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Key New Features in Origin 8.6

1. Native 64 bit Application as well as 32 bit
 2. PCA and Cluster analysis (Pro)
 3. Spider/Radar chart
 4. New Tool to drag data plot to change axis scale
 5. Auto-hide Project Explorer window
 6. Vertical Cursor and other new gadgets
 7. Parametric function plot
 8. Fitting with integral
 9. Worksheet Navigation dialog
 10. File Import menu customization dialog
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64 Bit Support

JIRA	Summary	Details
ORG-3185	Native 64-bit support	<ul style="list-style-type: none">• 64 bit version has much more memory at its disposal, so is useful for large data sets.• Supports importing ASCII files bigger than 4GB• Some Import/Export Formats are

not supported in 64 bit Origin due to non-availability of third-party plug-ins/DLLs:

- ◆ Thermo (SPC, CGM) Import
 - ◆ *.dbf, *.WK *, *.DIF Import
 - ◆ Database Import: Query Builder tool not available. SQL Editor tool works fine.
 - ◆ Export Graph as Image: *.ai, *.cgm, *.dxf
- pclamp Import not fully supported in 64bit.
 - Export worksheet to multiple PDF files not working in 64 bit

Gadgets

JIRA	Summary	Details
ORG-3106	Vertical Cursor	This gadget is used to read the X and Y coordinate values for the data points on the stacked panel plots crossed by the vertical cursor.
ORG-2462	Quick Sigmoidal Fit	This gadget allows use of nonlinear regression with a sigmoidal function to fit the selected dataset on graph. It is an adaptation of the Fit Sigmoidal tool in Origin 7.5, but with more advanced controls.
ORG-1667	Curve Intersection Gadget	This gadget is used to calculate the intersection points of the input curves in the ROI box.
ORG-2298	Improvements in Integration Gadget	<ul style="list-style-type: none">• Simplify the tabs in the Integration gadget dialog.• Output Integrated Curve and Baseline curve data.• Create baseline based on Full Plot Range/Curve Within ROI rectangle.
ORG-3896	Calculate Standard Error for Derived Parameters in Quick Fit and Quick Sigmoidal Fit	Standard Error for Derived Parameters calculated and shown in report.

Graphing

JIRA	Summary	Details
ORG-382	Radar Chart	Radar Chart is also known as Spider Chart, Star Chart.
ORG-1947	Parametric Function Plot	Origin can plot 2D Function plot, 2D Parametric Function Plot and 3D Function Plot. <ul style="list-style-type: none">• Use a set of parametric equations to express the relation of X and Y.• Specify number of data points and range of parameter.• Built-in functions can be quoted in the parameter equations.• Use LabTalk script to define the constants before running formula script.• Output the data of 2D Parametric and 3D function plots to worksheet and matrix.• Save function plot settings as a theme for future use.• Modify function plot in Plot Details dialog, then copy settings and use when creating new function plot.
ORG-3338	Improvements in Add Error Bars dialog	<ul style="list-style-type: none">• Add Standard Deviation Data with different scaling factors.• Add Square root of Data as error bars.• Auto updates of error bars if source data changes.• Edit error bars in Set Column Values dialog.
ORG-3134	New rescale tool to drag plot and update axis range.	New Recale button on Tools toolbar. <ul style="list-style-type: none">• Select rescale tool and cursor becomes hand. Use hand to drag the plot, and X, Y axis ranges change. Use mouse wheel for horizontal scaling, or hold Shift while using mouse wheel for scaling along on Y axis.• Z (Zoom) and X(Pan) are the hotkeys for this tool, will work with drag, mouse wheel, arrow keys.

