Category Reference for LabTalk Commands, Objects, Functions, and Macros

The following sections categorize the LabTalk commands, objects, functions, and macros based on their purpose. For detailed information on a specific command, object, function, or macro, refer to the *LabTalk Manual* or the LabTalk Help file.

Note: The fitting functions available from the nonlinear curve fitter are not included in this document. To learn more about these functions, review the CurveFittingFunctions.PDF available from the OriginLab website.

Contents

1. Commands

1.1 Data Manipulation and Calculation

average: Replace a dataset with a running average.

copy: Copy one dataset to another.

create: Create a dataset, worksheet, or function.

delete: Delete a dataset, function, macro, or variable.

derivative: Take the derivative of a dataset.

edit: Open the worksheet for a dataset.

integrate: Integrate a dataset.

limit: Find the minimum and maximum X and Y values for a dataset.

lr: Perform linear regression on a dataset.

mark: Delete or mask data points in a dataset.

math: Perform mathematical operations on or between datasets.

matrix: Set the dimensions and values of a matrix. Transpose a matrix.

nlsf: Perform nonlinear least squares fitting.

plot: Append values to a dataset.

sort: Sort worksheet data.

undo: Undo various procedures.

1.2 Display Control

axis: Open the Axis dialog box. Edit the axis scale type, grid display, tick, and tick label display. Display additional axes in a layer.

document -t: Open a window based on a template.

doToolBox: Select or block selection of a Tools toolbar tool. Hide the Tools toolbar. Display a picture of a worksheet or graph window in a layout page window.

draw: Draw a line and edit its properties. Hide an object. Update an object. Edit the location of an object. Read a metafile, bitmap, or object from a file into an object. Update an object's numeric or text fields.

edit: Open the worksheet for a dataset. Open the Color Palette dialog box.

get: Read the display properties of a dataset or data plot.

label: Create and edit a text label, including axis titles.

layer: Edit the properties of a layer. Add data to a layer. Add layers to a graph page. Open layer-related dialog boxes including the Plot Details dialog box. Extract multiple data plots to separate layers.

legend: Display or update the legend for a graph layer.

page: Edit the properties of a page. Add data to separate layers of a graph page. Open page-related dialog boxes including the Plot Details dialog box. Extract multiple layers to separate graph pages.

plot: Update the layer or the page.

select: Edit the display of the selected objects including alignment and grouping.

set: Edit the display properties of a dataset or data plot. Open the Plot Details dialog box.

type: Hide the Script window or the status bar.

undo: Undo various procedures.

window: Open, close, hide, minimize, maximize, rename, and activate a window. Merge graph windows.

worksheet: Edit the properties of a worksheet. Duplicate a worksheet. Open worksheet-related dialog boxes. Plot worksheet data. Run a worksheet's script.

1.3 Project Management

document: Append projects. Close the current project. Open a project. Rename the current project. Count the number of layers in a graph window. Count the number of object types in a project.

file: Copy one file to another.

list: List all datasets, macros, system variables, or data plot style holders.

1.4 Control Flow

break: Exit from a loop, a script, or a progress dialog box.

continue: Skip to the next iteration of the current loop.

document -e (-ef): Loop to execute a script that affects every object of the specified type (**-ef** = in the active Project Explorer folder).

exit: Exit from Origin.

for: Loop for repeated operation.

if [else]: Test a condition and branch accordingly.

layer -o: Execute a script for the specified layer.

loop: Loop while incrementing a variable.

repeat: Execute the same script multiple times.

return: Return a value from a script and exit the script.

switch: Test an expression against a series of constant values and branch accordingly.

win -o: Execute a script for the specified window.

1.5 Input/Output

clipboard: Copy the current page to the clipboard. Save the specified graph page as a Windows metafile.

copy: Copy one dataset to another.

draw -fb, -fm: Read a bitmap or metafile from a file into an object.

getFileName: Open the Open or Import Multiple ASCII dialog boxes.

getNumber: Get input of up to six numbers or strings.

getPts: Graphically get points or screen coordinates from a data plot.

getSaveName: Open the Save As dialog box.

getString: Get a user-supplied text string.

getYesNo: Open a Yes/No/Cancel dialog box.

open: Import a data file.

print: Print the active (or specified) page. Open the Print or Page Setup dialog boxes.

save: Save the project or save a window in the project. Export worksheet data.

type: Output text to the Script window, status bar, or various dialog boxes.

1.6 Script Management

define: Define a macro.

draw: Run an object's Label Control dialog box script.

menu: Manipulate menus, submenus, and menu commands.

queue: Place a script at the end of the window update queue.

run: Execute a script file or run a Windows program.

