Working with Excel in Origin

Limitations When Working with Excel in Origin

- To plot your workbook data in Origin, you must have Excel version 7 (Microsoft Office 95) or later installed on your computer either as a local or network copy.
- If Excel version 8 (Microsoft Office 97) is installed on your computer when you save a project with links to an external Excel workbook file, or when you save a project with an internal Excel workbook, you will not be able to re-open the project on a computer with Excel version 7 (Microsoft Office 95) installed. This is an Excel limitation.
- Origin does not support dynamically linking a formula in a workbook to source data located in another workbook.

Starting New Projects with a Workbook Window Already Open

Origin allows you to customize many interface preferences, including control of the default child window that displays when you start an instance of Origin or open a new project. To display a new Excel workbook (instead of an Origin worksheet) when you start Origin or open a new project, perform the following:

1) Select **Window:Origin Options** when a workbook is active, or **Tools:Options** when any other child window is active. Both menu commands open the Options dialog box.

2) Select the Open/Close tab.

3) Select Excel Workbook from the Start New Project With drop-down list.

4) Click OK.

5) An Attention dialog box prompts "Save as Origin's startup options?". Click Yes to save the dialog box settings for future Origin sessions. Click No to use the current dialog box settings for the current Origin session only.

Opening a Workbook in Your Project

Existing workbooks can be opened in an Origin project. Additionally, a new workbook can be created in a project.

Opening an Existing Workbook

When you open an existing workbook in Origin, you have the option of opening the workbook as an Excel workbook, or opening the workbook as one or more Origin worksheets. If you open the workbook as a

workbook, you can continue to use Excel's spreadsheet tools to process your data, all within the Origin workspace. You also have access to Origin's plotting and analysis tools. When you are ready to save your project, you can save the project with a link to your source workbook, and update the link, or you can save the workbook as part of your Origin project. When you update the link to a (linked) workbook, the updated workbook is available for other applications or other users.

If you open the workbook as one or more Origin worksheets, you have no access to Excel's spreadsheet tools in Origin. Furthermore, the data no longer has a connection to the source workbook. Thus, the changes you make to the data are lost to the original workbook.

To open an existing workbook in Origin, perform the following:

1) Select **File:Open Excel** or click the Open Excel button on the Standard toolbar. Both the menu command and the toolbar button open the Open dialog box with 'Excel (*.XLS)' selected from the Files of Type drop-down list.

2) Select the desired folder from the Look In drop-down list.

3) Select the desired workbook file from the list box and click Open. This action opens the Open Excel dialog box.

4) To open the workbook as a workbook, select the Open as Excel Workbook radio button. To open the workbook as one or more Origin worksheets, select the Open as Origin Worksheet(s) radio button.

5) Click OK to close the dialog box and open the workbook or worksheet(s).

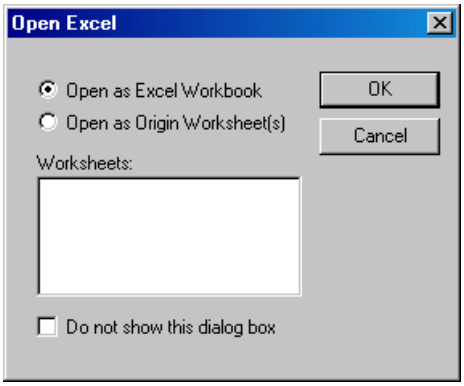
If you select the Open as Excel Workbook radio button, Origin creates and names the workbook Book*n*, where *n* is the lowest available number without duplicating a window name. Additionally, Origin displays the full path and file name of the linked Excel source file.

If you select the Open as Origin Worksheet(s) radio button, Origin creates a worksheet window for each sheet selected from the Worksheets list box (in the Open Excel dialog box) and names the worksheet(s) *SheetName*. For example, if Sheet1 and Sheet2 are selected from the Worksheets list box, Origin names the resultant worksheets Sheet1 and Sheet2. Origin sets the column type for each of the worksheet columns to Text & Numeric.

If a workbook sheet includes formulas to calculate values, Origin displays the calculated values in the resultant worksheet.

If a workbook sheet contains links to another workbook sheet, the links are broken in the worksheet. The data displays in the worksheet as it last displayed in the workbook sheet.

The Open Excel Dialog Box



The Open as Excel Workbook Radio Button

Select this radio button to open the existing Excel workbook as a workbook. This option allows you to use Excel tools when the workbook is active in Origin.

The Open as Origin Worksheet(s) Radio Button

Select this radio button to open the selected sheet(s) of the existing Excel workbook as an Origin worksheet(s). The data displays in the worksheet(s) and loses its association with Excel.

The Worksheets List Box

If the existing Excel workbook contains multiple sheets and the Open as Origin Worksheet(s) radio button is selected, then the available workbook sheets display in this list box. Select the sheets to open as worksheets from this list box. Click to select a single sheet, SHIFT+click to select a range of sheets, or CTRL+click to select nonconsecutive sheets.

The Do Not Show this Dialog Box Check Box

Select this check box to prevent this dialog box from opening when you select an Excel file from the Open dialog box (**File:Open Excel** or the Open Excel button on the Standard toolbar), or when you select an Excel file from the "Recently Used Files" list in the **File** menu. When this check box is selected and you click OK, Origin automatically opens future Excel files using the last selection in the dialog box. For example, if the Open as Excel Workbook radio button is selected and the Do Not Show this Dialog Box check box is selected, then after clicking OK, Origin opens future Excel workbooks as workbooks. If the Open as Origin Worksheet(s) radio button is selected and the Do Not Show this Dialog Box check box is selected, then after clicking OK, Origin opens all sheets in future Excel workbooks as worksheets.

To re-enable the display of this dialog box, select the Opening Excel Files check box on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active, or **Tools:Options** when any other child window is active).

Creating a New Workbook

To create a new workbook in Origin, perform one of the following operations:

1) Select **File:New** to open the New dialog box. Select Excel from the Window Type list box and click OK.

2) Click the New Excel button  on the Standard toolbar.

Origin creates and names the new workbook Book*n*, where *n* is the lowest available number without duplicating a window name. The Book*n* workbook contains four sheets, Sheet1 through Sheet4.

Saving a Workbook Separately from the Project

Like other child windows, workbook windows can be saved separately from the project. To save the active workbook to a *.XLS file, perform one of the following operations:

1) Right-click on the workbook title bar and select **Save Workbook As** from the shortcut menu.

2) Select **File:Save Window**.

Both menu commands open the Save As dialog box with 'Excel (*.XLS)' selected from the Save as Type drop-down list. Type the desired file name in the File Name text box and click Save.