ORG-2576	System variable @LCA added to control shape of tick marks	<ul style="list-style-type: none"> • Press Shift and hotkey to switch movement to Y axis. <p>The major and minor tick marks were rounded at their ends and had no sharp edges. Users may want the tick marks as squared-off rectangular bars. @LCA is added. 0 - Round (default), 1 - Square, 2 - Flat.</p>
ORG-3734	Show Fill Area information in legend for Line plot	Legend of line plot did not show fill area information in older versions.
ORG-1830	Arbitrary Line Profile	Support Arbitrary line profile in Image Profile

Curve Fitting

JIRA	Summary	Details
ORG-3327	Fitting with Integral	<ul style="list-style-type: none"> • User friendly GUI to define Integral Fitting Function step by step in Fitting Function Builder. • Simulate Curve supports integral function • Fitting with integral function in NLFit
ORG-2740	NLFit: Independent Fit Improvements	<ul style="list-style-type: none"> • When doing independent fit on multiple datasets, there was no way to select a single dataset to fit by 1 Iteration or Iteration till Converged, and see the result for just that data. • This is especially useful for user-defined functions without parameter initialization code. Users may want to fit one dataset first, and then make sure parameters are good, or adjust parameters, then use them for all other datasets.
ORG-2473	NLFit: Columns on Parameters/Bounds tab can be dragged to change order	Origin now supports dragging columns to change order.
ORG-2097	NLFit: Calculate Standard Error for Derived Parameters	Standard Error for Derived Parameters is now calculated and shows in result sheet.
ORG-3140	Bring back Linear Fit with X Error	This was hidden in 8.5.1 as the result was not accurate for some datasets.

- Ripley Method still hidden in GUI.
 - Update York with 2003 algorithm. (Previously used York 1966 algorithm.)
 - Hide the Errors as Weight node for all 3 methods.
 - Add an editbox node, labeled with "Correlation Between X and Y Errors" with values fall in [0,1].
- ORG-738, Specify X Data
 ORG-2156, range's From and To
 ORG-3499, by X values
 ORG-1750

User could only specify X range by row numbers in the past.

- Syntax for Row Range Specified by X Values is [BookName]SheetName!ColName[x4.5:17.89]
- In NLFit, PA, etc., dialog that supports XYRange input, user can specify X range by number number and by X values.
- User can apply such row range/X range to other data during the analysis.
- Save X/Row Range in dialog theme.

- ORG-126 Speed improvements on LabTalk Script-Based Fitting Function

In 8.5.1, using LT-based fitting function was slow. Improved in 8.6.

Peak Analyzer

JIRA	Summary	Details
ORG-2550	Create report sheet with NA in summary table even if no peak is found.	Peak Analyzer(PA) did not generate report if no peak was found. Then, when doing batch procesing with PA on multiple datasets, no report was given if no peaks were found in some datasets. Report now says "NA" when peaks not found.
ORG-3052	Add more baseline and peak finding methods to match those in Quick Peaks gadget	We have added new capabilities (e.g., "min and max" baseline) to Quick Peaks Gadget. Also added to Peak Analyzer.

Statistics

JIRA	Summary	Details
ORG-2697	Principal Component Analysis	OriginPro only feature

ORG-2699, ORG-2700	Hierarchical, K-Means Cluster Analysis	OriginPro only feature
ORG-2698	Discriminant, Canonical Discriminant Analysis	OriginPro only feature
ORG-3228	Improvements in Normality Tests	OriginPro only feature <ul style="list-style-type: none"> • Support Group in Normality Test. • Improved format in output. • Support more methods.
ORG-2427	Output Statistics on Columns quantities to a flat worksheet	<ul style="list-style-type: none"> • Results for stat on columns were previously put into a "report sheet". This type of report was not convenient to use for further analysis. • "Quantities" node has been added to Output Settings node. User may now output quantities to a flat worksheet.
ORG-3133	Further Improvement of ROC Curve	<ul style="list-style-type: none"> • Test Direction radio buttons added for ROC curve, which has two options <ul style="list-style-type: none"> ◆ Positive vs. High: Larger test measurement values indicate more positive test ◆ Positive vs. Low: Smaller test measurement values indicate more positive test • Cut off value added for ROC Values
ORG-1556	Support Raw and Indexed data form in Frequency Counts and Discrete Frequency	<ul style="list-style-type: none"> • Support frequency count on multiple data. User can choose Input Data form as Raw and select multiple columns as input data. • For customer with grouping information in one column and data in another column, user can set Input Data Form as Indexed, and specify grouping and data range.
ORG-3103	Support Raw and Indexed data form in	

all Nonparametric Tests

ORG-3688 Distribution Curve Improvements for Histogram and Frequency Counts.