1.7 External Access

dde: Client DDE support.

dll: Execute a function from a user-supplied DLL.

1.8 Time

seconds: Elapsed time counter. Perform timer-related operations.

timer: Execute the **TimerProc** macro's script periodically.

2. Objects

2.1 Data Manipulation and Calculation

curve: Perform smoothing, integration, differentiation, and baseline and peak operations on a data plot.

excel: Run Excel macros or VB application functions from Origin.

fft: Perform forward and backward fast Fourier transforms, correlation, convolution, and deconvolution.

integ: Read the integration results from the **integrate** command.

limit: Read the limit results from the **limit** command.

lr: Read the linear regression results from the **lr** command.

mat: Convert data between a worksheet and matrix. Perform mathematical operations on matrix data.

nlsf: Perform nonlinear least squares fitting.

sort: Sort worksheet data.

stat, stat.ds, stat.lr, stat.mr, stat.pr: Perform linear, polynomial, and multiple regression. Calculate descriptive statistics.

sum: Read the statistics results from the **sum( )** function or from Statistics on Columns.

2.2 Display Control

create: Create worksheets. Delete worksheet columns and datasets.

ed: LabTalk Editor control.

draw: Edit objects in Button Edit Mode.

layer: Edit the properties of a layer. Add data to a layer.

layer.axis: Edit the properties of an axis.

layer.axis.break: Edit the properties of an axis break.

layer.axis.grid: Edit the properties of axis grid lines.

layer.axis.label: Edit the properties of axis tick labels.

layer.plot*N*.boxchart: Edit the bin and box properties of a box chart.

page: Edit the properties of a page (for example, the graph page).

system: Read the general project properties including the current date and time, the Origin version number, and the starting menu level.

system.axis: Edit the default axis color and width for graphs that aren't created from a template.

system.dash: Edit the dash line settings and hatch line settings.

system.dataDisplay: Edit the properties of the Data Display toolbar.

system.date: Edit the custom date formats available from the Date Format drop-down lists.

system.dialog: Edit the open and close properties of the Options dialog box.

system.display: Edit the display properties for balloon help, window updating, and axis blinking when double-clicked.

system.excel: Edit the settings for using Excel in Origin.

system.font: Edit the font-related settings for text labels.

system.graph: Edit the graph-related settings that aren't saved with a template.

system.grid: Edit the properties of axis grid lines for graphs that aren't created from a template.

system.math: Set the angular units to radians, degrees, or gradians.

system.notes: Control the size of a notes window. Display a prompt when closing a notes window.

system.numeric: Edit the numeric display settings including the number of digits displayed after a decimal point, the numeric separator, and the conversion threshold for decimal to scientific notation.

system.operations: Control the display of the toolbar spacer.

system.page: Edit the spacing of the axis grid lines and the object grid lines.

system.project: Edit the Project Explorer display settings. Control the type of child window that displays when you open a new project.

system.script: Display a prompt when closing the Script window.

system.symbol: Edit the symbol border width and the line and symbol gap for data plots.

system.tick: Edit the tick and tick label settings that aren't saved with a template.

system.toolbar: Custom toolbar control.

system.wks: Display a prompt when closing an Excel workbook, worksheet, or matrix. Delete datasets when deleting a worksheet. Delete empty columns after transposing a worksheet. Set new columns to Numeric or to Text & Numeric.

type: Hide the Script window or the status bar.

wks: Edit the properties of a worksheet. Add, select, and insert columns. Combine worksheets. Open a worksheet based on a template.

wks.col: Edit the properties of a worksheet column.

2.3 Input/Output

copy: Read the number of elements copied when using the **copy** command.

db: ODBC import.

export: Export a graph to a file.

export.image: Control the display of an advanced dialog box for editing the image attributes when exporting a graph.

fdlog: Edit the properties and open the Save As, Open, and Open Multiple Files dialog boxes.

getPts: Read or set the points/screen coordinate properties when using the **getPts** command. The **getPts** command graphically gets points/screen coordinates from a data plot.

image: Export graphs. Import and export raster graphic images.

mail: Basic email functionality.

oFTP: FTP access.

oPack: Exchanging custom tools.

oWks2HTM: Convert worksheet to HTML.

rt: Read the properties of the real-time data block coming into Origin.

system.copyPage: Edit the Copy Page and export graph settings.

system.display: Control the setting when pasting images from the Clipboard (metafile or bitmap).

system.fileExt: Add and remove file extension groups and add file extension types to the Save As and Open dialog boxes. Track the default file paths within an Origin session or between Origin sessions.

system.operations: Use OLE in-place activation when editing Origin objects embedded in another application.

system.print: Edit the print-related settings.

system.project: Back-up the current project file before saving.

type: Copy the contents of a worksheet to the Script window. Redirect analysis output to the Script window or a notes window. Display a modal message box. Append a header to the Results Log.

wks: Copy the contents of a worksheet into **%A**. Paste the variable contents into a worksheet.

wks.export: Control the data export options for a worksheet.

wks.import: Open the Import Verification dialog box before importing a data file.

