cue II-415
Show Default Text Encoding III-465
show events
window hooks IV-304
Show Experiment Info III-465
Show Info II-319
Show Multivariate Functions
in Curve Fitting dialog III-201
Show Tools III-62
ShowIgorMenus operation V-869
ShowInfo operation V-869
showing
notebooks III-4
procedure windows III-398
DisplayProcedure operation V-163
ShowTools operation V-870
shrinking graphs II-286
shuffle
HDF5 compression II-213
sigmoid
curve fitting function III-211
sigmoid curve fit V-128
sign function V-870
sign of a wave V-1091
signal processing III-270–III-292
continuous wavelet transform III-282, V-137
convolution III-284
Convolve operation V-101
correlation III-286
CWT operation V-137
decimating III-136, V-803
discrete wavelet transform III-283, V-189
down-sampling V-803
DPSS operation V-171, V-672
DSP support procedures III-274
DSPDetrend operation V-182
DSPPeriodogram operation V-182
DWT operation V-189
FFT III-270
FFT operation V-222
FilterFIR operation V-230–V-233
FilterIIR operation V-234–V-239
Hanning operation V-337
Hanning window III-277

Hilbert transform III-280
HilbertTransform operation V-348
IFFT operation V-357
IIR filters V-234–V-239
coefficients, designing V-238
ImageWindow operation V-435
InstantFrequency operation V-443
interpolating V-803
LombPeriodogram operation V-521
lowpass filtering V-803
magnitude III-274
operations V-4
periodograms III-279, V-182, V-521
phase III-274
power spectra III-279
Resample operation V-803–V-808
Rotate operation V-810
SmoothCustom operation V-883
STFT operation V-994
time frequency analysis III-280
trend removal V-182
Unwrap operation V-1050
up-sampling V-803
Wigner transform III-281
WignerTransform operation V-1095
windowing III-275, V-182
significant digits
in tables II-255
Silent operation IV-122, V-871
compatibility mode V-871
obsolete for comments IV-113
simple input dialog IV-144
Help button IV-145
help for IV-148
pop-up menus IV-145
saving parameters for reuse IV-147
simulated annealing V-725, V-729
simultaneous equations III-161
sin
curve fitting function III-209
sin (sine) curve fit V-127
sin function V-871
sin of a wave V-1091
sinc function V-871
single precision V-788
single-precision floating point II-66
single-stepping in debugger IV-216
singular value decomposition III-179, III-265, V-584
MatrixInverse operation V-541
singularities in curve fitting III-265
sinh function V-871
size
expanding windows to full II-50
managing windows II-50
moving windows to preferred II-50
skeleton
ImageSkeleton3D operation V-413
skewness of wave V-1084
2D V-415
Skip this block button II-140
Skip this Path button II-29
Skip this Wave button II-27
skipping lines
in delimited text files II-136
in general text files II-141
Sleep operation V-871
slices
in tables II-262
Slider controls III-418, III-429
action procedures III-430
event handling III-430
Slider operation V-874
Slider operation V-874
SliderControl subtype IV-205
keyword V-877
sliders
repeating III-418, V-875, V-877
slideshows
page layouts V-481
sliding average V-878
Slow operation IV-122, V-877
Smooth operation V-878–V-882
SmoothCustom operation III-298, V-883
smoothing III-292–III-299
binomial III-294, V-878
box III-295, V-53, V-878
BoxSmooth operation V-53
convolution III-298
custom coefficients III-298, V-230, V-234
cutoff frequency V-879
end effects III-299
FilterFIR operation V-230–V-233
FilterIIR operation V-234–V-239
gaussian III-294, V-878
half power point V-879
in image plots V-637
Least Squares Polynomial III-294, V-878
locally-weighted regression V-515
loess III-297
Loess operation V-515
LOWESS III-297, V-515
median III-114, III-296
nonparametric regression V-515
Nyquist frequency V-879
percentile III-296
percentiles V-878
polynomial V-878
Savitzky-Golay III-294, V-878
Smooth operation V-878–V-882
SmoothCustom operation V-883
WavesAverage user-defined function III-173
smoothing spline interpolation III-115

algorithm III-118
parameters III-119
snapshots V-828
Sobel edge detector V-370
Sort operation III-132, V-883
SortColumns operation V-884
sorting III-132–III-135
description of III-133
file lists V-441
guided tour (example) I-48
index sort III-134–III-135
index wave applications III-134
IndexSort example III-135
IndexSort operation III-134–III-135, V-442
MakeIndex example III-135
MakeIndex operation III-134–III-135, V-527
many waves III-134
multiple keys III-133
Reverse operation V-809
simplest case III-133
Sort operation III-132, V-883
SortColumns operation V-884
SortList function V-886
text III-133
case-sensitive III-133
example III-133
unsorting III-134
XY data III-133
SortList function V-886
sorting file lists V-441
sound
WAVE files V-892
SoundInRecord operation V-887
SoundInSet operation V-887
SoundInStartChart operation V-888
SoundInStatus operation V-888
SoundInStopChart operation V-889
SoundLoadWave operation V-890
sounds
AddMovieAudio operation V-21
AIFF files V-892
Beep operation V-46
input IV-245
NewMovie operation V-683
output IV-245
PlaySnd operation V-746
PlaySound operation V-747
recording from microphone IV-312
related operations V-6
SoundInRecord operation V-887
SoundInSet operation V-887
SoundInStartChart operation V-888
SoundInStatus operation V-888
SoundInStopChart operation V-889
SoundLoadWave operation V-890
SoundSaveWave operation II-180, V-892
SoundSaveWave operation II-180, V-892
source waves
in wave assignment II-74
subranges of II-76
spaces
as delimiters II-136
in delimited text files II-136
in fixed field text files II-136–II-137
in general text files II-138
in text data columns II-134
spacing
in notebooks III-7–III-8
sparse data
converting to matrix II-367
sparse matrices III-151–III-162
ADD operation III-157
COO format III-152
CSC format III-153
CSR format III-152
example III-153
format conversion III-159–III-160
formats III-151
ImageFromXYZ operation V-373
index data type III-156
inputs III-155
list of operations III-154
MatrixSparse operation V-580
MM operation III-157
multiplication III-157–III-158
MV operation III-158
operation data type III-155
operations III-156
simultaneous equations III-161
SMSM operation III-158
TOCOO operation III-159
TOCSC operation III-159
TOCSR operation III-160
TODENSE operation III-160
transformations III-156
TRSV operation III-161
spatial frequency filtering III-360
special characters
in notebooks III-13, V-709–V-710
in tables II-261
special folders II-30
special functions V-8
airyA V-24
airyAD V-24
airyB V-25
airyBD V-25
besseli V-46
besselj V-46
besselk V-47
bessely V-47
bessI V-47
beta V-49

betai V-49
binomial V-52
binomialln V-52
binomialNoise V-52
chebyshev V-63
chebyshevU V-64
Ci V-109
dawson V-145
digamma V-159
ei V-194
EllipticE V-194
EllipticK V-194
erf V-197
erfc V-198
erfcw V-198
expInt V-212
expnoise V-213
factorial V-214
fresnelCos V-264
fresnelCS V-264
fresnelSin V-264
gamma V-288
gammaEuler V-288
gammaNoise V-289
gammInc V-288
gammln V-289
gammp V-289
gammq V-290
hermite V-345
hermiteGauss V-346
hyperG0F1 V-353
hyperG1F1 V-353
hyperG2F1 V-354
hyperGNoise V-354
hyperGPFQ V-354
inverseErf V-463
inverseErfc V-463
JacobiCn V-465
JacobiSn V-465
laguerre V-474–V-475
LaguerreA V-475
LambertW V-475
legendreA V-484
logNormalNoise V-521, V-523
poissonNoise V-749
sphericalBessJ V-897
sphericalBessJD V-897
sphericalBessY V-897
sphericalBessYD V-898
sphericalHarmonics V-898
sqrt function V-902
StatsVonMisesNoise V-987
wnoise V-1113
ZernikeR V-1120
special numbers
e V-190
Inf V-442
NaN V-676
Pi V-742
Special submenu III-14
SpecialCharacterInfo function V-893
SpecialCharacterList function V-895
SpecialDirPath function V-895
Specify Color
Gizmo II-419
spectral leakage
in FFTs III-277
specular light
Gizmo II-432
sphere objects
Gizmo II-440
spherical interpolation V-899
spherical linear interpolation V-573
sphericalBessJ function V-897
sphericalBessJD function V-897
sphericalBessY function V-897
sphericalBessYD function V-898
sphericalHarmonics function V-898
SphericalInterpolate operation V-899
SphericalTriangulate operation V-899
splines wavelet transform V-189
SplitAxis Dialog II-347
SplitString operation IV-177, V-900
splitting
waves V-901
splitting up waves II-70
SplitWave operation V-901
Spotlight II-30
spreadsheets
compared to tables II-234
sprintf operation IV-259–IV-261, V-902
conversion specifications IV-260
SQL II-181
sqrt function V-902
sqrt of a wave V-1091
square root V-902, V-1091
sscanf operation V-902
SSL IV-276
stack in debugger IV-216
Stack operation V-905
stacking
graphs in page layouts II-490
in page layouts II-482, II-487, V-905
windows II-50, V-905
StackWindows operation V-905
standard deviation
for a point in curve fitting III-179, III-199
of a wave V-415, V-1077, V-1084
of an image V-415
of parameters in curve fitting III-222
standard error of mean V-1084
StartMSTimer function V-906

static
constants IV-51
functions V-906
user functions
ModuleName pragma IV-54
static functions IV-105, IV-236, IV-244
independent modules IV-238–IV-239, IV-243
regular modules IV-236
Static keyword V-906
user functions IV-51, IV-105, IV-244
stationery
experiment files II-21
notebook files III-30
statistics III-384–III-394
classification V-472
clustering V-472
complementary error function V-198
complex III-124
confidence intervals V-1006
curve fitting III-222–III-227, V-1006
error function V-197, V-463
functions V-10
binomialln V-52
binomialNoise V-52
enoise V-195
erf V-197
erfc V-198
erfcw V-198
expnoise V-213
faverage V-218
faverageXY V-218
gamma V-288
gammaNoise V-289
gammInc V-288
gammln V-289
gammp V-289
gammq V-290
GeometricMean V-295
gnoise V-323
hyperGNoise V-354
inverseErf V-463
inverseErfc V-463
logNormalNoise V-521, V-523
max V-586
mean V-586
median V-586
min V-589
norm V-692
poissonNoise V-749
StatsBetaCDF V-911
StatsBetaPDF V-911
StatsBinomialCDF V-912
StatsBinomialPDF V-912
StatsCauchyCDF V-912
StatsCauchyPDF V-913
StatsChiCDF V-913
StatsChiPDF V-913
StatsCMSSDCDF V-922
StatsCorrelation V-925
StatsDExpCDF V-926
StatsDExpPdf V-926
StatsErlangCDF V-928
StatsErlangPDF V-928
StatsErrorPDF V-928
StatsEValueCDF V-929
StatsEValuePDF V-929
StatsExpCDF V-929
StatsExpPDF V-929
StatsFCDF V-930
StatsFPDF V-930
StatsFriedmanCDF V-930
StatsGammaCDF V-932
StatsGammaPDF V-933
StatsGeometricCDF V-933
StatsGeometricPDF V-933
StatsGEVCDF V-934
StatsGEVPDF V-934
StatsHyperGCDF V-935
StatsHyperGPDF V-935
StatsInvBetaCDF V-936
StatsInvBinomialCDF V-936
StatsInvCauchyCDF V-936
StatsInvChiCDF V-936
StatsInvCMSSDCDF V-937
StatsInvDExpCdf V-937
StatsInvEValueCDF V-937
StatsInvExpCDF V-938
StatsInvFCDF V-938
StatsInvFriedmanCDF V-938
StatsInvGammaCDF V-939
StatsInvGeometricCDF V-939
StatsInvKuiperCDF V-939
StatsInvLogisticCDF V-939
StatsInvLogNormalCDF V-940
StatsInvMaxwellCDF V-940
StatsInvMooreCDF V-940
StatsInvNBinomialCDF V-940
StatsInvNCChiCDF V-940
StatsInvNCFCDF V-941
StatsInvNormalCDF V-941
StatsInvParetoCDF V-941
StatsInvPoissonCDF V-941
StatsInvPowerCDF V-941
StatsInvQCDF V-942
StatsInvQpCDF V-942
StatsInvRayleighCdf V-942
StatsInvRectangularCDF V-943
StatsInvSpearmanCDF V-943
StatsInvStudentCDF V-943
StatsInvTopDownCDF V-943
StatsInvTriangularCDF V-943
StatsInvUSquaredCDF V-944