How the Origin Workspace Changes When a Workbook is Active

The Menu

When a workbook is active, the following Origin menus are available: **File**, **Plot**, **Window**.

All other menus are Excel menus.

Locations of Origin Menu Commands when a Workbook is Active

- To open the (Origin) Options dialog box when a workbook is active, select **Window:Origin Options**.
- To open the (Origin) Toolbars dialog box when a workbook is active, select **Window:Origin Toolbars**.
- To open the (Origin) Help file when a workbook is active, right-click on the workbook title bar and select **Help Contents** from the shortcut menu.

Toolbars

When a workbook is active, both the Origin and Excel Standard toolbars display.

All buttons on Origin's Standard toolbar are active except the Refresh and Duplicate buttons.

Origin's 2D Graphs, 2D Graphs Extended, and 3D Graphs toolbars are available if open. To open these toolbars when a workbook is active, select **Window:Origin Toolbars**. This menu command opens the Toolbars dialog box. Select the desired toolbar check boxes and click Close.

All buttons on Excel's Standard toolbar are active except the New Workbook, Open, Save, Print, and Print Preview buttons.

All other Excel toolbars that are open are available.

Note: Origin includes a toolbar spacer that stabilizes the toolbar region when child window activity is changed in Origin. The toolbar spacer is the reserved space for toolbars located below the menu bar. The height of the toolbar spacer is determined by the maximum height required to display all the selected docked toolbars for any of the child windows in the project. Because the Excel toolbars display when a workbook is active, the workbook window (if open in the project) generally "determines" the height of the toolbar spacer. If you have switched child window activity from the workbook to any other child window, and you want to manually reset the toolbar region for the currently active child window, right-click on the toolbar spacer and select **Hide Toolbar Spacer** from the shortcut menu.

The Status Bar

When a workbook is active, the status bar displays descriptions of both Origin and Excel tools.

The Shortcut Menus

When a workbook is active, Origin provides a combination of Origin and Excel shortcut menus. Excel shortcut menus are available within the workbook. The Origin shortcut menu is available from the workbook window title bar.

Origin Shortcut Menu Commands Available from the Workbook Title Bar

Shorcut Menu Command	Description
Save Workbook As	Saves the active workbook to a file. Opens the Save As dialog box.
Update Origin	Updates Origin for the following conditions: If you rename a workbook sheet that contains data that is plotted in a graph window, this shortcut menu command updates the connection between the data plot and its source sheet. After selecting the command, Origin opens the Associate Excel Worksheet dialog box. Edit this dialog box to re-establish the connection between the data plot and the sheet. Occasionally, the workbook window, or other windows containing workbook data, may become inactive. This condition is apparent when the window containing workbook data has a blank display. To reactivate the window and restore its display, select this shortcut menu command.
Help Contents	Opens the Contents tab of Origin's online Help file.
Properties	Opens the Workbook Properties dialog box. Edit this dialog box to rename the workbook window and control how the workbook is saved when you save your project. This dialog box also lists the workbook sheets that contain plotted data, and the associated Origin index numbers. Index numbers are included in the names of data plots that contain workbook data.

Working with Workbook Windows

The workbook window is a special type of Origin child window. As a child window, you can rename, arrange, save, or delete the workbook window. You can also open multiple workbook windows within an Origin project. Like the worksheet child window, you can view data in a workbook window and view the graphic representation of the data in a graph window. However, the workbook window also has features that are distinct from other child windows. The following sections review these distinct workbook window features.

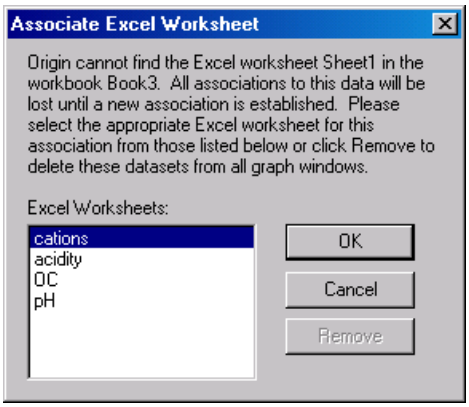
Renaming the Workbook

To rename a workbook window, right-click on the workbook window title bar and select **Properties** from the shortcut menu. This menu command opens the Workbook Properties dialog box. Type a new name in the Window Title text box and click OK. If the workbook is saved externally to the project, the full path and file name also display in the title bar.

Renaming Sheets in the Workbook

If you rename a sheet in a workbook from which you have already plotted data, Origin loses the association between the data plot and its source Excel workbook sheet. To re-establish the connection between the data plot and the workbook sheet, right-click on the workbook window title bar and select **Update Origin** from the associated shortcut menu. This menu command opens the Associate Excel Worksheet dialog box. Edit this dialog box to inform Origin of the new sheet name. For example, if Sheet1 was renamed Sample1, select Sample1 from the Excel Worksheets list box. Click OK to re-establish the connection between the data plot and the workbook sheet.

The Associate Excel Worksheet Dialog Box



The Excel Worksheets List Box

When you rename a workbook sheet that contains plotted data, Origin must be informed of the new sheet name. Select the new sheet name from the Excel Worksheets list box.

The Remove Button

If you delete or rename a workbook sheet from which data is plotted, click this button to delete the associated data plots from all graph windows.

The OK Button

Click this button to update Origin with the re-association indicated in the Excel Worksheets list box.

Note: If you have renamed multiple workbook sheets that contain plotted data, Origin re-opens this dialog box automatically after clicking OK. Edit the dialog box for the workbook sheet specified in the text at the top of the dialog box.

Deleting Sheets from the Workbook

If you delete a workbook sheet from which data is plotted in a graph window, you must update Origin with this change. Right-click on the workbook window title bar and select **Update Origin** from the shortcut menu. This menu command opens the Associate Excel Worksheet dialog box. Click the Remove button to update Origin and remove all data plotted from the (deleted) sheet.

Creating a Matrix from the Workbook

To create a matrix and fill the matrix with the highlighted workbook data, select **Window:Create Matrix**. This menu command opens a new matrix window and fills the matrix with the highlighted data, so that the data displays in the matrix identical to its display in the workbook.

Working with Workbook Data

When a workbook is the active child window, except for Origin's plotting features, Excel provides the *visual interface* to access workbook data. Thus, when a workbook is active, the **Format**, **Tools**, and **Data** menus are all Excel menus. However, Origin does provide access to the workbook data using LabTalk, Origin's built-in scripting language. Use LabTalk to run Excel macros, invoke Visual Basic Application Functions, and read or set cell values.