2.4 Script Management

ini: Create sections in an initialization file. Assign values to keywords. Create new keywords.

macro: Read the number of arguments passed to a macro.

menu: Manipulate menu commands.

run: Execute script from a script file.

3. Functions

3.1 Worksheet, Dataset, and Miscellaneous Functions

3.1.1 Basic Worksheet Functions

col(*colName*): Set or return the dataset associated with the *colName* (or *colNum*) column.

col(*colName*)[*rowNum*]: Set or return the numeric value of the specified cell. We recommend using the **cell( )** function instead.

col(*colName*)[*rowNum*]$: Set or return the text value of the specified cell. We recommend using the **cell( )** function instead.

wCol(*colNumVariable*): Set or return the dataset associated with column number variable (for example, **ii**).

wCol(*colNumVariable*)[*rowNum*]$: Set or return the text value of the specified cell.

cell(*rowNum,colNum*): Set or return the specified cell value. Note: The **cell( )** function was first implemented in Origin 6.0 SR4. In Origin 6.0 SR4 and the release version of Origin 6.1, the function argument order was **cell(*colNum,rowNum*)**. The argument order was changed for Origin 6.1 SR1 and up.

3.1.2 Dataset Generation Functions

data(*x1,x2,inc*): Create a dataset with the specified initial and final value and increment.

{*v1,v2,...vn*}: Return the specified values. Use the **col( )** function to assign the values to a column.

fit(*XDataset*): Create a dataset corresponding to the NLSF fit line.

table(*dataset1,dataset2,dataset3*): Create a look-up table from the NLSF fit line and a specified X or Y dataset.

3.1.3 Dataset Manipulation Functions

sort(*dataset*): Sort a dataset.

diff(*dataset*): Return a dataset that contains the difference between adjacent points in *dataset*.

peaks(*dataset,width,minHeight*): Find peaks in a dataset.

corr(*dataset1,dataset2,k*[*,N*]): Correlation between two datasets.

3.1.4 Dataset Information Functions

isMasked(*index,dataset*): Return the number of masked points in *dataset*, or return the mask state of the index number point.

findMasks(*dataset*): Return a dataset that contains the indexes of the masked data points.

hasX(*dataset*): Return 1 if *dataset* has an associated X column.

XOf(*dataset*): Return a string containing the X values of *dataset*.

errOf(*dataset*): Return a dataset (error column) containing the error values of *dataset*.

XValue(*i,dataset*): Return the corresponding X value for *dataset* at row number *i* in the active worksheet.

XIndex(*x,dataset*): Return the index number of the first cell in the X dataset associated with *dataset*, where the cell value is less than or equal to *x*.

XIndex1(*x,dataset*): Return the index number of the first cell in the X dataset associated with *dataset*, where the cell value is greater than or equal to *x*.

list(*value*,*dataset*): Return the index number in *dataset* where *value* first occurs.

3.1.5 Miscellaneous Functions

colNum(*colName*): Return the *colName* column number.

color(*name*): Return the color index for the *name* color.

date(*date*): Return the Julian day value for *date*.

exist(*name*): Return a value which indicates *name*'s object type (dataset, variable, graph, etc.).

exist(*name*,*n*): Check if *name* is active and not hidden.

hex(*string*): Return the base 10 equivalent to the hexadecimal value represented by *string*.

asc(*char*): Return the ASCII value of *char*.

font(*name*): Return the font index for the *name* font.