StatsInvVonMisesCDF V-944
StatsInvWeibullCDF V-945
StatsKuiperCDF V-949
StatsLogisticCDF V-955
StatsLogisticPDF V-955–V-956
StatsLogNormalCDF V-956
StatsMaxwellCDF V-956
StatsMaxwellPDF V-957
StatsMedian V-957
StatsMooreCDF V-957
StatsNBinomialCDF V-959
StatsNBinomialPDF V-959
StatsNCChiCDF V-960
StatsNCChiPDF V-960
StatsNCFCDF V-960
StatsNCFPDF V-960
StatsNCTCDF V-961
StatsNCTPDF V-961
StatsNormalCDF V-961
StatsNormalPDF V-962
StatsParetoCDF V-965
StatsParetoPDF V-965
StatsPermute V-965
StatsPoissonCDF V-966
StatsPoissonPDF V-966
StatsPowerCDF V-966
StatsPowerNoise V-967
StatsPowerPDF V-967
StatsQCDF V-967–V-968
StatsRayleighCDF V-971
StatsRayleighPDF V-971
StatsRectangularCDF V-971
StatsRectangularPDF V-971
StatsRunsCDF V-974
StatsSpearmanRhoCDF V-977
StatsStudentCDF V-979
StatsStudentPDF V-979
StatsTopDownCDF V-980
StatsTriangularCDF V-980
StatsTriangularPDF V-980
StatsTrimmedMean V-981
StatsUSquaredCDF V-984
StatsVonMisesCDF V-987
StatsVonMisesNoise V-987
StatsVonMisesPDF V-987
StatsWaldCDF V-988
StatsWaldPDF V-988
StatsWeibullCDF V-990
StatsWeibullPDF V-990
StudentA V-1006
StudentT V-1006
sum V-1007
variance V-1066
WaveMax V-1077
WaveMin V-1078
WaveMinAndMax V-1078
wnoise V-1113
incomplete gamma function V-289–V-290
k-means clustering V-472
maximum V-1091
minimum V-1091
of complex waves V-1082
of matrices
maximum chunk location V-1085
maximum column location V-1084
maximum layer location V-1085
maximum row location V-1084
minimum chunk location V-1085
minimum column location V-1084
minimum layer location V-1085
minimum row location V-1084
of waves III-122–III-124, V-1082
average deviation V-1084
average value V-1084
dispersion V-1084
geometric mean V-295
kurtosis V-1084
maximum V-1077, V-1084, V-1091
maximum location V-1084
mean V-586
median V-586
min and max V-1078
minimum V-1078, V-1084, V-1091
minimum location V-1084
number of points V-1084
RMS V-1084
root mean squared V-1084
skewness V-1084
standard deviation V-1084
standard error of mean V-1084
sum V-1007
sum of values V-1084
variance V-1066, V-1084
operations V-4
EdgeStats V-190
Histogram V-349
ImageGLCM V-375
ImageHistModification V-378
ImageHistogram V-379
ImageStats V-414
JointHistogram V-466
PulseStats V-783
SetRandomSeed V-853
StatsAngularDistanceTest V-906
StatsANOVA1Test V-907
StatsANOVA2NRTest V-908
StatsANOVA2RMTest V-909
StatsANOVA2Test V-910
StatsChiTest V-913
StatsCircularCorrelationTest V-914
StatsCircularMeans V-916
StatsCircularMoments V-918

StatsCircularTwoSampleTest V-921
StatsCochranTest V-923
StatsContingencyTable V-924
StatsDExpPdf V-926
StatsDunnettTest V-927
StatsFriedmanTest V-931
StatsFTest V-931
StatsHodgesAjneTest V-933
StatsJBTest V-945, V-948
StatsKDE V-946
StatsKendallTauTest V-947
StatsKWTest V-949
StatsLinearCorrelationTest V-950
StatsLinearRegression V-952
StatsMultiCorrelationTest V-957
StatsNPMCTest V-962
StatsNPNominalSRTest V-964
statsQuantiles V-968
StatsRankCorrelationTest V-970
StatsResample V-972
StatsSample V-974
StatsScheffeTest V-975
StatsShapiroWilkTest V-976
StatsSignTest V-977
StatsSRTest V-977
StatsTTest V-981
StatsTukeyTest V-983
StatsVariancesTest V-985
StatsWatsonUSquaredTest V-988
StatsWatsonWilliamsTest V-989
StatsWheelerWatsonTest V-990
StatsWilcoxonRankTest V-991
StatsWRCorrelationTest V-993
WaveMeanStdv V-1077
WaveStats V-1082
random V-323
random numbers V-195
references III-393
special functions V-288–V-290
Student's T distribution V-1006
StatsAngularDistanceTest operation V-906
StatsANOVA1Test operation V-907
StatsANOVA2NRTest operation V-908
StatsANOVA2RMTest operation V-909
StatsANOVA2Test operation V-910
StatsBetaCDF function V-911
StatsBetaPDF function V-911
StatsBinomialCDF function V-912
StatsBinomialPDF function V-912
StatsCauchyCDF function V-912
StatsCauchyPDF function V-913
StatsChiCDF function V-913
StatsChiPDF function V-913
StatsChiTest operation V-913
StatsCircularCorrelationTest operation V-914
StatsCircularMeans operation V-916
StatsCircularMoments operation V-918
StatsCircularTwoSampleTest operation V-921
StatsCMSSDCDF function V-922
StatsCochranTest operation V-923
StatsContingencyTable operation V-924
StatsCorrelation function V-925
StatsDExpCDF function V-926
StatsDExpPdf function V-926
StatsDIPTest operation V-926
StatsDunnettTest operation V-927
StatsErlangCDF function V-928
StatsErlangPDF function V-928
StatsErrorPDF function V-928
StatsEValueCDF function V-929
StatsEValuePDF function V-929
StatsExpCDF function V-929
StatsExpPDF function V-929
StatsFCDF function V-930
StatsFPDF function V-930
StatsFriedmanCDF function V-930
StatsFriedmanTest operation V-931
StatsFTest operation V-931
StatsGammaCDF function V-932
StatsGammaPDF function V-933
StatsGeometricCDF function V-933
StatsGeometricPDF function V-933
StatsGEVCDF function V-934
StatsGEVPDF function V-934
StatsHodgesAjneTest operation V-933
StatsHyperGCDF function V-935
StatsHyperGPDF function V-935
StatsInvBetaCDF function V-936
StatsInvBinomialCDF function V-936
StatsInvCauchyCDF function V-936
StatsInvChiCDF function V-936
StatsInvCMSSDCDF function V-937
StatsInvDExpCdf function V-937
StatsInvEValueCDF function V-937
StatsInvExpCDF function V-938
StatsInvFCDF function V-938
StatsInvFriedmanCDF function V-938
StatsInvGammaCDF function V-939
StatsInvGeometricCDF function V-939
StatsInvKuiperCDF function V-939
StatsInvLogisticCDF function V-939
StatsInvLogNormalCDF function V-940
StatsInvMaxwellCDF function V-940
StatsInvMooreCDF function V-940
StatsInvNBinomialCDF function V-940
StatsInvNCChiCDF function V-940
StatsInvNCFCDF function V-941
StatsInvNormalCDF function V-941
StatsInvParetoCDF function V-941
StatsInvPoissonCDF function V-941
StatsInvPowerCDF function V-941
StatsInvQCDF function V-942

StatsInvQpCDF function V-942
StatsInvRayleighCdf function V-942
StatsInvRectangularCDF function V-943
StatsInvSpearmanCDF function V-943
StatsInvStudentCDF function V-943
StatsInvTopDownCDF function V-943
StatsInvTriangularCDF function V-943
StatsInvUSquaredCDF function V-944
StatsInvVonMisesCDF function V-944
StatsInvWeibullCDF function V-945
StatsJBTest operation V-945, V-948
StatsKDE operation V-946
    KDE V-946
    kernel density estimate V-946
StatsKendallTauTest operation V-947
StatsKuiperCDF function V-949
StatsKWTest operation V-949
StatsLinearCorrelationTest operation V-950
StatsLinearRegression operation V-952
StatsLogisticCDF function V-955
StatsLogisticPDF function V-955–V-956
StatsLogNormalCDF function V-956
StatsMaxwellCDF function V-956
StatsMaxwellPDF function V-957
StatsMedian function V-957
StatsMooreCDF function V-957
StatsMultiCorrelationTest operation V-957
StatsNBinomialCDF function V-959
StatsNBinomialPDF function V-959
StatsNCChiCDF function V-960
StatsNCChiPDF function V-960
StatsNCFCDF function V-960
StatsNCFPDF function V-960
StatsNCTCDF function V-961
StatsNCTPDF function V-961
StatsNormalCDF function V-961
StatsNormalPDF function V-962
StatsNPMCTest operation V-962
StatsNPNominalSRTest operation V-964
StatsParetoCDF function V-965
StatsParetoPDF function V-965
StatsPermute function V-965
StatsPoissonCDF function V-966
StatsPoissonPDF function V-966
StatsPowerCDF function V-966
StatsPowerNoise function V-967
StatsPowerPDF function V-967
StatsQCDF function V-967–V-968
statsQuantiles operation V-968
StatsRankCorrelationTest operation V-970
StatsRayleighCDF function V-971
StatsRayleighPDF function V-971
StatsRectangularCDF function V-971
StatsRectangularPDF function V-971
StatsResample operation V-972
StatsRunsCDF function V-974
StatsSample operation V-974
StatsScheffeTest operation V-975
StatsShapiroWilkTest operation V-976
StatsSignTest operation V-977
StatsSpearmanRhoCDF function V-977
StatsSRTest operation V-977
StatsStudentCDF function V-979
StatsStudentPDF function V-979
StatsTopDownCDF function V-980
StatsTriangularCDF function V-980
StatsTriangularPDF function V-980
StatsTrimmedMean function V-981
StatsTTest operation V-981
StatsTukeyTest operation V-983
StatsUSquaredCDF function V-984
StatsVariancesTest operation V-985
StatsVonMisesCDF function V-987
StatsVonMisesNoise function V-987
StatsVonMisesPDF function V-987
StatsWaldCDF function V-988
StatsWaldPDF function V-988
StatsWatsonUSquaredTest operation V-988
StatsWatsonWilliamsTest operation V-989
StatsWeibullCDF function V-990
StatsWeibullPDF function V-990
StatsWheelerWatsonTest operation V-990
StatsWilcoxonRankTest operation V-991
StatsWRCorrelationTest operation V-993
status line help
    for controls III-436
stderr
    fprintf V-261
stdout
    fprintf V-261
stellar images
    deconvolution V-404
Step button in debugger IV-216
Step Into button in debugger IV-216
Step Out button in debugger IV-216
stereographic projection V-781
STFT operation V-994
Stop button in debugger IV-216
stop tool
    Gizmo II-415
StopMSTimer function V-995
stopping
    from control panel IV-160
    macros IV-124
    user functions IV-112
str2num function II-73, V-996
Strconstant keyword V-996
    in switch statements IV-44
    string declaration IV-51
strict wave reference mode IV-52, IV-75
string charsets
    HDF5 II-219

String declaration II-105, V-996
automatic creation of SVAR IV-70
in user functions IV-70
local variables in macros IV-119
local variables in user functions IV-34
not in a macro loop IV-119
string expressions
continuation characters IV-35, IV-113
string formats
HDF5 II-219
string inspector in debugger IV-222–IV-223, IV-225
string objects
Gizmo II-444, II-471
string padding
HDF5 II-219
string variables II-105–II-106, IV-13–IV-19
$ operator IV-18, IV-62
assignment IV-6, IV-17
char2num function V-60
CmpStr function V-73
constants IV-51
ConvertGlobalStringTextEncoding operation V-95
converting to names IV-18–IV-19, IV-62
converting to UTF-8 III-487
copying II-115
creating V-996
declaring II-105, V-996
default values V-1005
deleting II-105
dependency assignments IV-231
exists function V-207
expressions IV-13
global II-105, III-417, III-428, V-996
GrepList function V-333
GrepString function V-334
indexing IV-16
initializing II-105, V-996
in macros IV-119
in user functions IV-34
killing II-105, II-117, V-471
KillString operation V-471
length of IV-14, V-1001
list of
GetIndexedObjName function V-303
GetIndexedObjNameDFR function V-304
ListBox controls III-416, III-426
listing in data folder V-141
ListMatch function V-498
ListToTextWave function V-499
loading from Igor experiment file V-500–V-505
LowerStr function V-523
MoveString operation V-663
moving to data folder II-115
names
CheckName function V-68
naming rules III-501
num2char function V-713
num2istr function V-713
num2str function V-714
parsing V-902
pass-by-reference IV-59
ProcedureText function V-779
related functions V-11
renaming II-115, III-504, V-796
saving V-815
Set Variable controls III-417, III-428
SortList function V-886
SplitString operation V-900
sscanf operation V-902
static IV-51
Static keyword V-906
str2num function V-996
Strconstant V-996
StringByKey function V-997
StringFromList function V-998
StringList function V-999
stringmatch function V-1000
strlen function V-1001
strsearch function V-1001
StrVarOrDefault function V-1005
substitution IV-18–IV-19
precedence IV-19
text encodings III-478
text waves IV-14
UniqueName function V-1048
string-to-number conversion V-996
StringByKey function IV-173, V-997
stringCRC function V-998
StringFromList function IV-172, V-998
example IV-198
load waves (example) II-171–II-172
StringList function V-999
stringmatch function V-1000
strings IV-13–IV-19
$ operator IV-18, IV-62
and sprintf IV-260
as lists IV-172
assignment IV-6, IV-17
binary data in strings IV-175, V-1000, V-1071
char2num function V-60
character-by-character operations IV-173
characters versus bytes III-483
CmpStr function V-73
command in string: Execute operation V-204
concatenation IV-6, IV-8
constants IV-51
conversion to upper case V-1053
converting to names IV-18–IV-19, IV-62
declaring II-105
escape characters IV-14
escape sequences IV-14