- Histogram: Weibull Distribution Curve is supported.
- Add Checkbox to Scale to % of Tallest bar.
- Output Distribution Curve data to Bin worksheet.

Import and Export

JIRA Summary
ORG-1344 Auto adjust column width after importing

Details

This control is hidden in GUI. After importing data, Origin will auto adjust column width so that user can see the data contents.

ORG-1739 Use negative value to Trim from end of file name

- Previously, in Import ASCII (and other imports), under the (Re)Naming Worksheets and Workbook branch, users could enter a positive value or 0 in Trim Filename To edit box. Origin did not have a mechanism for trimming from the end of the file name (e.g., to trim extension when renaming worksheet). Origin now supports negative values for trimming filenames from the right.

For example, for filename abcd.txt, specify the following:

Trim Filename From: 1

Trim Filename To: -4

Filename is trimmed to abcd.

ORG-2642 Import File Structure Framework

- Users can now import meta-data and file information before file data. This control allows better performance when importing large data files.
- Feature is available for the following data formats:
 - ◆ ETAS INCA MDF (DAT, MDF)
 - ◆ NI TDM (TDM, TDMS)
 - ◆ HDF5 (H5, HE5, HDF5)

- This control can be accessed under the Import Options branch on the GUI. After importing file with structure only, user can highlight columns or active workbook, and then run "reimport sel := 1;" in the Command Window for partial import. In File menu, user can also click Re-Import Directly to import all data.

ORG-1979 Default Copy Page Settings changed from Set Resolution into Keep Size on Page tab of Tools: Options dialog.

We have changed to use EMF when copy page since 8.5.1. The problem with Set Resolution was that EMF internally had huge intrinsic size; this size was roughly the size of the main screen multiplied by the used resolution (usually 300dpi or 600dpi) which means possibly close to one half meter or so. Some containers (and this varied a lot) would show the pasted picture in this huge size, so user had to resize it down to be able to see something. On the other hand, Keep Size, while to it would force the nice size, used have the problem that some containers, such as CorelDraw would show deformed picture.

Import Wizard Improvements

JIRA	Summary	Details
ORG-3571	Save <last used> filter when import wizard is used	When using Import Wizard, we now save a <last used> filter even when user does not select the Save filter check box. When user next opens the Import wizard, user can pick the <last used> filter from the Applicable filter dropdown list.
ORG-3181	Filter dropdown list to exclude unnecessary variables	Variables are extracted by the Specify delimiter and wizard scans for variable names and values option in Import Wizard. A Filter dropdown list has been added on the Header Variables page for excluding unnecessary variables (L1V1, L1V2, etc.).

ORG-2376	Start new hidden workbook option in Non-numeric data in a numeric field dropdown list	On Data Columns, add Start new hidden workbook option for Non-numeric data in a numeric field dropdown list. This also applies to Import ASCII dialog. This also applies to Import ASCII dialog.
ORG-2990	Improvements on Space Delimiter	<ul style="list-style-type: none"> • On Data Selection page, "Space" delimiter previously included single space, multiple spaces, and TAB for various cases. Selection has been renamed Space/TAB. • Added Space selection for single Space delimiter.

Excel

JIRA	Summary	Details
ORG-3008	Import and open XLSM file (Excel with Macro)	Excel 2010 now has different .xslm extension to identify macro-enabled files.