3.2 Mathematical Functions

3.2.1 Basic Functions

prec(*x*,*p*): Return a value or dataset with *p* significant figures.

round(*x*,*p*): Return a value or dataset with *p* decimal places accuracy.

abs(*x*): Return the absolute value of *x*.

angle(*x*,*y*): Return the angle in radians between the specified point and the X axis.

exp(*x*): Return the value of e raised to the *x* power.

sqrt(*x*): Return the square root of *x*.

ln(*x*): Return the natural log of *x*.

log(*x*): Return the base 10 log of *x*.

mod(*x*,*y*): Return the integer modulus of integer *x* divided by integer *y*.

rMod(*x*,*y*): Return the real modulus of real number *x* divided by real number *y*.

int(*x*): Return the truncated integer of *x*.

nInt(*x*): Return the rounded off value of *x*.

sin(*x*): Return the sine of *x*.

cos(*x*): Return the cosine of *x*.

tan(*x*): Return the tangent of *x*.

asin(*x*): Return the inverse sine of *x*.

acos(*x*): Return the inverse cosine of *x*.

atan(*x*): Return the inverse tangent of *x*.

sinh(*x*): Return the hyperbolic sine of *x*.

cosh(*x*): Return the hyperbolic cosine of *x*.

tanh(*x*): Return the hyperbolic tangent of *x*.

3.2.2 Special Functions

Jn(*x*,*n*): Bessel function of order *n*.

J0(*x*): Zero order Bessel function.

J1(*x*): First order Bessel function.

Yn(*x*,*n*): Bessel function of second kind.

Y0(*x*): Zero order Bessel function of second kind.

Y1(*x*): First order Bessel function of second kind.

gammaLn(*x*): Return the natural log of the gamma function.

incBeta(*x*,*a*,*b*): Incomplete beta function.

beta(*a*,*b*): Beta function.

incGamma(*x*,*a*): Incomplete gamma function.

3.2.3 Random Number Generators

rnd(*seed*): Return a value between zero and one from a uniformly distributed sample.

ran(*seed*): Return a value between zero and one from a uniformly distributed sample.

gRnd( ): Return a value from a normally distributed sample, with zero mean and unit standard deviation.

normal(*nPts,seed*): Return a range from a normally distributed sample, with zero mean and unit standard deviation.

Poisson(*nPts,mean,seed*): Return *nPts* number of random integers having a Poisson distribution with mean *mean*.

uniform(*nPts,seed*): Return a range from a uniformly distributed sample.

3.3 Statistical Functions

3.3.1 Statistics on Datasets or a Set of Values

max(*values*): Return the maximum value from a set of values.

min(*values*): Return the minimum value from a set of values.

histogram(*dataset,inc,min,max*): Create data bins from *dataset*.

sum(*dataset*): Return a dataset whose ith element is the sum of the first i elements of the dataset *dataset*.

ave(*dataset,size*): Break *dataset* into groups of size *size*, find the average for each group, and return a range containing these values.

percentile(*dataset1,dataset2*): Return a range comprised of the percentile values for *dataset1* at each percent value specified in *dataset2*.

ss(*dataset,ref*): Sum of squares function. For each value in *dataset*, subtract *ref*. Square the results and sum for all values.

ss(*dataset*): Sum of squares function. *Ref* is omitted.

ss(*dataset1,dataset2*): Sum of squares function. *Ref* is a dataset.

ss(*dataset,expression*): Sum of squares function. *Ref* is an expression involving i or x.

cov(*dataset1,dataset2,ave1,ave2*): Return the covariance between two datasets.

3.3.2 Statistical Distributions

tTable(*x,n*): Student's t distribution function with n degrees of freedom.

invT(*value,n*): Inverse t distribution function with n degrees of freedom.

fTable(*x,m,n*): F distribution function with m and n degrees of freedom.

incF(*x,m,n*): Incomplete f distribution function with m and n degrees of freedom.

invF(*value,m,n*): Inverse f distribution function with m and n degrees of freedom.

erF(*x*): Error function (or normal error integral).

invErF(*x*): Inverse error function.

prob(*x*): Probability density (for a normal distribution) integrated from $-x$ to $+x$.

invProb(*x*): Inverse probability density function.

QCD2(*n*): Return a factor (Quality Control D2 Factor) which is used to estimate the standard deviation of a parent distribution from an average range when the sample size n is given.

QCD3(*n*): Return a factor (Quality Control D3 Factor) for determining the 3-sigma lower control limit for R charts from the average range when the sample size n is given.

QCD4(*n*): Return a factor (Quality Control D4 Factor) for determining the 3-sigma upper control limit for R charts from the average range when the sample size n is given.