exists function V-207
expressions IV-13
FontSizeHeight function V-257
FontSizeStringWidth function V-258
Grep operation V-327
GrepList function V-333
GrepString function V-334
in user functions IV-31
indexing IV-16
initializing
in macros IV-119
in user functions IV-34
keyword-value packed strings II-84, IV-173
length of IV-14, V-1001
ListBox controls III-416, III-426
ListToTextWave function V-499
LowerStr function V-523
naming rules III-501
null IV-14, IV-16
num2char function V-713
num2istr function V-713
num2str function V-714
PadString function V-732
parsing V-902
pass-by-reference IV-59
ProcedureText function V-779
processing lists of waves IV-198–IV-201
related functions V-11
RemoveEnding function V-792
ReplaceString function V-799
replacing items V-799
ReplicateString function V-802
searching V-327, V-333–V-334, V-1001
SelectString function V-834
SortList function V-886
SplitString operation V-900
splitting V-900
sprintf operation V-902
Static keyword V-906
str2num function V-996
StringByKey function V-997
StringFromList function V-998
StringList function V-999
stringmatch function V-1000
StringToUnsignedByteWave function V-1000
strlen function V-1001
strsearch function V-1001
substitution IV-18–IV-19, IV-62
in user functions IV-83
precedence IV-19
substrings IV-16
text encodings III-480
text waves IV-14
TrimString function V-1047
Unicode III-480
Unicode escape sequences IV-15
UnPadString function V-1050
UTF-16 literals IV-12, IV-14
UTF-8 III-480
utility functions IV-19
WaveDataToString function V-1071
StringToUnsignedByteWave function V-1000
strlen function V-1001
characters versus bytes III-483
StrSearch function V-1001
strswitch statements IV-43, V-1002
default keyword V-146
STRUCT keyword V-1002
StructFill operation V-1002
example IV-104
StructGet operation V-1003
example IV-104
use in multitasking IV-328
StructPut operation V-1004
example IV-104
use in multitasking IV-328
structure fit functions III-261–III-263
examples III-262
multivariate III-263
syntax III-263
WMFitInfoStruct structure III-263
structures IV-99–IV-105
accessing members IV-101
action procedures IV-103
alignment IV-100
applications IV-103
arrays of
disallowed IV-101
built-in IV-103
HDF5DataInfo V-342
HDF5DatatypeInfo V-342
HDF5LinkInfoStruct V-343
HDF5SaveDataHookStruct V-344
Point V-749
PointF V-749
Rect V-787
RectF V-787
RGBAColor V-810
RGBColor V-810
WMAxisHookStruct V-609, V-1103
WMBackgroundStruct V-1103
WMButtonAction V-57, V-1104
WMCheckboxAction V-66, V-1104
WMCustomAction V-136
WMCustomContro Action V-137
WMCustomControlAction V-1105
WMDrawUserShapeStruct V-1106
WMFitInfoStruct V-1107
WMGizmoHookStruct II-473, V-1107
WMListboxAction V-494, V-1108
WMMarkerHookStruct IV-309, V-1109
WMPopupAction V-1109

WMSetVariableAction V-858, V-1110
WMSliderAction V-876, V-1111
WMTabControlAction V-1013, V-1112
WMWinHookStruct IV-293, IV-297, V-1113
controls III-437, IV-103
debugging IV-221
declaring IV-100
defining IV-100
DFREF keyword IV-80
EndStructure keyword V-195
examples IV-102, IV-104
exporting V-220
into a string V-1004
into a wave V-1004
for axes
WMAxisHookStruct V-609
for controls
WMButtonAction V-57
WMCheckboxAction V-66
WMCustomAction V-136
WMCustomControAction V-137
WMListboxAction V-494
WMSetVariableAction V-858
WMSliderAction V-876
WMTabControlAction V-1013
global IV-104
importing V-219
from a string V-1003
from a wave V-1003
initialization IV-100
initializing V-1002
limitations IV-104
local references V-1002
member arrays IV-100
member types IV-100
Multithread keyword example IV-328
named window hooks
WMWinHookStruct IV-293
passing IV-101
passing to XOPs IV-104
Point structure V-749
PointF structure V-749
predefined IV-103
printing V-769–V-770
printing structure elements V-770
reading V-220
Rect structure V-787
RectF structure V-787
RGBAColor structure V-810
RGBColor structure V-810
static IV-100
STRUCT keyword V-1002
StructFill operation V-1002
StructGet operation V-1003
StructPut operation V-1004
structure fit functions III-261–III-263
examples III-262
multivariate III-263
syntax III-263
WMFitInfoStruct structure III-263
user data IV-104
using IV-101
windows IV-103
WMAxisHookStruct structure V-1103
WMBackgroundStruct structure V-1103
WMButtonAction structure V-1104
WMCheckboxAction structure V-1104
WMCustomControlAction structure V-1105
WMDrawUserShapeStruct structure V-1106
WMFitInfoStruct structure V-1107
WMGizmoHookStruct structure V-1107
WMListboxAction structure V-1108
WMMarkerHookStruct structure V-1109
WMPopupAction structure V-1109
WMSetVariableAction structure V-1110
WMSliderAction structure V-1111
WMTabControlAction structure V-1112
WMWinHookStruct structure V-1113
writing V-221
StrVarOrDefault function V-1005
example IV-147
saving parameters IV-147
StudentA function V-1006
StudentT function V-1006
Student's T distribution V-1006
style macros II-48, II-350–II-352, V-1101
adding annotations II-352
DoWindow operation V-171
for page layouts II-498
for tables II-272
limitations II-352
load waves II-173
object indexing IV-20
vs preferences II-350–II-351
styles
plain notebooks III-8
Submenu keyword IV-126, V-1006
submenus
consolidating items IV-131
creating IV-127
subminor ticks
in user tick waves II-314
log axes II-308–II-309
subpatterns
in regular expressions IV-186
named IV-186
subrange
display syntax II-321
displaying II-321
limitations II-322
subranges
of text waves IV-17

of waves II-76
wave assignment statements II-76
subscripts
in an axis label II-318
in annotations III-37, III-54
in notebooks III-9
subset of data
using cursors in graphs II-320
subtraction IV-6
subtypes IV-118, IV-204–IV-205
ButtonControl IV-205
CameraWindow IV-205
CDFFunc IV-205
CheckBoxControl IV-205, V-66
CursorStyle IV-204
DrawUserShape IV-204
FitFunc IV-205
GizmoPlot IV-205
Graph IV-204
GraphMarquee IV-204, V-310
GraphStyle IV-204
GridStyle IV-204
Layout IV-205
LayoutMarquee IV-205, V-310
LayoutStyle IV-205
ListBoxControl IV-205
Panel IV-205
PopupMenuControl IV-205, V-763
SetVariableControl IV-205, V-858
SliderControl IV-205
TabControl IV-205
Table IV-205
TableStyle IV-205
user functions IV-32
window macros II-47
subwindows III-80–III-93
ChildWindowList function V-69
closing V-471
command syntax III-92
contextual menus III-82
converting to III-90
creating III-82
DefineGuide operation V-153
draw mode III-80, III-84
examples III-86
exterior III-443, V-318, V-687, V-689
examples V-689
frame style III-84
frames III-80
Gizmo II-469
graphs III-82
GuideInfo function V-336
GuideNameList function V-337
guides III-80, III-83, III-85
built-in III-83, V-153
creating V-153
deleting V-153
information about V-336
list of V-337
moving V-153
user-defined III-84–III-85
in control panels III-443
killing V-471
layout mode III-80, III-85
limitations III-82
listing V-69
MoveSubwindow operation V-663
notebook subwindows III-91
operate mode III-80, III-84
page layouts III-82, III-90, III-92
panels III-82
path to active V-318
positioning III-83
programming III-92
recreating notebooks V-711
renaming V-797
repositioning V-663
selection III-80
SetActiveSubwindow operation V-835
setting active V-835
sizing in commands III-92
tables III-82
terminology III-80
tutorial III-86
window hook functions IV-294
sum function V-1007
SumDimension operation V-1007
SumSeries operation V-1008
Sun Raster files
file info V-372
importing V-390
loading II-159
superscripts
in an axis label II-318
in annotations III-37, III-54
in notebooks III-9
surface plot
data format II-451
Gizmo tour II-410, II-412
Voronoi interpolation II-412
surface plots II-95
Gizmo II-459
SVAR keyword IV-65, V-1010
/Z flag IV-67
automatic creation IV-70
automatic creation with rtGlobals IV-70
checking in debugger IV-213
example IV-69
explicit creation IV-70
failures IV-67
SVAR_Exists function V-1011
use with $ IV-62

use with data folders IV-69
with data folders IV-249
SVAR_Exists IV-67, V-1011
SVG
graphics technology III-507
SVGs
exporting graphics III-97, III-104
switch statements IV-43, V-1011
break IV-44
Constant keyword V-85
default IV-44
default keyword V-146
Strconstant keyword V-996
Symbol font III-491–III-493
EPS III-493
Greek letters III-491
Igor6 compatibility III-492
PDFs III-493
Symbolic Path Status dialog II-23
symbolic paths II-22–II-24
automatically created II-23
creating manually II-22, V-690
example II-22, II-175
home II-23
Igor II-23
IgorUserFiles II-23
killing II-23
KillPath operation V-470
naming rules III-501
CheckName function V-68
NewPath operation V-690
Open operation V-717
PathInfo operation V-737
PathList function V-738
platform-related issues III-449
related functions V-12
related operations V-5
renaming III-504, V-797
Sync to Gizmo II-416
syntax coloring III-407
changing III-407
syntaxColorSelection keyword V-705
system locale III-461
system requirements III-513
system text encoding III-461
SZIP
HDF5 compression II-213

T

t function V-1011
in multidimensional waves II-92–II-93, II-95
T scaling
changing V-107
SetScale operation V-853
CopyScales operation V-107
SetScale operation V-853
T units
changing V-107, V-853
T values
t function V-1011
T_ReplacedDuplicates V-241–V-242
T_Tags V-391–V-392
tab characters
escape code for IV-14
in annotations III-39
in delimited text files II-131
in general text files II-138
in notebooks III-7–III-8
in strings IV-14
in tables II-258
in text data columns II-134
indentation conventions IV-26
plain notebooks III-8
saving text waves II-180
Tab key
in tables II-243
tab-delimited data
exporting from tables II-252
pasting II-239
saving waves as V-813
TabControl III-418, III-431
creating III-431
drawing order of V-148
TabControl operation V-1011
TabControl subtype IV-205
keyword V-1014
Table Date Format dialog II-239
Table Macros submenu II-48
Table menu II-234, II-236
Table pop-up menu II-236
table selection
Compose Expression dialog III-138
Table subtype IV-205
keyword V-1014
TableInfo function V-1015
TablePopup menu IV-138
tables II-234–II-274
3D copy and paste II-269
appending columns II-242
AppendToTable operation V-37
arrow keys II-243
can't enter X values II-244
carriage return characters II-258
cell area II-236
cell ID area II-243
CheckDisplayed operation V-68
Choose Dimensions dialog II-263
chunks of data II-263
clearing values II-247
closing II-241
columns

autosizing
by double-clicking II-252
by menus II-253
limitations II-253
formats II-255
pasting II-249
headings by index V-1079
indices II-261
names II-241, II-261
positions II-252
styles II-272
titles II-254
widths II-252
comma as decimal separator II-255
compared to spreadsheets II-234
complex columns II-241
Compose Expression dialog III-138
control characters II-260
copy/paste multidimensional data II-265–II-270
copying II-247, II-252
create-paste of multidimensional data II-269
creating II-234, V-192–V-193
blank values II-247
multidimensional waves II-234
text waves II-234
waves by copy/paste II-240, II-269
while loading waves II-235
cutting II-248
rows or columns II-268
d suffix II-241
data values II-235
date format II-239
dates II-239, II-245, II-256
formats II-246
decimal numeric format II-255
decimal separators II-238
decimal symbols II-255
DelayUpdate box II-237, II-244
deleting data II-249
digits after decimal point II-255
dimension labels II-235, II-262
dynamic updating II-234, II-237
Edit operation V-192–V-193
Edit Text Cell dialog II-258
editing existing waves II-235
elapsed time II-256
elements column hiding V-649
empty table in new experiments II-21
Enter key II-243
entering dates II-246
entering new waves II-234, II-239
entering values II-244
escape sequences for invalid text II-260
exporting as graphics II-271, V-826
exporting data II-252
save table copy II-270
SaveTableCopy operation V-829
extracting a matrix from a 3D wave II-269
finding values II-249
fixed dimension II-264
fractional seconds II-256
free dimension II-264
general numeric format II-255
hex dump II-260
hexadecimal numbers II-257
hiding parts of II-237
horizontal dimension II-263
horizontal index row II-261
i suffix II-241
imag suffix II-241
in new experiments II-234
in notebooks III-18
index columns II-241, II-249
for multidimensional waves II-242
INFs II-247
insert-paste of multidimensional data II-266–II-267
inserting data II-244, II-249
insertion cell II-236, II-239, II-244
integer numeric format II-255
invalid text II-259
killing II-241
killing waves II-243
l suffix II-241
layers of data II-262
linefeed characters II-258
list of V-1098, V-1100
making a matrix from 1D waves II-267
making a new table II-45
example I-13
ModifyTable operation II-254, V-645–V-649
multidimensional waves II-261–II-270
names and titles II-45
NaNs II-247
new table II-45
example I-13
numeric formats II-255
numeric precision II-239, II-255
object references II-258, II-270
octal numbers II-257
page setup preference II-272
page setups II-271
parts of a table II-235
pasting
data II-239, II-248
index columns II-249
with column names II-240
point column II-252, II-262
hiding V-649
precision II-245
preferences II-272
printing II-271, V-779