Worksheet

JIRA	Summary	Details
ORG-3616	Navigate worksheets dialog	New Navigate... menu selection when right-clicking on sheet tab. Resulting dialog allows user to: <ul style="list-style-type: none"> • Find and activate a sheet • Sort sheets by name, size, column size, type, etc. • Move, copy, drag, clear data and delete selected sheets.
ORG-3794	Add comments to a sheet	<ul style="list-style-type: none"> • Comment... context menu when right-clicking Sheet tab to edit comment. • Show worksheet comment as Tooltip when mousing over sheet name. • Some analysis information is put as output Worksheet's comment.
ORG-2574	Worksheet: Split Worksheet... menu	Split a worksheet into multiple worksheets by: <ul style="list-style-type: none"> • Number of Columns

- Number of Rows
 - Column Label information. When using this method, the new worksheet will be named after the label information.
- ORG-3180 Support Hide/Unhide context menu for label rows in worksheet
- Right-click a label row to hide it. A dark gridline will show in label rows around it.
 - Double-click the dark gridline to unhide label row.
- ORG-4312 Add "Prefer Long Name" check box in Set Column Values dialog
- The check box shows under Col(A) menu in Set Column Values dialog. If checked, long name will be used when inserting columns in formula. Otherwise, will use short name in formula.
- ORG-260 Add more functions in F(X) of Set Column/Matrix Values dialog.
- Complex
 - ◆ Real2Complex(dReal, dImag) to convert into a complex number (e.g., Real2Complex(1, 2)=1+2i).
 - ◆ Imabs(cX) to get the modulus of a complex (e.g., imabs(3+4i)=5).
 - ◆ Imaginary(cX), ImReal(cX) to get the imaginary and real part of a complex (e.g., Imaginary(3+4i)=4).
 - ◆ Imargument(cX) to get the argument (theta) of a complex (e.g., Imargument(1+i)=pi/4).
 - ◆ Imconjugate(cX) to get the conjugate of a complex (e.g., Imconjugate(3+4i)=3-4i).
 - ◆ Imcos(cX), Imexp(cX), Imln(cX), Imlog10(cX), Imlog2(cX), Imsqrt(cX), Imsin(cX), to get the cos, exp, ln, log10, log2, sqrt, sin of a complex.
 - ◆ Imdiv(cY1, cY2), Improduct(cY1, cY2), ImSub(cY1, cY2), ImSum(cY1, cY2), ImPower(cX, n) to calculate the operation

on complex.

- Engineering
 - ◆ Convert between binary number and decimal. Excel has many such functions (e.g., `Dec2hex(i)`, `Dec2hex(100)`=64). These functions may be very useful for some fields.
 - ◆ Convert units. Excel provides a function to convert units. This simple function may be very useful. It has the form `Convert(x, strUnit1, strUnit2)`. For example, `Convert(25, "C", "F")=77` to convert Celsius degrees to Fahrenheit.
- Statistics
 - ◆ `Confidence(alpha, std, size)` - Return the confidence interval for a population mean.
 - ◆ `Skew(vX)`, `Kurt(vX)` - Return the skewness and kurtosis of data. Supported in Stats on Columns.
- Math
 - ◆ `Combine(n1, n2)` - Return the number of combinations for a given number of items (e.g., `combine(4, 2)=6`).
 - ◆ `fact(n)` - Return the factorial of a number (e.g., `fact(3)=3*2*1=6`).
 - ◆ `factdouble(n)` - Return the double factorial of a number (e.g., `factdouble(5)=5*3*1=15`).

ORG-4029 Open Set
Column/Matrix Values
dialog from
Column/Matrix
Properties dialog
and vice versa.

- Set Column Value button added in Column Properties dialog.
- Open Column Properties button added in Set Column Values dialog.
- Set Matrix Values button added in Matrix Properties dialog.
- Matrix Properties button added in Set Matrix Values dialog.

ORG-2531 Support modifying properties of multiple embedded graphs.

wcellgraph x-function added.

- Run "wcellgraph -d" in Script window to modify properties of multiple embedded graphs.

Matrix

JIRA	Summary
ORG-3296	Matrix: Set Values dialog - List independent variable names in F(x): Variables and Constants submenu.

Details
Choose independent variables for use in setting matrix values.

Programming

JIRA	Summary
ORG-431	64 bit NAG C Library, Mark 9 support
ORG-3337	X-Function TwoDBinning now script accessible
ORG-2877	Improve Plotxy for creating graph from custom templates

Details
Update NAG library to 64-bit and Mark 9

Previously only accessible from GUI.