Running Excel Macros in Origin

Excel macros can be run from Origin using LabTalk. LabTalk includes commands with option switches, as well as object properties and methods. Origin uses an **excel** object method to run Excel macros from Origin. For the Excel macro to run properly, you must supply the correct arguments using the **excel** object method. LabTalk will accept no more than five arguments. Additionally, the workbook containing the Excel macro must be the active window.

To run the macro, type the following in the Script window and press ENTER:

Excel.RunRange(*SheetName*,*RangeName*,*Arg1*,*Arg2*,…,*Arg5*)

Where *SheetName* is the name of the sheet containing the macro, *RangeName* is the name of the cell on the sheet where the macro starts (for example, C6), and *Argn* are the correct arguments for the macro (not exceeding five arguments).

The return value after executing the **excel** object method comes from the macro.

Invoking Visual Basic Application Functions in Origin

In addition to Excel macros, you can invoke Visual Basic application functions in Origin. As with macros, these functions are invoked using LabTalk's **excel** object. For the Visual Basic application function to run properly, you must supply the correct arguments with the **excel** object method. LabTalk will accept no more than five arguments. Additionally, the workbook containing the Visual Basic application function must be the active window.

To run the Visual Basic application function, type the following in the Script window and press ENTER:

Excel.Run(*FunctionName,Arg1,Arg2,…,Arg5*)

Where *FunctionName* is the Visual Basic application function, and *Argn* are the correct arguments for the function (not exceeding five arguments).

The return value after executing the **excel** object method comes from the function.

Plotting Workbook Data

Origin provides a broad range of methods for creating graphs from workbook data. The plotting method you use is dependent on whether you want to create a new graph window or add workbook data to an existing graph window.

Once the graph is created from the workbook data, you have full access to Origin's graphic customization features.

Note: Occasionally, the workbook or graph window containing workbook data becomes inactive. This condition is apparent when the window containing workbook data has a blank display. To restore the display in the window, right-click on the workbook window title bar and select **Update Origin** from the shortcut menu.

How Origin Denotes Plotted Workbook Data

References to plotted Excel workbook data are found in the same locations as are references to plotted Origin worksheet data. These locations include the data list at the bottom of the **Data** menu, the graph legend, and the Layer *n* dialog box.

The Excel workbook dataset naming convention is similar to the Origin worksheet dataset naming convention, but includes information on the sheet number in the workbook. Excel workbook datasets are named using the following syntax:

WorkbookName_ColumnName@SheetNumber

Where *WorkbookName* is the workbook name, *ColumnName* is the workbook sheet column name, and *SheetNumber* is the numeric value reflecting the order in which data was plotted from the sheets in the workbook.

For example, open a new Excel workbook and enter data on Sheet1 through Sheet4. Then plot the data from the four sheets in the following order: Sheet1, Sheet4, Sheet2, and Sheet3. The numeric values of *@SheetNumber* will be:

Sheet1 no number

Sheet2 @3

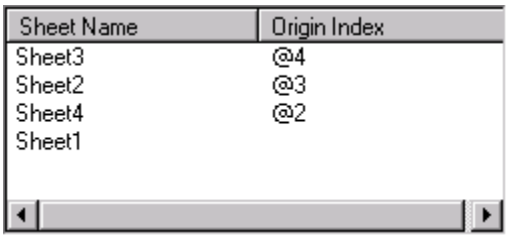
Sheet3 @4

Sheet4 @2

(When referencing the first plotted sheet, Origin does not use @1.)

To verify the *@SheetNumber* value for each sheet that contains plotted data, right-click on the workbook window title bar and select **Properties** from the shortcut menu. The workbook sheets and their associated *@SheetNumber* values display in the Sheet Name / Origin Index list box.

Determining the Origin Index Number for Each Sheet



As with Origin worksheets, the data list at the bottom of the **Data** menu lists each of the data plots included in the active layer of the graph window. If the Y data is plotted versus X data, both datasets are listed. If the Y data is plotted versus workbook row number, then Origin lists the starting row number and the increment (in most cases, this value will be one).

The graph legend displays either the workbook sheet's column titles, the sheet's column names, or the full dataset name for the data plots. If column titles are present in the workbook sheet, they are displayed in the legend by default. If no column titles are present, the column name is displayed by default. To display the full workbook dataset name instead of the workbook column name, select **Format:Page** when the graph window is active. This menu command opens the Plot Details dialog box with the graph icon selected on the left side of the dialog box. Select the Legends tab and then select the Full Dataset Name check box and click OK.

As with Origin worksheets, plotted workbook datasets are also displayed in the Layer Contents list box of the Layer *n* dialog box. (To open this dialog box, double-click on the layer icon in the upper-left corner of the graph window.) In the Layer Contents list box, Origin displays the workbook dataset that supplies the Y values in the data plot.

Creating a Graph from Workbook Data

Interactively Selecting Cells and Assigning their Plotting Designation (Default Plotting Method)

Method Description

This plotting method uses an interactive dialog box, the Select Data for Plotting dialog box, that allows you to select data from the workbook and assign the desired plotting designation (X, Y, etc.) by clicking a button within the dialog box. Thus, you can create data plots by selecting and assigning the X values, Y values, and optional Z, error bar, label, and legend title values. This interactive plotting method also allows you to create multiple data plots that can be displayed in one graph layer, multiple graph layers, or multiple graph windows. If desired, the interactive dialog box can remain open after plotting, allowing you

to add additional data plots to an existing graph window. You can resize the dialog box (by dragging on its edge) to minimize the amount of screen space it occupies.

A Resized Select Data for Plotting Dialog Box

How to Activate this Method

This plotting method is the default option after installing and starting Origin. If the default options have been altered, re-activate this plotting method by performing the following:

Clear the Default Plot Assignments check box on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active or **Tools:Options** when any other child window is active).

What Data Must be Selected for Each Graph Type?

The Select Data for Plotting dialog box opens when you select **Plot:*Graph Type*** or click the *Graph Type* button on the 2D Graphs, 2D Graphs Extended, or 3D Graphs toolbars, assuming the conditions are met in the "How to Activate this Method" section. When plotting using this method, each graph type has associated data requirements. For example, a ternary diagram requires X, Y, and Z data. For a list of the data requirements for each graph type:

- See Data Analysis, for Origin's statistical graphs.
- See Plotting: Origin's Built-in Graph Types, for all other graphs.

Creating One Data Plot

To create a single data plot in a new graph window using Origin's interactive plotting dialog box, perform the following:

1) With the workbook active, select **Plot:*Graph Type*** or click the *Graph Type* button on one of the graph toolbars. Selecting the menu command or the toolbar button opens the Select Data for Plotting dialog box.