printing selection II-271
properties V-1015
real columns II-241
real suffix II-241
recreating II-241
recreation macros V-1101
Redimension Waves dialog II-267, II-269
related operations V-1
relation to layouts I-3
relation to waves I-3, II-234
removing columns II-242, V-794
replace-paste of multidimensional data II-266
replacing values II-251
Return key II-243
row column hiding V-649
row indices II-261
scientific numeric format II-255
Select All II-243
Select All in Modify Columns dialog II-253
selecting cells II-243
selection
Compose Expression dialog III-138
selections V-315
setting to NaN II-247
shortcuts II-273
showing parts of II-237
showing X values II-235
significant digits II-255
slices of data II-262
special characters II-261
specifying column by index number V-645
style macros II-272
styles II-253–II-254
for multidimensional waves II-254
subwindows III-82
subwindows in layouts II-497
tab characters II-258
Tab key II-243
tab-delimited data II-239
Table pop-up menu II-236
TableInfo function V-1015
target cell ID II-236
target cells II-243
terminator characters II-258
text color V-648
text waves II-258
thousands separators II-238
time–of–day II-256
times II-239, II-256
troubleshooting II-240, II-244
Use Special Symbols for Control Characters II-261
vertical dimension II-263
views of multidimensional waves II-263
wave references II-270
WaveName function V-1079
waves in V-1080
whitespace characters II-258
window names II-240, V-1048
window titles II-235, II-240
wintype function V-1103
X columns II-241
x suffix II-241, II-254
X values II-235
y suffix II-241, II-254
TableStyle subtype IV-205
keyword V-1015
Tag operation V-1017–V-1022
/Q and contour plots II-379
tags III-43–III-47
anchors III-46
arrows III-45–III-46
as contour labels II-377–II-378
attached to wave III-44
attachment point III-38, III-44
changing III-45
axis escape codes III-57
definition III-34
deleting III-45, V-154
dynamic text III-38, III-55
lines III-45–III-46
lines too close to markers III-46
making a tag (example) I-17
modifying III-35
offscreen III-46
position III-46–III-47
offscreen III-47
standoff III-46
Tag operation V-1017–V-1022
TagVal function III-38, V-1022
TagWaveRef function III-38, V-1023
trace offsets III-38
wave name III-38
TagVal function III-38, V-1022
in contour labels II-378
TagWaveRef function III-38, IV-198, V-1023
tan function V-1023
tan of a wave V-1091
tanh function V-1023
tank icon (it's a bulldozer, really) III-65
Targa files
exporting V-405
file info V-372
target cells in tables II-243
target window II-44
graphs II-277
TBB IV-323
MultiThreadControl operation V-674
TDMS files
loading II-128
saving II-178
technical support II-4

FAQ II-5
mailing list II-4
World Wide Web II-5
template files
formatted notebooks III-30
templates
experiments II-21
file extensions II-21
in procedure windows III-397
temporary files
saving experiments II-29
termination criteria in curve fitting III-180
terminator II-128
terminator character
in tables II-258
terminator characters
in delimited text files II-126
ternary graphs II-317
TestHDF5ExperimentCompression function II-17
tetrahedron objects
Gizmo II-445
TeX III-58
in annotations III-54
text
cross-platform issues III-453
DrawText operation V-178
in annotations III-35
retrieving from notebooks III-28
text color
in notebooks III-9
text encoding names III-490
text encodings III-460–III-493
Asian III-462
binary data III-475
byte order marks III-471
character encoding schemes III-462
code points III-462
ConvertGlobalStringTextEncoding operation V-95
converting to UTF8 III-485
ConvertTextEncoding operation V-98
data folders III-478
default file text encoding III-465
dimension labels III-473
experiment file text encoding III-465
formatted notebooks III-472
FReadLine operation V-261, V-263
Grep operation V-329
HDF5 II-221
history area III-470
inspecting in Data Browser III-473
invalid text III-464, III-470
invalid text in tables II-259
literal strings III-480
LoadWave operation II-129, II-149, III-475, V-509
MBCS III-462
misidentification III-463
mixed III-464
NewNotebook operation V-685
OpenNotebook operation V-723
OpenProc operation V-724
override experiment III-466
plain text files III-466
problems III-463
programming III-480
SaveNotebook operation V-823
saving text waves II-181
SetWaveTextEncoding operation V-859
string variables III-478
text encoding names III-490
text waves II-87
TextEncoding pragma IV-55
TextEncodingCode function V-1028
TextEncodingName function V-1028
Unicode conversion errors III-460
UTF-16 III-463
UTF-32 III-463
UTF-8 III-463
wave names III-473
wave units III-473
waves III-472–III-478
WaveTextEncoding function V-1086
western III-461, III-466
TEXT files
notebooks III-2
text files
converting to UTF-8 III-489
delimited text files II-129–II-137
delimiter characters II-126
description of II-126
fixed field text files II-137
FORTRAN files II-137
FReadLine operation V-261
general text files II-138–II-142
headers II-126
home text files II-56
Igor Text files II-150–II-154
shared text files II-56
terminator characters II-126
TextFile function V-1029
text formats
in notebooks III-9
text info variables III-51, III-55–III-56
examples
simple III-52
Text Markers dialog II-294
text markers in graphs II-293–II-294
text operations
Close operation V-71
DrawText operation V-178
FGetPos operation V-228

fprintf operation IV-259–IV-261, V-260
FReadLine operation V-261
FSetPos operation V-264
FStatus operation V-265
IndexedFile function V-440
Open operation IV-196, V-716–V-721
Print operation V-769
printf operation IV-259–IV-261, V-770–V-773
sprintf operation IV-259–IV-261, V-902
sscanf operation V-902
TextFile function V-1029
wfprintf operation IV-259–IV-261, V-1093
text size
in notebooks III-9
text sizes
in notebooks III-8–III-9
in procedure windows III-406
text style
in notebooks III-9
text styles
in notebooks III-8
in procedure windows III-406
text transfers IV-275
text waves
accessing IV-68, IV-83, V-1069
allowable content of II-86
assignments IV-18, IV-68, IV-83, V-1069
containing binary data III-475–III-477
converting to/from numeric wave II-73
creating IV-18
creating in tables II-234
in category plots II-356
in Igor Text files II-154
in tables II-258
in user functions IV-68, IV-83, V-1069
indexing IV-17
labels in graphs II-293–II-294
loading from delimited text files II-134
making II-86–II-87
examples II-68, II-86
markers in graphs II-293–II-294
preallocation V-526
redimensioning II-72
saving in text files II-180
SetScale pitfall V-854
speeding up V-526
strings IV-14
subranges IV-17–IV-18
text encoding when saving II-181
text encodings II-87
Text2Bezier operation V-1023
TextBox operation V-1024–V-1027
textboxes
definition III-34
deleting V-154
exterior III-40
affects graph plot area III-41
Gizmo II-472
in page layouts II-483
interior III-40
modifying III-35
offset III-41
position III-40–III-42
TextBox operation V-1024–V-1027
TextEncoding keyword V-1027
TextEncoding pragma IV-55
TextEncodingCode function V-1028
TextEncodingName function V-1028
TextFile function V-1029
TextHistogram operation V-1029
texture objects II-467
textures
creating V-421
ImageGLCM V-375
thinning
ImageSkeleton3D operation V-413
thousands separators
in tick mark labels V-633
ThreadGroupCreate function V-1031
ThreadGroupGetDF function V-1031
ThreadGroupGetDFR IV-331
ThreadGroupGetDFR function V-1031
ThreadGroupPutDF IV-331
ThreadGroupPutDF operation V-1031
ThreadGroupRelease function V-1032
ThreadGroupWait function V-1032
ThreadProcessorCount function V-1033
ThreadReturnValue function V-1033
threads IV-329–IV-339
aborting IV-337
Igor Text files II-152
MatrixOp operation III-148
network operations IV-271
worker functions IV-330
ThreadSafe functions IV-106, IV-329–IV-339
debugging IV-225
DisableThreadSafe IV-226
ThreadSafe keyword V-1033
ThreadStart operation V-1033
thumbnails
in page layouts II-478
tick mark labels II-307
axis scaling II-319
color II-308, V-634
engineering mode II-309
exponential mode II-309
exponential notation II-308
forcing II-311
font II-308
Gizmo II-471
hiding II-312
log axes II-319

low trip, high trip II-308
minor tick labels on log axes II-315
no leading zero II-311
no trailing zeroes II-311
scaling II-308
scientific notation II-309
TickWavesFromAxis V-1034
tweaks II-311
units
suppress II-311
units in every label II-311
use thousands separator II-311, V-633
x10^n prevention II-319
zero as 0 II-311
tick marks
auto ticks II-308
color II-308
computed manual ticks II-308
control of II-308
control of minor II-308
crossing II-309
hiding II-308
inside II-309
length II-309
location II-309
manual II-312–II-314
canonic tick II-312
date/time axes II-317
from waves II-313–II-314
tick increment II-312
minor ticks on log axes II-315
on mirror axes II-307
outside II-309
problems II-316
separation II-308
subminor on log axes II-308
thickness II-308–II-309
TickWavesFromAxis V-1034
types illustrated II-309
user ticks from waves II-308, II-313–II-314
specifying tick type II-314
Tick Options tab II-310
Ticks and Grids tab II-308–II-310
date/time items II-316
ticks function IV-246, V-1034
TickWavesFromAxis operation V-1034
TIFF
CMYK III-99, III-105
TIFF files
bilevel II-158
CMYK II-158
EXIF metadata V-395
exporting V-405, V-408
RGB waves V-408
RGBA waves V-408
stacks V-408
tags V-405
file info V-372
grayscale II-158
importing V-390
palette color II-158
RGB II-158
RGBA II-158
stacks II-158
TIFFs
importing III-509
loading II-158
Tile operation V-1035–V-1036
Tile or Stack Windows dialog II-50
TileWindows operation V-1036–V-1037
tiling
in page layouts II-482, II-487, V-1035–V-1036
page layouts II-487–II-488
windows II-50, V-1036–V-1037
tiltles
controls III-53
time format in date/time axes II-316
time frequency analysis III-280
time function V-1037
time–of–day II-256, II-315–II-317, V-833
loading format II-130
timeouts
in network operations IV-270
URLRequest operation V-1056
timers IV-246
MarkPerfTestTime operation V-529
StartMSTimer function V-906
StopMSTimer function V-995
ticks function V-1034
times
date/time axes II-307, II-315–II-317
DateTime function V-145
elapsed time II-130, II-256, II-315–II-317, V-833
in delimited text files II-130
in Igor Text files II-151
in notebooks III-13, III-20
in tables II-239, II-256
formats II-256
pasting in tables II-249
related functions V-7
representation of II-315
Secs2Time function V-833
ticks function V-1034
time function V-1037
time–of–day II-130, II-256, II-315–II-317, V-833
units II-68–II-69
UTC V-145
wave precision II-69
tips I-8
TitleBox controls III-418, III-433
TitleBox operation V-1038
titles