4. Macros

4.1 Data Manipulation and Calculation

checkVar *varName value*: Check if the variable *varName* exists. If it does, this macro does nothing. If it doesn't, it creates the variable and assigns the value.

checkWksSelection: Check if a Z column (or a range of a Z column) is selected in the active worksheet. If so, the **nZCol**, **nYCol**, and **nXCol** variables are set.

clearWorksheet *worksheetName*: Clear the worksheet and set the number of rows to 30.

lSqFit: Perform a nonlinear least squares fit of the active dataset.

new *dataset numPoints*: Create an empty dataset with *numPoints*.

newFunction: Create a new function.

noYOffset: Initialize the variables **p1** and **pv1** to zero.

setDataRange *dataset*: Set the X value for the first data point and the X increment for the dataset.

testColSet: Check if a column (or a range of a column) is selected in the active worksheet.

setXYOffset *minimumOffset*: Used when initializing various fitting functions. Compute and set the minimum X and Y offset.

4.2 Display Control

arrangeLayers *numRows numCols*: Arrange all unlinked layers and all linked layers with units of % of linked layer.

beforeIterate: Set layer 1 active in the active window.

beginSave: Move the active window to the end of the **Window** menu window list.

checkMargins: Check if the variables **top**, **left**, **right**, **bottom**, **xGap**, and **yGap** are initialized. If not, this macro initializes them. **CheckMargins** is intended to be executed prior to executing **arrangeLayers**.

clr: Update the active graph window.

DBCPage: Open the page's Plot Details dialog box.

enlarger.Ctrl: Create the **zoomRect** object in the active graph window and create the Enlarged graph window.

getEnumTempWks *template winName*: Create a worksheet incrementing *winName*.

getEnumWin *winName*: Create a graph incrementing *winName*.

getEnumWks *winName*: Create a worksheet incrementing *winName*.

getNamedPlot *winName template*: Make the *winName* graph active. If it doesn't exist, create it.

getNamedWin *winName*: Make the *winName* graph active. If it doesn't exist, create it.

getNamedWks *winName template*: Make the *winName* worksheet active. If it doesn't exist, create it.

graph *dataset*: Add *dataset* to the layer contents of the active graph layer.

iconizeNamedWks *winName*: Minimize the *winName* worksheet. If it doesn't exist, create it and then minimize it.

oneQCLine *lineNameValue*: Draw a horizontal line on the graph at Y = *lineNameValue*. Used by the QC chart template.

QCLines *average*: Draw and label three horizontal lines (Ave, UCL, and LCL). Used by the QC chart template.

rescale: Rescale the X and Y axes of the active layer to show all data.

4.3 Project Management

autoExec: Use this macro to override internal default settings. Triggered at the end of the Origin start up sequence. This macro is not predefined.

beginSave: Triggered when a project or child window is saved. This macro is currently defined to do nothing.

docBegin: Triggered when opening a project. This macro is currently defined to do nothing.

docEnd: Triggered when the current project is closed. This macro is currently defined to do nothing.

endOpen: Triggered when Origin is directed to start by opening a specific project. This macro is not predefined.

4.4 Input/Output

endToolbox: Triggered by the **pointProc** macro, after the data points have been selected using the Data Reader or Screen Reader tools. This macro is not predefined.

pointProc: Triggered when a data point is selected using the Data Reader or Screen Reader tools. This macro is defined in the ORIGIN.OGS file.

quitToolbox: Triggered when a new Tools tool is selected, other than the Data Reader or Screen Reader tools. This macro is defined in the ORIGIN.OGS file.

filterImport *fileExtType*: Open the Open dialog box with the default extension *fileExtType*. Use only with WK?, DIF, and WKQ files.

formatFilterImport *fileExtType fileExtType*: Open the Open dialog box with the default extension *fileExtType*. Use only with XLS and DBF files. You must type *fileExtType* twice.

helpMarker: Display status bar text for the Data Selector tool.

mvPts *dataset*: Open the Data Reader tool in the active graph. Display status bar text for the Data Reader tool.

notReady: Display a "This operation is still under development." message in a dialog box.

pick1Pt: Open the Data Reader tool in the active graph for selecting points for a user created dataset. Display status bar text for the Data Reader tool.

Separator *numberOfTabs*: Output a separating dashed line across the Script window.

4.5 Script Management

errorProc: Triggered when the LabTalk interpreter detects a **#Command Error**, when Cancel is clicked in a dialog, or when No is clicked in a dialog without a Cancel button. This macro is not predefined.

doButton *objectName*: Run the script in the object's Label Control dialog box.

4.6 Time

timerProc: Triggered by the **timer** command for periodic execution. This macro is not predefined.

timerError: Stop executing the **timerProc** macro, display a "Timer stop" message in the status bar, and remove the current timer.

watch: Display the elapsed time in the Script window since Windows startup, the previous **watch** was run, or since the **second -i** command was executed.