2) To specify the X values for the data plot, highlight the desired column of data, or a range of the desired column, and click the X button in the Select Data for Plotting dialog box. To plot the Y values versus row number, skip this step.

3) To specify the Y values for the data plot, highlight the desired column of data, or a range of the desired column, and click the Y button in the Select Data for Plotting dialog box. If your graph doesn't require a selection of Z, error bar, label, or legend title values, go to step 6.

4) If the selected graph type requires Z values, highlight the desired column of data, or a range of the desired column, and click the Z button in the Select Data for Plotting dialog box.

5) If the selected graph type requires error bar, label, or legend title values, highlight the desired column of data, or a range of the desired column, and click the respective button in the Select Data for Plotting dialog box.

6) Click Plot to create a data plot in a new graph window based on the selections in this dialog box.

To add additional data to an existing graph window using this dialog box, *do not* click Close after plotting your data. Leave the dialog box open for future access. Resize the dialog box to minimize its display.

Creating Multiple Data Plots

To create multiple data plots in a new graph window using Origin's interactive plotting dialog box, perform the following:

1) With the workbook active, select **Plot:*Graph Type*** or click the *Graph Type* button on one of the graph toolbars. Both the menu command and the toolbar button open the Select Data for Plotting dialog box.

2) To specify the X values for the data plots, highlight the desired column of data, or a range of the desired column, and click the X button in the Select Data for Plotting dialog box. To plot the Y values for the data plots versus row number, skip this step.

3) To specify the Y values for the data plots, perform one of the following operations, or a combination of the following operations:

- Highlight multiple Y columns by clicking and dragging through the desired column headings, SHIFT+clicking on a range of columns, or CTRL+clicking on nonadjacent columns.
- Highlight a range of data in a column by clicking and dragging through the desired cells. CTRL+click to select additional cells.

Click the Y button in the Select Data for Plotting dialog box after selecting the data. If your graph doesn't require a selection of error bar, label, or legend title values, go to step 5.

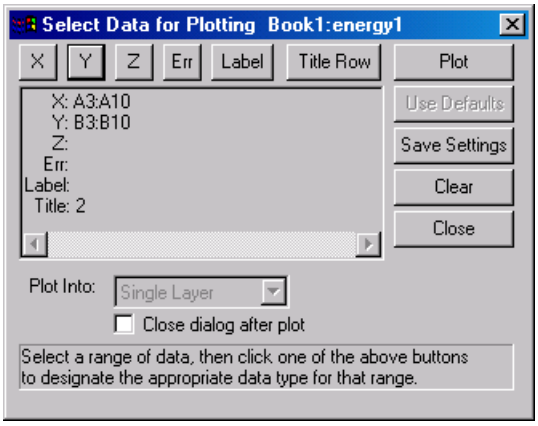
4) If the selected graph type requires error bar, label, or legend title values, highlight the desired column of data, or a range of the desired column, and click the respective button in the Select Data for Plotting dialog box.

5) After making your data selections, select the data plot display method from the Plot Into drop-down list. Select Single Layer to plot all datasets into a single layer graph. Select Multiple Layers to plot each data plot into its own layer in the same graph window. Select Multiple Pages to plot each data plot into its own single layer graph window.

6) Click Plot to create the graph(s) specified in the Plot Into drop-down list.

To add additional data to an existing graph window using this dialog box, do not click Close after plotting your data. Leave the dialog box open for future access. Resize the dialog box to minimize its display.

The Select Data for Plotting Dialog Box



The Plot Designation Buttons

Assign the selected workbook data to provide:

X The X values for a single data plot or for multiple data plots.

Y The Y values for a single data plot or for multiple data plots.

Z The Z values for a single data plot.

Err The Y error bar values for a single data plot. The error bars are associated with the first selected Y dataset to the left of the error bar data.

Label The data label values for a single data plot. The data labels are associated with the first selected Y dataset to the left of the label data.

Title Row The legend text for the data plot(s). If the Scan Data for Legend check box on the Excel tab of the Options dialog box is selected (**Window:Origin Options** when a workbook is active or **Tools:Options** when any other child window is active), Origin automatically assigns a row number for this designation.

The Data Plot Association View Box

This view box displays the data range selections for the X, Y, etc. values. Except for the Title field, the range is displayed using the following syntax: *StartColNameRowNum*:*EndColNameRowNum*. The Title field displays the selected row number only.

The Plot Into Drop-down List

If you assign multiple Y ranges from the workbook, Origin creates multiple data plots using either the selected X data or the associated row numbers. Control the display of the data plots from this drop-down list.

- Select Single Layer to plot all datasets into a single layer graph.
- Select Multiple Layers to plot each data plot into its own layer in the same graph window.
- Select Multiple Pages to plot each data plot into its own single layer graph window.

The Close Dialog After Plot Check Box

Select this check box to close the dialog box after clicking Plot.

If this check box is cleared, the dialog box remains open and available when a workbook or a graph window is active. Edit the dialog box to add additional data plots to the graph, or to create new graphs from the workbook data. Resize the dialog box to minimize the amount of screen space it occupies.

The Plot Button

Click this button to create one or more data plots based on the selection in the data plot association view box. *The data plots using the graph type that was selected when the dialog box first opened.*

The Change Book Button

If you change workbooks after this dialog box is open, the Plot button is replaced by the Change Book button. Click this button to enable selection of datasets in the currently active workbook. After clicking this button, the button is replaced by the Plot button.

The Add Plot Button

When the graph window is active, the Plot button is replaced by the Add Plot button. Click this button to add the current data selection in the Select Data for Plotting dialog box to the graph.

To use this button effectively, first redirect window activity to the workbook window. Create the new data plot association(s) by selecting data and clicking the plot designation buttons. Then redirect window activity back to the graph window. Click the Add Plot button to add the data plot(s) to the active graph layer.

The Use Defaults Button

This button is only available when data is highlighted in the workbook before you select **Plot:*Graph Type*** or click the *Graph Type* button on one of the graph toolbars. Additionally, if the previous condition is met, this button is only active when you first open the dialog box.

Click this button to plot the highlighted workbook data using Origin's default plot assignments for the selected graph type instead of establishing plot associations in the dialog box. After clicking the button, an Attention dialog box prompts to select the Default Plot Assignments check box on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active or **Tools:Options** when any other child window is active). Click Yes to create the data plots from the highlighted workbook data and change the check box status. Click No to create the data plots but leave the check box status unchanged.

The Save Settings Button

Click this button to save the selection from the Plot Into drop-down list for future instances of this dialog box in the current Origin session.

The Clear Button

Click this button to clear the current selection in the data plot association view box.

The Close Button

Click this button to close the dialog box without creating a data plot.