column titles in tables II-254
TitleBox operation V-1038
To Clip button I-7
To Cmd Line button I-7
ToCommandLine operation V-1040
tool palette
Gizmo II-414
HideTools operation V-347
in page layouts II-479, II-481–II-484
ShowTools operation V-870
toolbar I-7
ToolsGrid operation V-1041
tooltips I-8, II-3
custom V-868
for columns II-3
for commands IV-3
for traces II-3
hook functions V-868
HTML IV-311
ListBox operation V-493
total least squares curve fitting III-237
total pages
in notebooks III-13
trace instance names II-278
trace menus IV-137
trace name parameters
user-defined IV-89
trace names II-282
as parameters IV-88
box plots II-330
custom V-620
programming IV-87
programming example IV-89
violin plots II-330
Trace Offset dialog II-302
trace symbols
in axis labels II-318
TraceFromPixel function V-1042
TraceInfo function IV-173, V-1042
TraceNameList function V-1044
example IV-197, IV-199
in dialogs IV-145
TraceNameToWaveRef function IV-85, IV-198, V-1045
example IV-146, IV-197
traces
alpha II-298
appearance in graphs II-290–II-306, II-348, II-364, II-380, V-613
AppendToGraph operation V-35
apppending II-280
color II-298, V-36, V-621
of each point V-621
cursors
z value from contour trace V-1120
customize at point II-306, V-625
dashed lines II-294
data folder II-112
defined II-277
display modes II-290, V-36
drag and drop II-280
drawing layer III-68
editing by drawing (example) I-21–I-22, I-29
end caps III-496, V-617
f(z) II-298
fill between II-297
gaps II-284, II-303
hiding II-295, II-303
hiding portions trick II-347
in graphs V-1044
index in style macros II-351
instance names III-38, IV-20, V-613
joins III-496, V-616
labels II-293–II-294
line size II-294–II-295
line style II-294, II-348, II-364, II-380
list of V-1044, V-1075
live II-347–II-348
log colors II-298, V-616
markers II-288, II-291, II-299
as f(z) II-298
coloring uniquely V-621
miters III-496, V-616
ModifyGraph operation V-613
names as parameters IV-88
next defined II-296
offsetting in graphs II-302–II-303
example I-24
multipliers II-302
preventing II-302
undoing II-302
opacity II-298
preferences II-348, II-364, II-380
programming IV-87
programming example IV-89
property from auxiliary wave II-298
related functions V-8
related operations V-1
removing II-283, V-792
reordering II-297
ReorderTraces operation V-798
ReplaceWave operation V-801
replacing II-114, II-284
selecting for modification II-290
sending to back II-297
Set as f(z) II-298
SetDashPattern operation V-837
setting all the same II-290
shortcuts II-353–II-354
symbol in an axis label II-318–II-319, III-37
text markers II-293–II-294
tooltips II-3

trace instance names II-278
trace names II-282, V-620
TraceFromPixel function V-1042
TraceInfo function V-1042
TraceNameList function V-1044
TraceNameToWaveRef function V-1045
transparency II-298
user data IV-89
user-defined trace names IV-89
wave reference from V-1045
X wave from trace V-1119
transferring
experiments II-24
files III-448–III-449
FTP III-448, V-268, V-271
files via FTP IV-272
files via HTTP IV-276
rulers III-12
translation
Gizmo II-425
translucency III-498
color table waves II-400
Gizmo II-432
image plots II-400–II-401
transparency
annotations III-39
color table waves II-400
EPS III-96, III-102
Gizmo II-432
graphics technology III-507
image plots II-400–II-401
in Gizmo II-428
in graph traces II-298
troubleshooting in Gizmo II-470
transpose
4D wave V-427
volumes V-427
transposition
MatrixOp operation III-144
Transverse Mercator projection V-781
trapezoidal integration
area function V-40
areaXY function V-41
faverage function V-218
faverageXY function V-218
Integrate operation V-446
integrate1D operation V-448
tree icon (what it is) III-65
trend removal
DSPDetrend operation V-182
trial exponent for axis label II-319
triangle objects
Gizmo II-437
triangle window function III-278
Triangulate3d operation V-1046
triangulation
convexHull operation V-101
Delaunay V-605
Triangulate3d operation V-1046
triangulaton
ModifyContour operation V-602
perturbation in contour plots V-605
trigonometric functions V-7
acos V-19
arbitrary precision V-27
asin V-41
atan V-42
atan2 V-42
cos V-109, V-1090
cot V-110
csc V-115
csch V-115
sawtooth V-831
sec V-832
sech V-832
sin V-871
tan V-1023, V-1091
trigonometric transforms
MatrixOp V-576
TrimString function V-1047
triple-clicking
on text III-408
triplet axes
Gizmo II-450
triplet waves
Gizmo II-406
troubleshooting II-4, IV-340–IV-341
crash log file IV-341
curve fitting III-265–III-267
delimited text files II-137
general text files II-141
Gizmo II-469
tables II-240, II-244
true and false IV-40
TrueType
embedding in EPS III-99, III-105
embedding in PDFs III-99
exporting tables
Macintosh OS X III-100
Windows OS III-106
truncate to integer (trunc) function V-1047
try keyword V-1047
try-catch-endtry statements IV-49, V-1047
catch keyword V-58
endtry keyword V-195
Tukey
box plots II-331
tutorial I-12
.txt file extension
notebooks III-2

U

uint64 declaration
  local variables in user functions IV-33
  variables in user functions IV-33
uint64 keyword V-1048
UltraHD displays III-507
  resolution of panels III-456
UNC paths III-451, V-734
undefine statement V-18
Unicode III-460, III-462–III-463
  byte order marks III-471
  canonical equivalence V-693
  compatible characters V-693
  decomposed characters V-693
  normalization V-693
  NormalizeUnicode function V-693
  precomposed characters V-693
  programming III-480
  replacement character III-465
  UTF-16 III-463
  UTF-16 literals IV-12, IV-14
  UTF-32 III-463
  UTF-8 III-463
Unicode conversion errors III-460
UniqueName function V-1048
units
  dat II-69
    precision II-69
  of waves V-1093
Universal Name Convention III-451
Unix
  paths III-452
  shell scripts IV-264
    example IV-264
UNIX paths V-734
unlocking
  notebooks III-5
  procedure files III-397
unpacked experiments
  adopting files II-25
  adopting files programmatically V-23
  autosave II-37, II-41
  experiment file II-17
  LoadData operation II-156
UnPadString function V-1050
UnsetEnvironmentVariable function V-1050
unsigned integers V-1048
Unwrap operation III-316, V-1050
unwrapping phase III-274, V-433
UnzipFile operation V-1051
Update All Now III-14, III-18
Update Selection Now III-14, III-18
updates
  during macros IV-123
  during user functions IV-112
  for Igor II-4
updating
  annotations III-38–III-39
  controls
    ControlUpdate operation V-94
  ControlUpdate operation III-436
  DelayUpdate operation V-153
  DoUpdate operation V-168
  during procedures V-153, V-168, V-739, V-809
  Igor II-4
  PauseUpdate operation V-739
  pictures in notebooks III-18
  pop-up menu controls III-428
  ReplaceWave operation V-801
  ResumeUpdate operation V-809
  special characters in notebooks III-14, V-709
  traces in graph II-114
upgrading
  Igor II-4
uploading
  directories via FTP IV-274
  files via FTP IV-274
upper-case string conversion V-1053
UpperStr function V-1053
URLDecode function V-1053
URLEncode function IV-268, V-1053
URLRequest operation V-1053
  authentication V-1054
  FILE scheme V-1058
  headers V-1054
  HTTP POST method V-1058
  passwords V-1054
  percent encoding V-1058
  POST method V-1058
  proxy servers V-1056
  redirects V-1055
  schemes V-1054
  timeouts V-1056
  usernames V-1054
URLs IV-267
  in help files IV-257
  percent encoding IV-268
  reserved characters IV-268
  URLDecode function V-1053
  URLEncode function V-1053
  URLRequest operation V-1053
Use Global Attributes
  Gizmo II-419
Use Selection for Find II-54
  in procedure windows III-404
Use Special Symbols for Control Characters II-261
use table formatting checkbox II-179
UseNewDiskHeaderBytes II-35
UseNewDiskHeaderCompress II-35
user data
  controls III-440

Buttons V-57
CheckBoxes V-66, V-136
examples III-440
GroupBox V-336
ListBox V-492
pop-up menus V-763
SetVariable V-857
Sliders V-876
TabControl V-1013
GetUserData function V-316
storing global variables IV-104
traces IV-89
windows IV-293, V-868
examples IV-293
getting V-316
user files
path to folder V-895
user functions IV-30–IV-114
$ operator IV-62
& operator IV-59
aborting IV-49, IV-51, IV-112, V-18–V-19, V-1047
accessing global variables IV-70
accessing waves III-170–III-174, IV-82–IV-85
automatic local variables IV-61
bitwise and logical operators IV-41
body code IV-35
break in switch IV-44
break statements IV-48
calling a macro IV-202
calling an external operation IV-202
case statements IV-43
coercion of data types IV-111
compared to macros IV-116
comparisons IV-41
compile time vs runtime IV-64
complex IV-31
complex return value IV-31
complex wave references IV-64
complex waves IV-68, IV-83
conditional compilation IV-108
conditional statements IV-40
constants IV-51
continuation characters IV-35, IV-113
continue statements IV-48
control panels IV-158
creating global variables in data folders IV-249
curve fitting to III-190, V-273
data folder reference result IV-31
data folder references IV-78–IV-82
data folders II-111
debugging
debugger IV-212–IV-227
GetRTStackInfo function V-314
runtime stack information V-314
default values V-715, V-1005
dependency assignment IV-233, V-847
dialogs IV-144
direct reference to globals IV-114
do-while loops IV-45
DoUpdate IV-112
Duplicate operation V-186
error handling IV-111
errors IV-110
examples III-171–III-175
FindSegmentMeans III-174
LogRatio III-172
modifying a wave III-171
RemoveOutliers III-171
WavesAverage III-173
WavesMax III-173
WaveSum III-171
Execute operation IV-202
exists function V-207
FitFunc keyword V-255
flags IV-31
flow control IV-40
for loops IV-46
FuncRefInfo function V-278
Function Execution Error dialog IV-110
function references IV-107–IV-108
FunctionInfo function V-279
FunctionList function V-284
GetRTStackInfo function V-314
global variables IV-65–IV-71
help for IV-259
hook functions IV-280–IV-292
if-else-endif IV-40
if-elseif-endif IV-40
in curve fitting
details III-250–III-260
IndependentModule keyword V-437
information about V-278–V-279
initialization of local variables IV-34
inline parameter lists IV-33
invoking operations IV-111
liberal names IV-68
local variable declaration IV-34
local variables IV-61
loops IV-45
multiple return statements IV-36
MultiThread keyword V-673
multivariate curve fitting to V-276
names IV-31
operation queue IV-278
optional parameters IV-33, IV-60, V-733
overriding IV-106, V-731
parameter lists IV-32
pass-by-reference IV-59
path to V-287
pause for user IV-152
PauseForUser operation V-738
performance V-529

pop-up menus IV-145
precision of calculations IV-31
predefined symbols IV-110
preemptive multitasking IV-106, IV-329–IV-339
preferences IV-203
ProcedureText function V-779
processing waves III-171–III-175
programming with liberal names IV-168–IV-169
Prompt reuse IV-147
Prompt statements IV-144, IV-147
prototype functions IV-107
range-based for loops IV-47
retrieve code
ProcedureText function V-779
return statements IV-35
returning waves III-170
reusing prompts IV-147
rtFunctionErrors pragma IV-55
rtGlobals=0 IV-114
runtime stack information V-314
S_ variables IV-61
scope of variables II-103–II-105, IV-34, IV-61
simple input dialog IV-144
static IV-105, IV-244
ModuleName keyword IV-54, V-658
Static keyword V-906
string IV-31
string return value IV-31
subtypes IV-32
switch statements IV-43
syntax for curve fitting III-251
syntax of IV-31
text waves IV-68, IV-83
ThreadSafe IV-106, IV-329–IV-339
ThreadSafe keyword V-1033
timing V-529
updates IV-112
V_ variables IV-61
variables
declaration IV-34
global IV-65–IV-71
local IV-61
scope II-103–II-105, IV-34, IV-61
wave access IV-65–IV-71
wave as parameter IV-82
wave parameters IV-60
wave reference functions IV-85
wave reference result IV-31
wave references IV-71–IV-78
waves as parameters III-170, V-675
while loops IV-46
user interface I-6
User Procedures IV-25
User Procedures folder II-32, III-400–III-401, IV-25, IV-166
user shapes drawing tool III-65
user-defined buttons
Data Browser II-120
user-defined drawing shapes V-179
user-defined menus
contextual menu example IV-162
user-defined trace names IV-89
UserAxes drawing layer III-68–III-69
UserBack drawing layer III-68
in page layouts II-479–II-480
UserFront drawing layer III-68–III-69
in page layouts II-479–II-480
usernames
in URLs IV-267–IV-268
URLRequest operation V-1054
UTC V-145
GetFileFolderInfo V-300
SetFileFolderInfo V-846
UTF-16 III-463
Unicode escape sequences IV-15
UTF-16 literals IV-12, IV-14
UTF-32 III-463
Unicode escape sequences IV-15
UTF-8 III-460–III-461, III-463, III-481
character-by-character operations IV-173
Convert to UTF-8 Text Encoding dialog III-485
converting notebooks III-489
converting procedure files III-489
converting string variables III-487
converting text files III-489
converting to III-485
converting waves III-486
history area III-489
invalid text III-470
plain text files III-470
programming III-480
TextEncoding pragma IV-56
Unicode escape sequences IV-15
utility procedures IV-25
writing IV-167

V

V_ variables II-103
curve fitting III-232–III-236
in macros IV-123
in user functions IV-61
V_AbortCode IV-49, V-1048
V_adev III-123, V-415, V-973, V-1084
V_Alpha V-70, V-91, V-93, V-307, V-318–V-319, V-759, V-766
V_alreadyOpen V-722
V_ascent V-588
V_autoMultiThread V-674
V_avg III-122, V-415, V-973, V-1084