The following works:

```
plotxy (?;1:end) o:=[<new template:=myTest>] p:=230
```

...but the symbol size argument's default of 9 will override what is saved in the template. Size:=-1 has been added to support using template's symbol size to plot graph.

ORG-3579	Integral function is renamed to Integrate
ORG-3558	Add more PDF functions to LabTalk to match those in Histogram Distribution Curves.

Under F(x):Math: menu in Set Column Values dialog, Integral function has been renamed to Integrate.

Also accessible from Set Column Values dialog. Functions added:

- cauchpdf
- exppdf
- gampdf
- lappdf
- lognpdf
- normpdf
- poisspdf

- ORG-3572 Labtalk function supports double argument type as default
- ORG-3065 LT access to Short Name for row index
- ORG-2915 Wildcard is supported in LT command delete -vs
- ORG-741 Use X to define range in XYRange
- ORG-3724 The default value of type.redirection is changed to 32768 from 5.
- ORG-4242 layer -g to support grouping a set of plots

Following two syntaxes are equal:

- Function double MyInte(t, Arg 1, Arg2, Arg3, Arg4, Arg 5, ..., ArgN)
- Function double MyInte(double t, double Arg 1, double Arg2, double Arg3, double Arg4, double Arg 5, ..., double ArgN)

Letter "G" is reserved to denote Short Name when accessing row index (e.g., the following code can set/get first column's short name):

```
wcol(1)[G]$=;
```

Delete -vs deletes the specified global/project string variable. Now supports wildcard.

```
XYRange      dr;
Add("X", "[book1]sheet1!A[x1.5:2.5]");
Add("Y", "[book1]sheet1!B[x1.5:2.5]");
```

```
layer -g BeginIndex EndIndex;
layer -gu PlotIndex;
```

Productivity

JIRA	Summary	Details
ORG-2858	Batch Analysis on all plots in graph	After user performs analysis on one plot in graph, a lock icon appears in the graph. Click the lock icon and choose Repeat this analysis to All Plots to perform batch analysis.
ORG-2741	Batch Process on columns in worksheet	After user performs analysis on column in worksheet, a lock icon appears in result column or results sheet. Click the lock icon and choose Repeat this analysis to All Y Columns to perform batch analysis.
ORG-2768	Tools: System Variables... menu.	Customize system variables and save as default settings.

Origin GUI

JIRA	Summary	Details
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ORG-3387 Redesign of File: New: submenus and dialogs	<ul style="list-style-type: none"> • File: New: Worksheet... menu selection for creating new worksheet. There are two ways to create worksheet. One is by specifying column designation. The other is by setting replicate sets. • Select File: New: Matrix... to create new matrix sheet. • Select File: New: From Template to open new worksheet, matrix or graph from existing template (OTW, OTM, OTP), including analysis template (OGW).
ORG-3395 Customize File: Import: menu	Specify file types and import themes to show in File: Import menu.
ORG-3691 Auto-hide dockable windows	<ul style="list-style-type: none"> • Project Explorer, Quick Help, Results Log, etc., are all dockable. • By default Project Explorer and Quick Help windows are docked on the left panel with Auto-hide active.
ORG-3724 New message window for analysis output info.	<ul style="list-style-type: none"> • Most message types (e.g., Info, Result, Error) which were previously sent to Script Window/Command Window now appear in new window. • Docked on left panel of Origin workspace, similar to Project Explorer and Quick Help.
ORG-3512 System Path tab in Tools: Options dialog	<ul style="list-style-type: none"> • Displays all important system paths: <ul style="list-style-type: none"> ◆ User Files Folder (changeable) ◆ AutoSave path (changeable) ◆ Application Data folder (read-only) ◆ Program Folder (read-only) ◆ Group Folder (changeable) ◆ License (read-only) • Change/Reset User Files Folder, AutoSave path, or Group Folder.
ORG-4135 Set Origin startup window size	ShowState in [Config] section of Origin.ini file

- ShowState=0 -- Start Origin with hidden window
- ShowState=1 -- Start Origin with normal window
- ShowState=2 -- Start Origin with minimized window
- ShowState=3 -- Start Origin with maximized window