Highlighting Data and Using the Default Plot Assignments

Method Description

This plotting method minimizes the steps required to create a graph from a workbook by allowing you to highlight your workbook data and then select **Plot:*Graph Type*** or click the *Graph Type* button on the 2D Graphs, 2D Graphs Extended, or 3D Graphs toolbar. The graph is automatically created based on the data selection and Origin's default plot assignments for the selected graph type. There is no dialog box to serve as an intermediary plotting tool. However, this plotting method must make assumptions on the designation (X, Y, etc.) of the highlighted data, given the selected graph type. These assumptions are discussed in the section, "What Data Must be Selected for each Graph Type?".

How to Activate this Method

This plotting method is *not* the default option after installing and starting Origin. To activate this plotting method, perform the following:

Select the Default Plot Assignments check box on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active or **Tools:Options** when any other child window is active).

What Data Must be Selected for Each Graph Type?

The data requirements for each of the built-in graph types are listed below. *Note that in all cases, when you are advised to select a column of data, you can alternatively select a range of a column*. Additionally, for some of Origin's graph types, when selecting multiple columns, the use of row numbers for X values can be activated by holding down the CTRL key when selecting **Plot:*Graph Type*** or when clicking the *Graph Type* button on the 2D Graphs, 2D Graphs Extended, or 3D Graphs toolbar (hold the CTRL key down until the graph is created). When this option is available, the Description field refers to the "CTRL key being depressed".

Origin's Default Plot Assignments Using this Plotting Method

Graph Type	Selection Requirement	Description
2 Point segment 2D Waterfall 3D Ribbons 3D Walls 3D Waterfall 3 Point segment 4 Panel 9 Panel Area Bar Column Horizontal 2 panel Horizontal step Line Line+symbol Polar Scatter Spline connected Stack Stack bar Stack column Vertical 2 panel Vertical drop line Vertical step XYY 3D Bars Zoom	One or more columns.	**If one column is selected:** The column supplies the Y values. The data are plotted versus row number. **If more than one column is selected:** The leftmost column supplies the X values. All other columns supply the Y values. The data are plotted versus the X values. **If more than one column is selected and the CTRL key is depressed:** All the columns supply the Y values. The data are plotted versus row number.
Box Chart	One or more columns.	Each selected column supplies Y values for a separate box. Column names supply the associated X values.

Origin's Default Plot Assignments Using this Plotting Method (continued).

Graph Type	Selection Requirement	Description
Double Y Axis	Two columns or three columns.	**If two columns are selected:** Both columns supply Y values. The data are plotted versus row number. **If three columns are selected:** The leftmost column supplies X values. The other columns supply Y values. The data are plotted versus X values.
Fill area	Two columns or three columns.	**If two columns are selected:** Both columns supply Y values. The data are plotted versus row number. **If three columns are selected:** The leftmost column supplies X values. The other two columns supply Y values. The data are plotted versus X values
Floating bar Floating column	Two or more columns.	**If two columns are selected and the CTRL key is depressed:** The leftmost column supplies the starting Y values. The second column supplies the ending Y values. The data are plotted versus row number. **If three or more columns are selected:** The leftmost column supplies the X values. The second column supplies the starting Y values. The next column supplies the intermediate Y values (etc.). The rightmost column supplies the ending Y values. The data are plotted versus X values.. **If three or more columns are selected and the CTRL key is depressed:** The leftmost column supplies the starting Y values. The next column supplies the intermediate Y values (etc.). The rightmost column supplies the ending Y values. The data are plotted versus row number.

Origin's Default Plot Assignments Using this Plotting Method (continued).

Graph Type	Selection Requirement	Description
High-Low-Close	Three columns or four columns.	**If three columns are selected:** The leftmost column supplies the high values, the next column supplies the low values, and the last column supplies the closing values. The data are plotted versus row number. **If four columns are selected:** The leftmost column supplies the X values. The second column supplies the high values. The third column supplies the low values. The rightmost column supplies the closing values. The data are plotted versus the X values.
Histogram	One or more columns.	A histogram graph is created containing an interlaced histogram for each of the selected columns.
Histogram + Probabilities	One column.	A histogram is created for the selected column. The cumulative counts are also displayed.
Indexed size (Bubble) and color map	Three columns or four columns.	**If three columns are selected:** The leftmost column supplies the Y values. The second column supplies the size values. The rightmost column supplies the color values. The data are plotted versus row number. **If four columns are selected:** The leftmost column supplies the X values. The second column supplies the Y values. The third column supplies the size values. The rightmost column supplies the color values. The data are plotted versus the X values.

Origin's Default Plot Assignments Using this Plotting Method (continued).

Graph Type	Selection Requirement	Description
Color map, Indexed size (Bubble)	Two columns or three columns.	**If two columns are selected:** The leftmost column supplies the Y values. The second column supplies the size or color values. The data are plotted versus row number. **If three columns are selected:** The leftmost column supplies the X values. The next column supplies the Y values. The rightmost column supplies the size or color values. The data are plotted versus the X values.
Line series	Two or three columns.	If two or three columns are selected: The columns supply the Y values. Each series of row values comprises a line + symbol data plot. The data plot's X values are determined by the selected Y column number (1, 2, or 3). The data plot's Y values are determined by the actual cell values in the selected column.
Pie	One column.	The selected column values are summed, and the percentage of the total is determined for each selected value. The pie chart displays the percentage of the total for each selected value as a pie section.
QC (X bar R)	One or more columns.	**If one column is selected:** The column supplies the Y values. The X values are determined by the subgroup number (defined by the subgroup size and the number of column values). The data are plotted versus X values. **If more than one column is selected:** The selected columns supply the Y values. The X values are determined by the row number. The data are plotted versus X values.

Origin's Default Plot Assignments Using this Plotting Method (continued).

Graph Type	Selection Requirement	Description
Ternary	Three columns.	The leftmost column supplies the X values. The second column supplies the Y values. The rightmost column supplies the Z values. The X, Y, Z data are plotted.
XYAM Vector	Three columns or four columns.	**If three columns are selected:** The leftmost column supplies the Y values. The second column supplies the angle values. The rightmost column supplies the magnitude values. The data is plotted versus row number. **If four columns are selected:** The leftmost column supplies the X values. The second column supplies the Y values. The third column supplies the angle values. The rightmost column supplies the magnitude values. The data is plotted versus the X values.
XYXY Vector	Four columns.	The leftmost column supplies the X start values. The second column supplies the Y start values. The third column supplies the X end values. The rightmost column supplies the Y end values.