V_Blue V-70, V-91, V-93, V-307, V-318–V-319, V-759, V-766
V_bottom V-310, V-319, V-321
V_bytesRead V-506
V_CenterX V-53
V_CenterY V-53
V_CenterZ V-53
V_chisq III-213, III-233, III-235
V_correlation V-416
V_creationDate V-301
V_debugDangerously IV-225, IV-227
V_debugOnAbort V-146
V_debugOnError V-146
V_defaultTextEncoding V-151
V_denominator V-786
V_descent V-588
V_disable V-90
V_EdgeAmp4_0 V-191
V_EdgeDLoc3_1 V-191
V_EdgeLoc1 V-191
V_EdgeLoc2 V-191
V_EdgeLoc3 V-191
V_EdgeLvl0 V-191
V_EdgeLvl1 V-191
V_EdgeLvl2 V-191
V_EdgeLvl3 V-191
V_EdgeLvl4 V-191
V_EdgeSlope3_1 V-191
V_enable V-146
V_endChunk III-124, V-1085
V_endCol III-124, V-316, V-1085
V_endLayer III-124, V-1085
V_endParagraph V-316
V_endPos V-172, V-316
V_endRow III-123, V-316, V-1085
V_Error V-891, V-1003
V_FIFOChunks V-229
V_FIFOnchans V-229
V_FIFORunning V-229
V_filePos V-228, V-265
V_FitError III-233, III-235
V_FitIterStart III-233, III-236
V_FitMaxIters III-234
V_FitNumIters III-234
V_FitOptions III-213, III-233–III-234
V_FitQuitReason III-233, III-235, V-182
V_FitTol III-233
V_Flag II-120, V-29, V-208–V-209, V-246, V-255, V-790, V-1003, V-1088
V_flag V-21, V-45, V-54, V-68, V-70–V-71, V-89–V-90, V-105–V-106, V-112, V-140, V-150, V-154–V-156, V-163, V-165–V-167, V-169, V-172, V-182, V-184, V-189, V-191, V-204, V-228–V-229, V-235, V-243, V-245, V-247, V-251, V-265, V-268, V-271, V-294–V-295, V-301, V-306, V-310, V-312, V-316, V-321, V-394, V-414, V-464, V-487, V-506–V-507, V-515, V-518, V-540–V-541, V-543–V-545, V-579–V-580, V-592, V-658, V-660, V-662, V-684, V-696, V-702–V-703, V-706, V-709, V-720, V-722, V-730, V-737, V-744–V-745, V-747, V-757–V-759, V-768, V-784, V-818, V-821–V-822, V-826, V-828, V-831, V-847, V-887–V-889, V-891, V-900, V-907–V-910, V-914, V-917, V-919, V-923–V-924, V-927, V-931–V-932, V-934, V-945, V-947–V-949, V-958, V-964, V-976, V-982, V-984–V-985, V-989, V-991–V-992, V-995, V-1052, V-1057, V-1117
  loading waves (example) II-171
  LoadWave operation II-170
V_fontSize V-588
V_fontStyle V-588
V_Green V-70, V-91, V-93, V-307, V-318–V-319, V-759, V-766
V_Height V-90, V-93
V_horizScroll V-91
V_IQR V-973
V_isAliasShortcut V-301
V_isFile V-301
V_isFolder V-301
V_isInvisible V-166, V-301
V_isReadOnly V-301
V_isStationery V-301
V_iterations V-879
V_kind V-758
V_kurt III-123, V-415, V-973, V-1084
V_LeadingEdgeLoc V-247
V_left V-90, V-310, V-312, V-319, V-321
V_LevelsFound V-245
V_LevelX V-243
V_logEOF V-265, V-302
V_LUPolarity V-547
V_marquee V-311
V_max III-123, V-260, V-295, V-415, V-730–V-731, V-973, V-1084
V_maxChunkLoc III-123, V-1085
V_maxColLoc III-123, V-415, V-1084
V_maxLayerLoc III-123, V-1085
V_maxloc III-123, V-730, V-1084
V_maxRowLoc III-123, V-415, V-1084
V_Median V-973
V_min III-123, V-295, V-415, V-547, V-730–V-731, V-973, V-1084
V_minChunkLoc III-123, V-1085
V_minColLoc III-123, V-415, V-1084
V_minLayerLoc III-123, V-1085
V_minloc III-123, V-730, V-1084
V_minRowLoc III-123, V-415, V-1084
V_modificationDate V-301
V_mouseX V-307
V_mouseY V-307

V_nextRun V-45
V_nextValue V-487
V_nheld III-233
V_no_MIME_TSV_Load IV-283
V_npnts III-122, III-213, V-415, V-740, V-1084
  curve fitting III-233
V_nterms III-233
V_numConversionsFailed V-98, V-864
V_numConversionsSkipped V-98, V-864
V_numConversionsSucceeded V-98, V-864
V_numerator V-786
V_numImages V-394
V_numINFs III-122, III-233, V-973, V-1084
V_numMarkedAsBinary V-860, V-864
V_numNaNs III-122, III-233, V-973, V-1084
V_NumParticles V-365
V_numRegions V-435
V_numResidues V-433, V-435
V_numRoots V-252
V_numWaves V-1088
V_numWavesAffected V-864
V_NVAR_SVAR_WAVE_Checking V-146
V_ODEFunctionCalls V-457
V_ODEMinStep V-457
V_ODEStepCompleted III-334, V-457
V_ODEStepSize V-457
V_ODETotalSteps V-457
V_OptNumFunctionCalls V-731
V_OptNumIters V-731
V_OptTermCode V-730
V_overrideExperiment V-151
V_PeakLoc V-247
V_peakP V-246
V_PeakVal V-247
V_PeakWidth V-247
V_peakX V-246
V_period V-45
V_Pr III-222, III-233
V_prob V-976
V_PulseAmp4_0 V-784
V_PulseLoc1 V-784
V_PulseLoc2 V-784
V_PulseLoc3 V-784
V_PulseLvl0 V-784
V_PulseLvl123 V-784
V_PulseLvl4 V-784
V_PulsePolarity V-784
V_PulseWidth2_1 V-784
V_PulseWidth3_1 V-784
V_PulseWidth3_2 V-784
V_q III-233, III-235
V_Q25 V-973
V_Q75 V-973
V_r2 III-221, III-233
V_Rab III-233
V_rab III-226, V-125
V_Radius V-53
V_Red V-70, V-91, V-93, V-307, V-318–V-319, V-759, V-766
V_responseCode V-1057
V_right V-310, V-319, V-321
V_rising V-243
V_rms III-123, V-415, V-973, V-1084
V_Root V-252
V_Root2 V-252
V_rowHeight V-91
V_SANumIncreases V-730
V_SANumReductions V-730
V_sdev III-123, V-415, V-973, V-1084
V_selCol V-91
V_sem III-123, V-1084
V_siga III-233
V_sigb III-233
V_skew III-123, V-415, V-973, V-1084
V_SoundInAGC V-887, V-889
V_SoundInChansAv V-889
V_SoundInGain V-888–V-889
V_SoundInSampSize V-889
V_startChunk III-124, V-1085
V_startCol III-123, V-316, V-1085
V_startLayer III-124, V-1085
V_startParagraph V-316
V_startPos V-172, V-254, V-316
V_startRow III-123, V-91, V-316, V-1085
V_statistic V-976
V_structSize V-506, V-826
V_subscriptExtraHeight V-588
V_Sum V-547, V-973
V_sum III-123, V-1084
V_superscriptExtraHeight V-588
V_SVConditionNumber V-585
V_tapValue V-487
V_TBBufZone III-39, IV-292, V-1025
V_threshold V-416
V_tol III-233, III-265
V_top V-90, V-310, V-312, V-319, V-321
V_TrailingEdgeLoc V-247
V_Value V-29
V_value V-90, V-150, V-252, V-254, V-306, V-318, V-427, V-436, V-491, V-745, V-1098
V_version V-302
V_vertScroll V-91
V_Width V-90
V_YatRoot V-252
V_YatRoot2 V-252
ValDisplay controls
  using III-418
ValDisplay operation III-433–III-435, IV-233, V-1060–V-1064
Value Display controls
  bar display III-419, III-434–III-435
  examples III-434–III-435

height III-434
LED display III-434
limits III-419, III-435
numeric readout III-434
programming III-433–III-435
title III-435
updating
problems III-442, V-94
widths explained III-433
value waves II-77
Variable declaration II-104, V-1065
automatic creation of NVAR IV-70
in user functions IV-70
local variables in macros IV-119
local variables in user functions IV-34
not in a macro loop IV-119
variable-length datasets
HDF5 II-207
variable-length strings
HDF5 II-219
VariableList function V-1066
variables II-102–II-106
complex II-104
default values V-715
exists function V-207
global II-102–II-105, II-111, III-417–III-418, III-428–III-429
creating II-102
in data folders II-108
in user functions IV-65–IV-71
numeric variables V-1065
runtime lookup IV-65–IV-67
string variables V-996
uses of II-102
using structures instead IV-103
versus local IV-61
in debugger IV-218, IV-220
list of
GetIndexedObjName function V-303
GetIndexedObjNameDFR function V-304
listing in data folder V-141
LoadData operation II-156
loading from Igor experiment file V-500–V-505
loading waves II-170
local II-105
in macros IV-119
in user functions IV-34
versus global IV-61
MoveVariable operation V-665
name conflicts III-505
names II-102
CheckName function V-68
naming rules III-501
numeric II-104–II-105
NVAR_Exists function V-716
pass-by-reference IV-59
references using $ IV-62
runtime lookup of globals IV-65–IV-67
saving V-815
saving procedure parameters IV-147
scope II-103–II-105, IV-34, IV-61, IV-119, IV-123
Static keyword V-906
string II-105–II-106
SVAR_Exists function V-1011
system II-102–II-103
user II-103
uses for global variables II-102
V_ variables II-103
veclen II-103
writing formatted data V-260
variables file
in experiments II-19
variance
of images V-415
of waves V-415, V-1084
variance function V-1066
VAX floating point II-167
vcsr function V-1067
in wave assignments II-84
VDT2 XOP IV-312
veclen II-103
vector plots II-294, V-614
wind barbs V-614
vectors
cross product V-115
version
IgorVersion function V-362
in include statement IV-166
of Igor V-359–V-360
of procedure file IV-166
pragma keyword V-1068
ProcedureVersion function V-780
version pragma IV-54
VertCrossing free axis II-278–II-279
vertical dimension in tables II-263
vertical offsets
in notebooks III-8–III-9
viewing volume
Gizmo II-421
viewport projection
Gizmo II-424
violin plots II-330, II-337–II-342, II-345, V-649
appearance II-339
AppendViolinPlot operation V-37
asymmetric II-341
creating V-37
KDE II-337
markers V-651–V-652
per point settings II-343
trace names II-330
virtual memory III-513
VISA

data acquisition IV-312
VISA XOP IV-312
Visual C++ IV-208
Voigt
curve fitting function III-206
VoigtFunc function V-1068
VoigtPeak function V-1069
volumes
shrinkBox V-426
transpose volume V-427
volumetric plots II-95
Voronoi interpolation V-384, V-602
surface plot II-412
voronoi tesselation V-428
voxelgram plots
Gizmo II-463
voxels
shrinkBox V-426
VRAM II-407
Gizmo II-465

W

W_Abs V-1090
W_Acos V-1090
W_alphaValues V-537
W_AngleWave V-919
W_ANOVA1BnF V-907
W_ANOVA1Welch V-907
W_Asin V-1090
W_Atan V-1090
W_BackgroundCoeff V-403
W_Beam V-420
W_betaValues V-537
W_BoundaryIndex V-365
W_BoundaryX V-365
W_BoundaryY V-365
W_CConjugate V-1090
W_circularity V-365
W_CircularMeans V-916
W_CircularStats V-918
W_coef III-213
in curve fitting III-195–III-196, V-124, V-131
W_Compressed V-418
W_ContingencyTableResults V-924
W_COOColumns III-152
W_COORows III-152
W_COOValues III-152
W_Cos V-1090
W_Covar III-226
W_Cross V-115
W_CSCPointerB III-153
W_CSCRows III-153
W_CSCValues III-153
W_CSRColumns III-152
W_CSRPointerB III-152
W_CSRValues III-152
W_CumulativeVAR V-739
W_CWTScaling V-138–V-139
W_DebugTimerIDs V-529
W_DebugTimerVals V-529
W_DeCompressed V-419
W_Detrend V-182
W_Diagonal V-548
W_DWT V-190
W_Eigen V-740–V-741
W_eigenValues V-535–V-536, V-579
W_ExtractedCol V-420
W_ExtractedRow V-420
W_extremum III-347, V-731
W_FFT V-222
W_FindLevels V-244
W_fitConstants III-190, III-213
W_FitConstraint III-231, V-124, V-131
W_flipped V-1090
W_FPCenterIndex V-259
W_FPClusterIndex V-259
W_FuzzyClasses V-420
W_Hilbert V-348
W_Histogram V-349, V-351
W_HodgesAjne V-933
W_IE V-740–V-741
W_IEigenValues V-579
W_ImageHist V-379
W_ImageHistB V-379
W_ImageHistG V-379
W_ImageHistR V-379
W_ImageLineProfile V-389
W_ImageObjArea V-365
W_ImageObjPerimeter V-365
W_IND V-740–V-741
W_Index V-329
W_index V-328
W_IndexedValues V-421
W_inPoly V-248
W_InstantAmplitude V-445
W_InstantFrequency V-445
W_IntAvg V-363
W_Interpolated V-459
W_IntMax V-363
W_IntMin V-363
W_Inverse V-1090
W_InvW V-584
W_IPIV V-543
W_JackKnifeStats V-972
W_JBResults V-945
W_KMDispersion V-472
W_KMMembers V-472–V-473
W_KSResults V-948
W_KWTestResults V-907, V-949
W_LDiagonal V-548
W_LFSR V-487

W_LinearOrderStats V-919
W_LinearRegressionMC V-955
W_LineProfileDisplacement V-389
W_LineProfileStdv V-389
W_LineProfileX V-389
W_LineProfileY V-389
W_LombPeriodogram V-521
W_LombProb V-521
W_LUPermutation V-546
W_Magnitude V-1090
W_MagSqr V-1090
W_MatrixOpInfo V-535
W_MatrixRCONDE V-535
W_MatrixRCONDV V-535
W_max V-1091
W_MeanStdv V-1077
W_min V-1091
W_MultiTaperDF V-672
W_MultiTaperF V-672
W_MultiTaperPSD V-672
W_MultiThreadingArraySizes V-674–V-675
W_NNResults V-676
W_normalizedArea V-1091
W_ObjPerimeter V-364
W_OptGradient III-347, V-731
W_ParamConfidenceInterval V-132
W_PCAEV V-356
W_Periodogram V-182
W_Phase V-1091
W_PIV V-548
W_polyRoot V-252
W_PolyX V-172
W_PolyY V-172
W_PrimeFactors V-769
W_PSL V-740–V-741
W_QuantilesIndex V-968
W_QuantileValues V-968
W_reciprocalConditionE V-537
W_reciprocalConditionV V-537
W_rectangularity V-365
W_RegParams V-402
W_REigenValues V-579
W_ReplacedDuplicates V-241
W_Resampled V-972–V-973
W_RMS V-740–V-741
W_roi_to_1d V-425
W_Root V-252
W_RSD V-740–V-741
W_Scale V-530
W_Sgn V-1091
W_sigma III-213
    in curve fitting V-131
W_sigma wave in curve fitting III-195–III-196, III-222
W_Sin V-1091
W_SoundInRates V-889
W_SphericalInterpolation V-899
W_SpotX V-365
W_SpotY V-365
W_sqrt V-1091
W_SqrtN V-351
W_StatsChiTest V-913
W_StatsCircularTwoSamples V-914, V-921
W_StatsFTest V-931
W_StatsKendallTauTest V-947
W_StatsLinearCorrelationTest V-950
W_StatsLinearRegression V-952
W_StatsMultiCorrelationTest V-958–V-959
W_StatsNPSRTest V-964
W_StatsQuantiles V-969, V-973
W_StatsRankCorrelationTest V-970
W_StatsSRTest V-977
W_StatsTTest V-981
W_StatsVariancesTest V-985
W_StatsWRCorrelationTest V-993
W_sumCols V-427
W_SumDimension V-1007
W_sumRows V-427
W_tan V-1091
W_Texture V-421
W_TextureParams V-375
W_TriangulationData V-384, V-387
W_U2Diagonal V-548
W_UDiagonal V-548
W_W V-542, V-583–V-584
W_WatsonUtest V-922, V-988
W_WatsonWilliams V-989
W_WaveList wave V-320
W_WaveTransform V-1090
W_WheelerWatson V-990
W_WilcoxonTest V-907, V-991
W_XContour V-240
W_XHull V-101
W_xmax V-366
W_xmin V-366
W_XPolyn V-325
W_XPolynn III-73
W_XProjection V-781
W_YatRoot V-252
W_YContour V-240
W_YHull V-101
W_ymax V-366
W_ymin V-366
W_YPolyn V-325
W_YPolynn III-73
W_YProjection V-781
W_ZScores V-1083
wait
    Sleep operation V-871
wait until user clicks
    Sleep/B V-872
warping

images V-384
watch cursor
nonspinning V-872
waterfall
subranges II-322
waterfall plots II-326
creating II-326, V-691
cursors V-741, V-785
displaying II-326
modifying V-657
ModifyWaterfall operation V-657
NewWaterfall operation V-691
pcsr function V-741
qcsr function V-785
"poor man's" II-302
wave assignment statements
index waves II-77
indexing II-76
subranges II-76
wave assignments II-74
* II-76
64-bits IV-39
bounds checking IV-53
chunk indexing V-1011
chunk numbers V-811
column indexing V-1119
column numbers V-785
complex 64-bits IV-39
Compose Expression dialog III-137–III-138
concatenating waves II-80
curly braces II-78
data values II-74
decomposing waves II-81
dependency formulas II-84, IV-232
destination waves II-74
evaluation of II-74
example II-75
FastOp operation V-216
impulses II-82
increment II-76
INF II-76
interpolation II-78, II-83
layer indexing V-1119
layer numbers V-786
lists of values II-78
mismatched waves II-83, III-175
multidimensional waves II-96–II-97
MultiThread keyword V-673
omitting indices II-76
p function II-74, II-96
point numbers V-731
q function II-96
r function II-96
row indexing in assignments V-1114
row numbers V-731
s function II-96
source waves II-74
speeding up V-216
subranges II-76
synthesis II-82
unexpected results II-84
x function II-74
X indexing in assignments V-1114
XY data II-80
wave declaration
automatic creation of NVAR IV-70
WAVE files V-892
wave inspector in debugger IV-222–IV-224
wave instance names IV-20
in annotations III-38
WAVE keyword IV-65, V-1069
/Z flag IV-67
automatic creation with rtGlobals IV-70, IV-72
checking in debugger IV-213
example IV-69
failures IV-67
function results IV-76
in procedures III-170
inline IV-73
reference type flags IV-74
reference types IV-73
standalone IV-72
use with $ IV-62
use with data folders IV-69
wave reference waves IV-77
with data folders IV-249
wave leaks
debugging IV-206–IV-207, V-1087
example IV-207
free wave leaks IV-94
IgorInfo(16) V-362
tracking IV-207
WaveTracking operation IV-207, V-1087
wave names
LoadWave operation II-142
text encodings III-473
wave notes II-84
copy/paste in tables II-240, II-269
keyword-value packed strings II-84
note function V-694
Note operation V-694
Wave parameters III-170
in macros IV-121
wave reference functions IV-85, IV-197
ListToWaveRefWave function V-499
WaveExists function V-1073
WaveRefIndexed function V-1080
WaveRefIndexedDFR function V-1080
WaveRefsEqual function V-1081
WaveRefWaveToList function V-1081
XWaveRefFromTrace function V-1119
wave references IV-71–IV-78

as destination waves IV-85–IV-86
as function results IV-76
automatic creation IV-72
checking in debugger IV-213
creation with $ IV-62, IV-83
explicit IV-75
in tables II-258, II-270
inline IV-73
passed as function parameter IV-82
problems IV-75
real versus complex IV-64
runtime wave type checking IV-53
standalone IV-72
strict mode IV-52, IV-75
WAVE keyword IV-65
waves containing IV-77
wave scaling
IndexToScale function V-442
ScaleToIndex function V-832
Wave Stats dialog III-124
wave symbols III-42
centering in annotations III-43
customize at point III-43
in an axis label II-318–II-319, III-37
in annotations III-37, III-42
markers III-43
size in annotations III-43
width in annotations III-43
wave text encodings III-472–III-478
converting to UTF-8 III-486
problems III-474
SetWaveTextEncoding operation III-477, V-859
WaveTextEncoding function V-1086
wave tracking
counter mode IV-207
tracker mode IV-207
wave units
text encodings III-473
WAVEClear keyword V-1070
waveCRC function V-1071
WaveDataToString function V-1071
WaveDims function V-1072
WaveExists IV-67
WaveExists function V-1073
example IV-200
waveform data
computing areas III-120
computing means III-120
converting to matrix II-98
definition I-2
description of II-62
generating from XY data III-109
loading waves (example) II-171
versus XY data III-108
WaveHash function V-1073
WaveInfo function V-1073
wavelet transforms
continuous III-282, V-137
CWT operation V-137
discrete III-283, V-189
DWT operation V-189
image analysis III-362–III-363
inverse V-189
WaveList function V-1075
in dialogs IV-145
liberal names with IV-169
WaveMax function V-1077
WaveMeanStdv operation V-1077
WaveMetrics
Igor mailing list II-4
packages IV-247
support II-4
WaveMetrics Procedures IV-25
WaveMetrics Procedures folder II-32, III-401, IV-25, IV-166
packages III-401
read only III-397
WaveMin function V-1078
WaveMinAndMax function V-1078
WaveModCount function V-1079
WaveName function V-1079
WaveRefIndexed function IV-197, V-1080
example IV-200
WaveRefIndexedDFR function IV-197, V-1080
WaveRefsEqual function IV-198, V-1081
WaveRefWaveToList function IV-198, V-1081
waves II-62–II-88
64-bit capable wave record II-35
64-bits IV-39
accessing in user functions IV-65–IV-78
adopting II-25
adopting in Data Browser II-119
adopting programmatically V-23
appearance in graphs II-290–II-306, II-348, II-364, II-380
AppendToGraph operation V-35
AppendToTable operation V-37
as Bezier curves III-75
as polygons III-75, V-248
as XY pair I-3, V-1118–V-1119
autosave II-37
auxiliary
setting markers II-298
average deviation V-415, V-1084
average value III-173, V-415, V-1084
axis controlled by wave II-279, II-318, V-43, V-85, V-381
browsing II-72
in dialogs II-228
combining V-82
comparing V-196
complex II-81

complex 64-bits IV-39
Concatenate operation V-82
concatenating II-80
contour names V-86
converting to/from text II-73
copying II-115
CopyScales operation V-107
creating II-65, II-92, V-185, V-526
by drawing
GraphWaveDraw operation V-325
examples I-35, I-46, I-53
in tables II-239, II-248
CreationDate function V-114
CsrWave function V-116
CsrWaveRef function V-117
CsrXWaveRef function V-117
dat units II-69
precision II-69
data
scaling V-853
units V-853
values II-63
finding point number V-51
data folder containing wave V-317
data full scale II-69
data types II-66
date format II-245, II-315
date/time II-85
deallocating memory IV-205, V-1070
decimation II-98, III-135
decomposing II-81
default properties II-67
definition I-2, II-62
deleting data II-73, II-249, V-157
dependency formulas II-84, IV-232
DimDelta function V-160
dimensions
how many V-1072
labels V-240, V-298
scaling V-853
DimOffset function V-160
DimSize function V-160
dispersion V-415, V-1084
display of complex III-273
drag and drop II-280
Duplicate operation V-185–V-186
duplicating II-70
in tables II-240, II-269
dynamic updating in tables II-234, II-237
editing by drawing III-73, III-75–III-76
examples I-21–I-22, I-29
GraphWaveDraw operation V-326
error waves II-304
exists function V-207
Extract operation V-213
f(z) II-298
finding values V-252–V-253
FindSequence operation V-252
FindValue operation V-253
fixed length V-526, V-788
flip V-1090
free IV-91–IV-96, IV-207
Extract operation V-214
free waves V-1092
freeing memory IV-205, V-1070
freezing
brr V-858
global IV-207, V-1087
global waves IV-91, IV-96, V-1092
graphing II-276–II-354
hiding in graphs II-295
home waves II-87
image names V-397
in experiments V-1075
in graphs V-1075
CheckDisplayed operation V-68
in tables V-1075
exporting II-270, V-829
in user functions III-170–III-174, IV-82–IV-85
in windows V-1075
index V-1090
index in style macros II-351
index waves II-77
indexing II-76
dimension labels II-93
using dimension labels II-82
information about II-72, V-1073
initialization II-79
inserting data II-73, II-249, V-443
instance names III-38, IV-20
integer data types II-85
integer wave calculations IV-9
inverse V-1090
killing II-70–II-71, II-117
KillWaves operation V-471
kurtosis V-415, V-1084
labels II-93–II-94
example II-82
FindDimLabel function V-240
GetDimLabel function V-298
in delimited text files II-131
in tables II-262
length limit II-94, II-244
naming conventions II-94
SetDimLabel operation V-838
speed considerations II-94
viewing in tables II-235
wave indexing II-82
list of V-1075
CountObjects operation V-110
CountObjectsDFR operation V-111
GetIndexedObjName function V-303