Creating a Graph with Error Bars

Origin provides two buttons to plot error bars when plotting workbook data using Origin's default plot assignments, the Y Error button  and the XY Error button  on the 2D Graphs Extended toolbar.

To create a graph with Y error bars:

- Highlight two workbook columns, or a range from two columns, hold down the CTRL key, and click the Y Error button on the 2D Graphs Extended toolbar. Origin uses the row index number for X values, the left column for Y values, and the right column for Y error bar values. The data displays as a scatter data plot with Y error bars.
- Highlight three workbook columns, or a range from three columns, and click the Y Error button on the 2D Graphs Extended toolbar. Origin uses the leftmost column for X values, the second column for Y values, and the rightmost column for Y error bar values. The data displays as a scatter data plot with Y error bars.

Note: You can create additional data plots with error bars as long as your highlighted workbook data is set up as X, Y1, Y1err, Y2, Y2err, etc.

To create a graph with X and Y error bars:

- Highlight four workbook columns, or a range from four columns, and click the XY Error button on the 2D Graphs Extended toolbar. Origin uses the leftmost column for X values, the second column for Y values, the third column for X error bar values, and the last column for Y error bar values. The data displays as a scatter data plot with X and Y error bars.

Adding Workbook Data to an Existing Graph Window

Highlighting and Dragging Data into the Graph Window

Method Description

This method of adding data plots to an existing graph window simplifies plotting by allowing you to drag your workbook data into the graph. There is no dialog box to serve as an intermediary plotting tool. However, this plotting method must make assumptions on the designation (X, Y, etc.) of the highlighted data. These assumptions are discussed in the section, "What Data Must be Selected for Each Graph Type?". Additionally, the resultant graph type is determined by the Drag and Drop Plot drop-down list selection on the Graph tab of the Options dialog box.

How to Activate this Method

This plotting method is available whenever a workbook is active and a graph window is open in the project (excluding minimized and hidden graph windows).

To select the graph type for your data plots created with the drag-and-drop method, select **Window:Origin Options** when a workbook is active or **Tools:Options** when any other child window is active. Both menu

commands open the Options dialog box. Select the desired graph type from the Drag and Drop Plot drop-down list on the Graph tab. Select among the following options:

- Select Line, Scatter, or Line+Symbol to create a line, scatter, or line+symbol data plot.
- Select Current to display the data plot using the style of the graph template (for example, line or scatter). If, however, you have created a custom template with data plot style holders, Origin will search for the first available style holder. If there are no style holders available, Origin displays the data plot using the style of the graph template.

What Data Must be Selected for Each Graph Type?

After selecting the desired data in the workbook, position the mouse at the edge of the selection area. The mouse display changes to a pointer. Click-and-drag the data into the desired graph window.

- If one column (or a range from one column) is highlighted, then this column supplies the Y values for the data plot. The data is plotted versus row number.
- If more than one column (or a range from more than one column) is highlighted, the leftmost column supplies the X values. All other columns supply the Y values. The data is plotted versus the X values.
- If more than one column (or a range from more than one column) is highlighted *and* the CTRL key is depressed while dragging the data, then all the columns supply the Y values. The data is plotted versus row number.

If the graph window contains multiple layers, the data plot displays in the layer that occupies the physical location where the data was dropped. If the layers are overlapping, the data plot displays in the active layer. If the data is dropped on a layer icon, the data plot displays in the associated layer.

Adding Data Using the Select Data for Plotting Dialog Box

Method Description

This method of adding data plots to an existing graph window uses the interactive Select Data for Plotting dialog box. Use this dialog box to add one or more data plots to a graph. When adding data to an existing graph window using this dialog box, the data displays using the style of the graph template (for example, line or scatter). If, however, you have created a custom template with data plot style holders, Origin will search for the first available style holder. If there are no style holders available, Origin displays the data plot using the style of the graph template.

How to Activate this Method

If you already created a graph using the Select Data for Plotting dialog box *and* if you didn't click Close, then the dialog box is still available for adding data to a graph. However, if you created a graph using a different plotting method or if you closed the Select Data for Plotting dialog box after creating a graph, then you must open this dialog box to activate this plotting method.

To open the Select Data for Plotting dialog box, make the workbook window active and perform the following:

1) Clear the Default Plot Assignments check box on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active or **Tools:Options** when any other child window is active).

2) Select **Plot:*Graph Type*** or click the *Graph Type* button on the 2D Graphs, 2D Graphs Extended, or 3D Graphs toolbar to open the Select Data for Plotting dialog box.

What Data Must be Selected for Each Graph Type?

Each graph type has associated data requirements. For example, a ternary diagram requires X, Y, and Z data. For a list of the data requirements for each graph type:

- See Data Analysis, for the statistical graphs.
- See Plotting: Origin's Built-in Graph Types, for all other graphs.

To Add Data Plots to an Existing Graph Window

To add data plots to an existing graph window using Origin's interactive plotting dialog box, perform the following:

1) If the Select Data for Plotting dialog box is not already open, then open the dialog box by making the workbook window active and selecting **Plot:*Graph Type*** or by clicking the *Graph Type* button on one of the graph toolbars.

2) If the Select Data for Plotting dialog box is already open, then make the workbook (that contains the data you want to plot) the active window. If this workbook is different from the workbook that was active when you opened this dialog box, then the Change Book button displays in the Select Data for Plotting dialog box. Click this button to continue.

3) To clear the current data plot associations in the Select Data for Plotting view box, click Clear. (You may need to resize the dialog box to access this button.)

4) To specify the X values for the data plot(s), highlight the desired column of data, or a range of the desired column, and click the X button in the Select Data for Plotting dialog box. To plot the Y values versus row number, skip this step.

5) To specify the Y values for a single data plot, highlight the desired column of data, or a range of the desired column.

To specify the Y values for multiple data plots, perform one of the following operations, or a combination of the following operations:

Highlight multiple Y columns by clicking and dragging through the desired column headings, SHIFT+clicking on a range of columns, or CTRL+clicking on nonadjacent columns.

Highlight a range of data in a column by clicking and dragging through the desired cells. CTRL+click to select additional cells.

Click the Y button in the Select Data for Plotting dialog box after selecting the data.

6) If the selected graph type requires Z values, highlight the desired column of data, or a range of the desired column, and click the Z button in the Select Data for Plotting dialog box.

7) If the selected graph type requires error bar, label, or legend title values, highlight the desired column of data, or a range of the desired column, and click the respective button in the Select Data for Plotting dialog box.

8) Make the graph window (that you want to add the data plots to) the active window.

9) Click Add Plot to plot the data into the graph window. If the graph window contains multiple layers, the data plots display in the active layer.