GetIndexedObjNameDFR function V-304
properties II-88
waves in graph V-320
listing in data folder V-141
ListToWaveRefWave function V-499
live II-347–II-348
loading
from Igor experiment file V-500–V-505
local IV-207, V-1087
local waves IV-91, IV-96, V-1092
locking V-858
magnitude squared V-1090
Make operation V-526
making II-65, II-67, II-92, V-185, V-526
MatrixOp operation III-143
maximum
column location V-415
location V-1084
row location V-415
value V-415, V-1084
minimum
column location V-415
location V-1084
row location V-415
value V-415, V-1084
mismatched waves II-83, III-175
modification date/time V-592
MoveWave operation V-665
moving to data folder II-115
name conflicts III-505
name from wave reference V-675
names II-63, II-65, III-38
as parameters IV-85
CheckName function V-68
in Igor binary wave files II-155
instance names IV-20
related functions V-11
names of free waves IV-95
naming rules III-501
normalization II-79
number of INFs V-1084
number of NaNs V-1084
number of points II-67, III-109, V-160, V-526, V-714, V-788, V-1084
default II-67
numeric precision II-66, II-68, V-788
default II-67
numeric types V-1092
numpnts function V-714
offsets in graphs II-302–II-303
multipliers II-302
preventing II-302
undoing II-302
overview of waves I-2–I-3
overwriting caveats II-68
parameters
in user functions IV-60
to functions V-675
pass-by-reference IV-60
passed as function parameter IV-82
point numbers II-63, V-1114
preventing modification V-858
printing V-769
processing lists of waves IV-198–IV-201
properties default II-67
Redimension operation V-788
redimensioning II-72, V-788
related functions V-8
related operations V-2–V-3
relation to graphs I-3
relation to tables I-3, II-234
removing INFs V-1091
removing NaNs V-1092
removing zeros V-1092
renaming II-72, II-115, III-504, V-796
in tables II-234, II-239
reshaping 1D to 2D V-789
Reverse operation V-809
RMS value V-415, V-1084
rotate V-1090
Rotate operation V-810
rows II-62
runtime lookup of globals IV-65–IV-67
saving
wfprintf operation V-1093
saving huge waves II-35
scaling II-68, V-160, V-853
searching V-252–V-253
SetDimLabel operation V-838
SetScale operation V-853–V-854
SetWaveLock operation V-858
shared waves II-87
shift V-1090
sign V-1091
skewness V-415, V-1084
splitting V-901
splitting up II-70
SplitWave operation V-901
standard deviation V-1077, V-1084
standard error of mean V-1084
statistics III-122–III-124, V-1077, V-1082
styles II-290–II-306, II-350–II-352
preferences II-348, II-364, II-380
sum function V-1007
sum of values V-1084
symbols in legends III-37, III-42
synthesis II-82
temporary II-108
terminology I-2, II-62
text encodings III-472–III-473
time format II-245, II-315
trace instance names III-38

transforms V-1090
uniform spacing I-2
UniqueName function V-1048
units string of V-1093
value waves II-77
variance V-1084
wave instance names IV-20
wave reference functions IV-197
ContourNameToWaveRef V-87
ImageNameToWaveRef V-398
WAVEClear keyword V-1070
WaveDims function V-1072
WaveExists function V-1073
WaveInfo function V-1073
WaveList function V-1075
WaveModCount function V-1079
WaveName function V-1079
WaveRefIndexed function V-1080
WaveRefIndexedDFR function V-1080
WaveRefsEqual function V-1081
WaveRefWaveToList function V-1081
WaveStats operation III-122
WaveTransform operation V-1090
X scaling I-2, II-63, V-157, V-483, V-810
X values II-62–II-63
x0, dx II-63
zero padding V-789
WAVES keyword in Igor Text files II-151
waves text encodings
Override Experiment III-473
WavesAverage function III-173
WavesMax function III-173
WaveStats
multidimensional waves II-99
WaveStats operation V-1082
for finding the mean III-121
NaNs and INFs III-124
special variables III-122
WaveSum function III-171
WaveTextEncoding function V-1086
WaveTracker
example IV-207
WaveTracking operation IV-207, V-1087
WaveTransform
removing NaNs III-113
WaveTransform operation V-1090
WaveType function V-1092
WaveUnits function V-1093
web pages
downloading via HTTP IV-276
HTTP queries IV-277
weighting wave
curve fitting III-199
JointHistogram operation V-466
western text encodings III-461, III-466
wfprintf operation IV-195, IV-259–IV-261, V-1093
conversion specifications IV-260
example IV-261
WhichListItem function V-1095
while loops
in user functions IV-45–IV-46
whiskers
box plots II-331–II-332, V-595
whitespace characters
in tables II-258
Whole Word III-24
width of graphs II-288
Wigner Distribution Function III-281
Wigner transform III-281
WignerTransform operation V-1095
wildcard character V-999, V-1066, V-1075
WinList function V-1098
wind barbs II-329, V-614
winding rule III-72
Window Browser
WindowBrowserWindowsPopup menu IV-140
window browser II-49
Window Control dialog II-49, II-240, II-277
window hooks
deactivate events IV-303
exterior subwindows IV-305
hide events IV-304
kill events IV-303
show events IV-304
Window keyword IV-118, V-1097
data folders II-111
window names II-45
changing V-169
CheckName function V-68
graphs II-277, V-162
references using $ IV-63
UniqueName function V-1048
window position
platform-related issues III-455
window recreation
DoWindow operation V-168
page layouts II-477
tables II-241
Window Tiling Area dialog II-50
window titles II-45
command window II-9
DoWindow operation V-170
for notebooks III-13, III-20, III-25
for page layouts II-477
for tables II-235, II-240
graphs II-277–II-278
WindowBrowserWindowsPopup menu IV-140
WindowFunction operation V-1097
windowing
amplitude compensation III-278
Bartlet function V-225
Bartlett function V-183, V-225, V-1097

Blackman function V-183, V-225, V-1097
Cos function V-225
DSPPeriodgram operation V-182
energy loss III-278
flat-top windows V-227
Hamming function V-183, V-226, V-1097
Hanning function V-183, V-226, V-1097
Hanning window function III-277
images V-435
Bartlet V-436
Bartlett V-436
Blackman V-436
Hamming V-436
Hanning V-436
Kaiser V-437
Kaiser Bessel function V-183, V-226, V-437, V-1097
matrices V-435
other window functions III-279
Parzen function V-183, V-226, V-1097
Poisson function V-183, V-226, V-1097
Riemann function V-183, V-227, V-1097
triangle window function III-278
used with FFT III-275–III-279
WindowFunction operation V-1097
Windows
file permissions II-30
high-DPI III-508
windows II-44–II-60
activating II-46
active state V-318
AutoPositionWindow operation V-42
Bring to Front II-50
Close Window dialogs II-47, II-350
closing II-46, V-471
control dialog II-49
DefineGuide operation V-153
DoWindow operation V-168
expand to full size II-50
GetUserData function V-316
GetWindow operation V-318
GetWindowBrowserSelection function V-323
GuideInfo function V-336
GuideNameList function V-337
guides
built-in V-153
creating V-153, V-336
deleting V-153
information about V-336
list of V-337
moving V-153
help windows II-3
hiding II-46
HideProcedures operation V-347
hook function V-320
named V-320, V-866
unnamed V-866
hook functions
named IV-293
subwindows IV-294
unnamed IV-305
killing II-46, V-471
list of V-1098, V-1100
macro submenus II-48
MacroList function V-524
making a new window II-45
managing position and size II-50
maximized state V-320
menu II-45–II-51
move to preferred position II-50
MoveWindow operation V-666
names
of notebooks III-25, V-686
of tables II-240
naming rules III-501
note V-320, V-867
overview II-44
Recent Windows submenu II-46
recreation macros II-47–II-48, II-350, V-168, V-1101
related functions V-10
related operations V-2
renaming V-797
retrieving II-50
retrieving all II-50
saving II-47
Send to Back II-50
SetWindow operation V-865
shortcuts II-60
showing II-46
DisplayProcedure operation V-163
size V-321
stacking II-50, V-905
style macros V-171
target window II-44
Tile or Stack Windows dialog II-50
tiling II-50, V-1036–V-1037
user data IV-293, V-868
examples IV-293
getting V-316
window browser II-49
Windows menu II-45–II-51
Windows metafiles
saving V-826
Windows OS
ActiveX Automation IV-265
date system II-245
file extensions
cross-platform issues
in procedures III-455
in procedure files III-455
template files II-21

file paths
in procedures III-455
issues III-448
Igor program name III-448
system requirements III-513
system version info V-360
Windows paths
HDF5 II-221
Windows-1252 text encoding III-460–III-461, III-481
WinList function V-1098
independent modules V-1099
WinName function V-1100
WinRecreation function V-1101
wintype function V-1103
wireframe plots II-95
WMAxisHookStruct V-609
WMAxisHookStruct structure V-1103
WMBackgroundStruct structure IV-319–IV-320, V-1103
WMButtonAction structure V-1104
WMCheckboxAction structure V-1104
WMCustomControlAction structure V-1105
WMDrawUserShapeStruct structure V-1106
WMF
saving V-826
WMFitInfoStruct structure V-1107
WMGizmoHookStruct II-473
WMGizmoHookStruct structure V-1107
WMListboxAction structure V-1108
WMMarkerHookStruct IV-309
WMMarkerHookStruct structure V-1109
WMMenus.ipf IV-247
WMPopupAction structure V-1109
WMSetVariableAction structure V-1110
WMSliderAction structure V-1111
WMT0 files
notebooks III-2
WMTabControlAction structure V-1112
WMTooltipHookStruct IV-310, V-1113
WMWinHookStruct IV-297
keyboard example IV-300
WMWinHookStruct structure V-1113
wnoise function V-1113
worker functions for threads IV-330
worksheets
using a notebook as III-4
World Wide Web II-5
creating help file links IV-257
Igor as browser IV-281–IV-283, IV-287, IV-289
NIDAQ Tools information IV-312
opening preferred browser V-54
WaveMetrics
home page II-5
Wrap Around Search III-24
wrap end effect method III-299
write-protect
in notebooks III-10, V-697
ModifyProcedure operation V-643
write-protect icon
in notebooks III-5
in procedure windows III-397

X

x
suffix in tables II-241, II-254
x function V-1114
in multidimensional waves II-92–II-93, II-95
in wave assignments II-74
X keyword in Igor Text files II-152
x offset
in polynomial fitting III-210, V-127
X scaling I-2, II-63
changed by FFTs III-271
changed by IFFTs III-271
changing II-68, V-107
SetScale operation V-853
checking
in tables II-235
CopyScales operation V-107
default II-67
deltax function V-157
for XY data II-63
in Igor Text files II-152
leftx function V-483
loading text files II-133, II-140
pnt2x function V-748
rightx function V-810
Rotate operation III-316
SetScale operation V-853
x2pnt function V-1114
X units
changed by FFTs III-271
changed by IFFTs III-271
changing II-68, V-107
SetScale operation V-853
default II-67
X values II-62–II-63
can't enter in tables II-244
conversion to point numbers V-1114
definition II-63
in tables II-235, II-241
in wave assignments II-74
indexing II-74, II-76
interpolation II-78
pnt2x function V-748
relation to point numbers II-63
tag attached at III-44
viewing in tables II-235
x function V-1114
x2pnt function V-1114
X waves

CsrXWave function V-117
CsrXWaveRef function V-117
x2pnt function V-1114
Xcode IV-208
xcsr function V-1114
XLLoadWave operation II-159, V-1115
XOP Toolkit IV-209
XOPs IV-209
XOR
bitwise operator IV-6–IV-7
Xoshiro256** V-196, V-324
XWaveName function V-1118
XWaveRefFromTrace function IV-197, V-1119
XY data
areaXY function V-41
converting to waveform data II-80, III-109
definition I-3
description of II-63
faverageXY function V-218
in curve fitting III-197
in graphs II-278, V-1118–V-1119
interpolation of III-109, V-458
loading waves (example) II-173
overview I-3
versus waveform data III-108
X scaling of II-63
XY area procedures III-122
XY Pair to Waveform panel III-109
XYToWave1 user-defined function III-111
XYToWave2 user-defined function III-112
XYZ (color) conversions
rgb2xyz V-424
xyz2rgb V-428
XYZ data
bounding sphere V-53
converting to matrix II-367
interpolation V-459, V-899

Y

y
suffix in tables II-241
Y full scale
default II-67
y function V-1119
in multidimensional waves II-92–II-93, II-95
Y scaling
changing V-107
SetScale operation V-853
CopyScales operation V-107
SetScale operation V-853
use in Axis Range tab II-287
Y units
changing V-107
SetScale operation V-853
default II-67
Y values
lists of II-78
y function V-1119

Z

z function V-1119
in multidimensional waves II-92–II-93, II-95
Z scaling
changing V-107
SetScale operation V-853
CopyScales operation V-107
SetScale operation V-853
Z units
changing V-107
SetScale operation V-853
Z values
z function V-1119
Zapf Dingbats font III-493
zcsr function V-1120
ZernikeR function V-1120
zero end effect method III-299
zero line in graphs II-310
zero padding waves V-789
zeros
removing
from waves V-1092
zeros and poles III-301
zeros of functions
finding III-338–III-343
FindRoots operation V-248
zeta function V-1120
zip files
UnzipFile operation V-1051
zooming
command line II-53
dialogs
text areas II-53
graphs II-285
example I-35
help II-53
help files II-53
history area II-53
notebooks II-53
page layouts II-477
procedure windows II-53
setting default II-53