Adding Data Using the Layer n *Dialog Box*

Method Description

This method of adding data plots to an existing graph window provides access to all the datasets in all the workbooks in the project. It also provides access to all the datasets in all the Origin worksheets in the project. When adding data to a graph window using this method, the data plot displays using the style of the graph template (for example, line or scatter). If, however, you have created a custom template with data plot style holders, Origin will search for the first available style holder. If there are no style holders available, Origin displays the data plot using the style of the graph template.

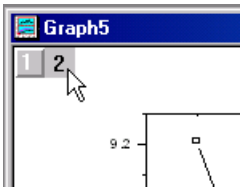
If a dataset from a workbook sheet is not listed in the Available Data list of the Layer *n* dialog box, perform the following:

1) Make the Excel workbook window that contains the desired dataset(s) the active window.

2) Right-click on the workbook window title bar and select **Update Origin** from the shortcut menu.

How to Activate this Method

This method is always available by double-clicking on the respective layer icon in the graph window.



What Data Must be Selected for Each Graph Type?

When adding data plots to a graph window using this method, the selected dataset supplies the Y values for the data plot. By default, the X values for the data plot are supplied by the leftmost column in the workbook.

To Add Data Plots to an Existing Graph Window

To add data plots to an existing graph window using the Layer *n* dialog box, perform the following:

1) With the graph window active, double-click on the desired layer icon to open the respective Layer *n* dialog box.

2) Specify the Y values for a single data plot by highlighting the desired workbook dataset in the Available Data list box.

3) Specify the Y values for multiple data plots by highlighting the desired workbook datasets in the Available Data list box. Click-and-drag through the dataset names, SHIFT+click on a range of dataset names, or CTRL+click on dataset names.

4) Click the ⇒ button to move the selected dataset(s) into the Layer Contents list box.

5) Click OK.

Adding Data Using the Select Columns for Plotting Dialog Box

Method Description

This method of adding data plots to an existing graph window provides access to those datasets that reside in the top sheet (when the dialog box was opened) of each of the workbooks in the project. It also provides access to all the datasets in all the Origin worksheets in the project. The dialog box allows you to select datasets and specify their designation, overriding the default designations in the workbook. This plotting method supports line, scatter, line+symbol, column, and area data plots.

Note: When adding workbook data to an existing graph window, you should use the Select Data for Plotting dialog box instead of the Select Columns for Plotting dialog box.

What Data Must be Selected for Each Graph Type?

The line, scatter, line+symbol, column, and area data plots all require the selection of a designated Y dataset in the Select Columns for Plotting dialog box. To specify the data plot's X values, select an X dataset, or set the X start value and increment in the Set X Values group in the dialog box.

To Add Data Plots to an Existing Graph Window

To add data plots to an existing graph window using the Select Columns for Plotting dialog box, perform the following:

1) With the graph window active, select **Graph:Add Plot to Layer:*Graph Type***.

2) Select the desired workbook from the Worksheet drop-down list.

3) Specify the X values for a single data plot by highlighting the desired workbook dataset in the list box below the Worksheet drop-down list. Alternatively, edit the Set X Values group.

4) Click the ↔X button to set the X designation.

5) Specify the Y values for a single data plot by highlighting the desired workbook dataset in the list box below the Worksheet drop-down list.

6) Click the ↔Y button to set the Y designation.

7) Click OK.

Managing Projects that Include Workbooks

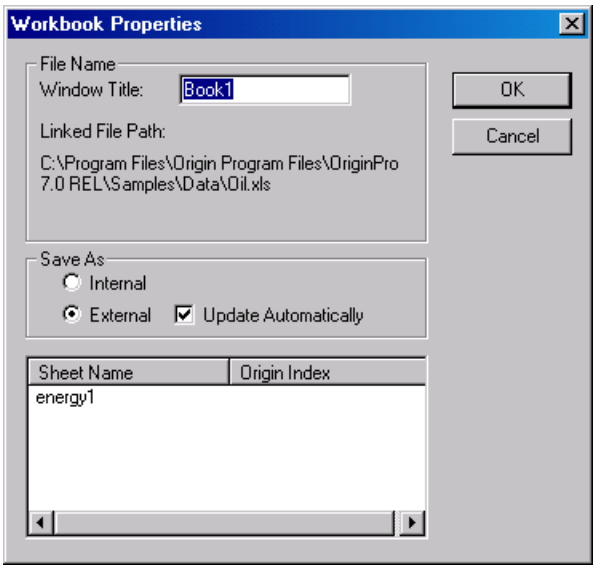
When you select **File:Save Project** or **File:Save Project As**, or when you click the Save Project button on the Standard toolbar, all child windows (including minimized and hidden child windows) that are open in the project are saved as part of the project. If a workbook window is open in the project, the project can be saved with a link to the source workbook file, or the workbook can be saved internal to the project.

- Saving the project with a link to the source workbook file allows you to maintain an external Excel file that is updated when changes are made to the associated workbook in Origin. This source file is also available for use in other applications and can be accessed by other users.
- Saving the workbook internal to the project enhances the project's portability. You can open the project on any computer that has Origin and Excel installed and have full access to your workbook data.

Saving the Project with Links to External Excel Workbook Files

To ensure that the active workbook will be linked to the current project when the project is saved, right-click on the workbook window title bar and select **Properties** from the shortcut menu. This shortcut menu command opens the Workbook Properties dialog box. Select the External radio button in the Save As group. After selecting this radio button, Origin displays the full path and file name of the linked source Excel file in the File Name group. If the workbook window was created in Origin, the default path is determined by the Excel path specified on the File Location tab of the Options dialog box (**Window:Origin Options** when a workbook is active, or **Tools:Options** when any other child window is active).

The Workbook Properties Dialog Box



The File Name Group

Type the desired workbook window name in the Window Title text box.

When the External radio button is selected (in the Save As group), Origin displays the full path and file name of the linked source file in the Linked File Path field.

The Save As Group

Select the Internal radio button to save the active workbook internal to the project when the project is saved. When this radio button is selected and the project is saved, changes made to the workbook in Origin are not reflected in the original source workbook. Additionally, changes made to the original source workbook file are not reflected in the Origin project.

Select the External radio button to save a link to the active workbook when the project is saved. Thus, when this radio button is selected and the project is saved, changes made to the workbook in Origin are reflected in the original source workbook. Additionally, changes made to the original source workbook file are reflected in the Origin project.

Select the Update Automatically check box to automatically update existing links between the workbook display in Origin and the original source workbook when the project is saved. This check box is only available when the External radio button is selected.

If this check box is cleared, changes made to the workbook in Origin are not reflected in the source workbook file. Additionally, when the project is re-opened, the workbook changes are not included.

The Sheet Name / Origin Index List Box

When plotting workbook data from multiple sheets, Origin uses an *@SheetNumber* notation to denote the sheets that contain plotted data. To determine the numeric value of *SheetNumber*, Origin numbers the sheets in the order in which they are accessed for plotting. The workbook sheets and their associated *SheetNumber* values are listed in this list box.

Updating the Linked Source Excel Files

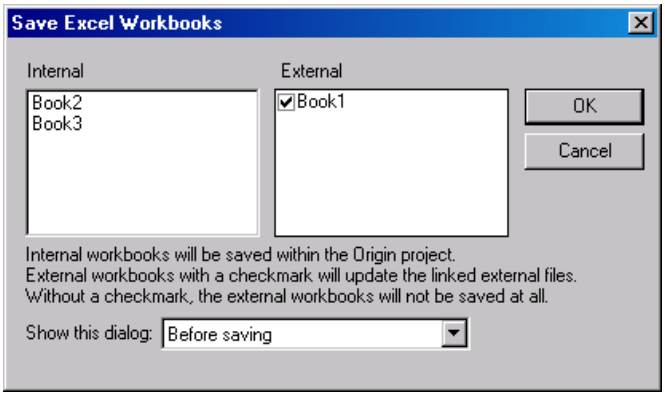
To ensure that changes made to an external Excel workbook in Origin are reflected in the source workbook file, you can manually re-save the workbook to the source file name, or you can automatically update the source file when you save your Origin project.

1) To manually re-save the workbook to the source Excel file, right-click on the workbook window title bar and select **Save Workbook As** from the shortcut menu.

2) To automatically update the source Excel file when saving your project, right-click on the workbook window title bar and select **Properties** from the shortcut menu. This shortcut menu command opens the Workbook Properties dialog box. Select the Update Automatically check box in the Save As group and click OK. When you select **File:Save Project** or **File:Save Project As**, or when you click the Save Project button on the Standard toolbar, Origin will automatically update the source Excel file.

If you have selected either Before Saving or Before Save Project As from the Saving Excel Workbooks drop-down list on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active, or **Tools:Options** when any other child window is active), then the Save Excel Workbooks dialog box opens after selecting one of the project saving options. To update the source Excel file, the associated check box must be selected from the External list box.

The Save Excel Workbooks Dialog Box



The Internal List Box

This list box displays the workbooks in which the Internal radio button was selected from the associated Workbook Properties dialog box. These workbooks are saved as part of the Origin project file, not as an Excel file with a link to the project.

Note: All workbooks created by clicking the New Excel button on the Standard toolbar have the Internal radio button selected by default.

The External List Box

This list box displays the workbooks in which the External radio button was selected from the associated Workbook Properties dialog box. These workbooks are saved as a separate Excel file, with a link to the project.

If the check box next to the workbook is selected, then the source Excel file is updated when the project is saved. To ensure that this check box is selected by default, select the Update Automatically check box in the workbook's associated Workbook Properties dialog box.

The Show this Dialog Drop-down List

This drop-down list controls the display of this dialog box when you save a project that contains a workbook.

- Select Never to prevent Origin from opening this dialog box under all circumstances.
- To re-enable the display of this dialog box, select either Before Saving or Before Save Project As from the Saving Excel Workbooks drop-down list on the Excel tab of the Options dialog box (**Window:Origin Options** when a workbook is active, or **Tools:Options** when any other child window is active).
- Select Before Saving to direct Origin to open this dialog box whenever you select **File:Save Project** (or whenever you click the Save button on the Standard toolbar), assuming the project includes an Excel workbook.

- Select Before Saving Project As to direct Origin to open this dialog box whenever you select **File:Save Project As**, assuming the project includes an Excel workbook.

Establishing Links if You Created the Workbook in Origin

When you click the New Workbook button on the Standard toolbar to open a new workbook in Origin, the Internal radio button is selected by default in the workbook's Workbook Properties dialog box. To change the workbook's status to external, perform one of the following operations:

- Right-click on the workbook window title bar and select **Properties** from the shortcut menu. This menu command opens the Workbook Properties dialog box. Select the External radio button and click OK.
- Right-click on the workbook window title bar and select **Save Workbook As** from the shortcut menu. This menu command opens the Save As dialog box. Type a file name in the associated text box and click OK.

Now when you save your project, a link is saved to the source (external) Excel workbook file.

Saving the Project with Internal Excel Workbooks

To ensure that the active workbook is saved internal to the current project when the project is saved, right-click on the workbook window title bar and select **Properties** from the shortcut menu. This shortcut menu command opens the Workbook Properties dialog box. Select the Internal radio button in the Save As group.

After changing the status of a workbook from external to internal, Origin *will not update* the original source Excel file when you select **File:Save Project** or **File:Save Project As**, or when you click the Save Project button on the Standard toolbar. Additionally, any new changes made to the original source Excel file are not reflected in the project.

Opening an Origin Project that has Links to External Excel Workbooks

When you open a project that includes links to external Excel file(s), Origin displays the current Excel workbook(s) in the project. If Origin can't find the Excel file at the location specified in the Linked File Path field of the workbook's Workbook Properties dialog box, then Origin opens the File Name dialog box. Type the correct path and file name in this dialog box and click OK. If the Excel file isn't available, click Ignore (or Ignore All). Origin opens the project and displays a placeholder for each workbook whose source wasn't available. Additionally, any data plots created from the workbook(s) are not displayed in the graph window(s).

Opening an Origin Project that Contains Internal Excel Workbooks

When you open a project that includes internal Excel file(s), Origin displays the Excel workbook(s) as they were saved with the project.

Troubleshooting Problems Using Excel in Origin

If Excel Doesn't Close When You Exit Origin

If you are working with an Origin project that includes Excel workbooks, Origin closes Excel when you close Origin or when you close the project that includes the workbooks.

If Origin fails to properly close Excel, you must close Excel manually. To accomplish this, press CTRL+ALT+DELETE. This action opens the Close Program dialog box. Select Excel from the list box and click the End Task button.

If One of the Windows has a Blank Display

Occasionally, the workbook window, or other windows containing workbook data, may become inactive. This condition is apparent when the window containing workbook data has a blank display. To reactivate the window and restore its display, right-click on the workbook window title bar and select Update Origin from the shortcut menu.

If Excel Fails to Launch from Within Origin

In certain instances, Excel may fail to launch from within Origin. In most cases, this is due to a problem with the Excel registration entry in Windows. To rectify this problem, Excel must be un-installed and then re-installed. For a complete discussion of this issue, see the Technical Services page of OriginLab's website (www.OriginLab.com).