Tutorials for Origin 2025b

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1 Getting Started

If you are new to Origin, or have used a much older version in the past, it is highly recommended that you start with these tutorials. Once you have familiarized yourself with the interface and key concepts of graphing and analysis introduced in these lessons, you can then move on to other chapters that cover Origin features in more detail.

At the end of each lesson, we ask you to save the project. Please work through the tutorials sequentially as some build on previous lessons.

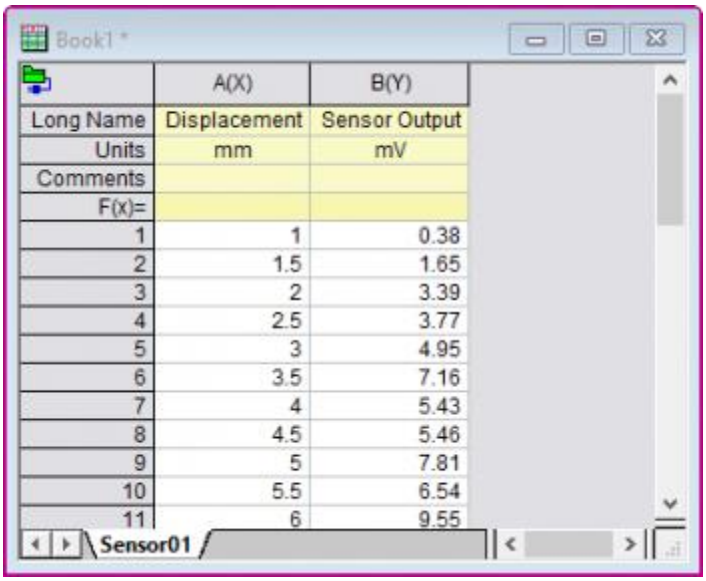
- My First Graph
- Graph Templates and Batch Plotting
- Data Selection
- Merge and Arrange Graphs
- Publishing Graphs
- 3D and Contour
- Gadgets
- Curve Fitting
- Peak Analysis
- Statistics
- Analysis Template
- Apps in Origin

We hope this set of **Getting Started** tutorials has been helpful in providing you with a broad overview and introduction to key features in Origin. We recommend that you continue with more advanced tutorials in the categories in this book that are most relevant to your work.

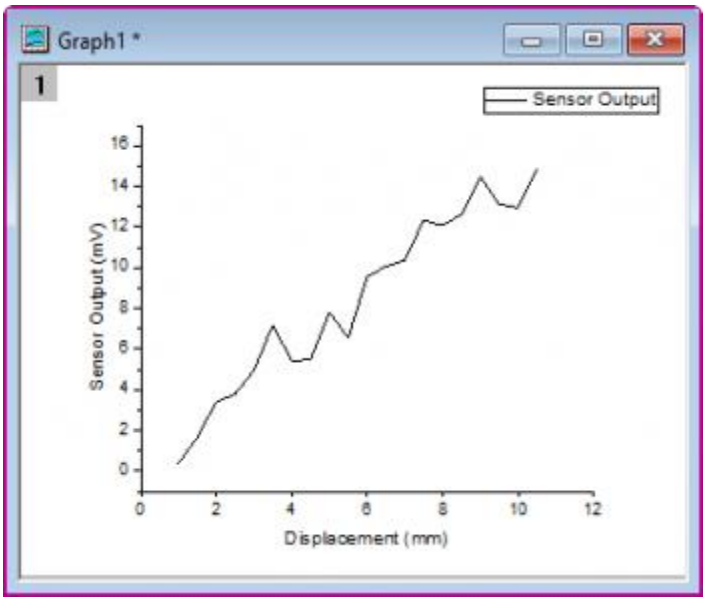
2 My First Graph

In this first lesson, we will generate some data, create a graph, do some simple customization of the graph, and save the data and graph as an Origin project.

2.1.1 Import data and graph

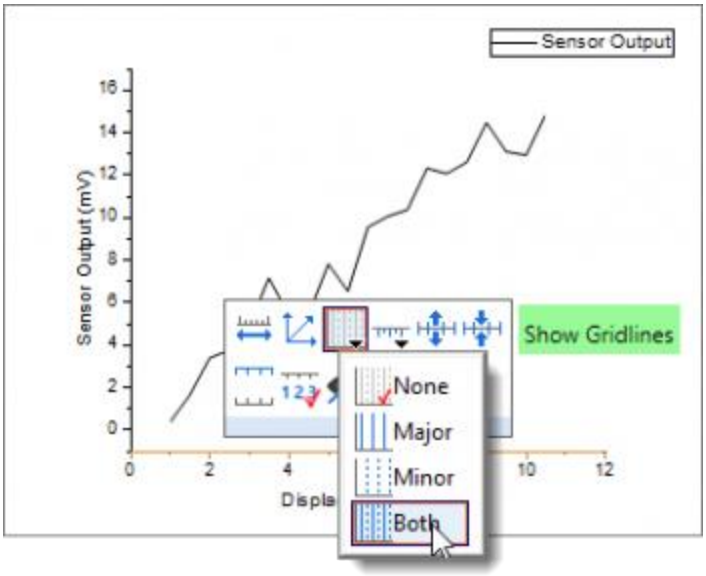
1. Launch Origin. You will see an empty workbook with one worksheet containing two columns.
2. Click **Help: Open Folder: Samples Folder** and browse to \Curve Fitting\Sensor01.dat. Drag the file to the Origin workbook.
3. 

4. Now let us create a graph. Click on the header of column B to select the entire column. Then click the **Line** button  in the **2D Graphs** toolbar docked at the bottom left of the interface. A graph window will open, with the data plotted as a line.

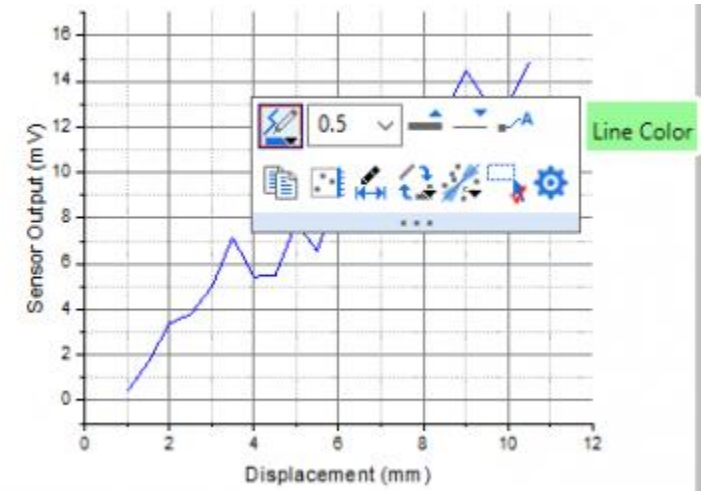
5. 

2.1.2 Customize the graph

1. We will now do some simple customization of the graph. Click on the X axis, and in the pop-up Mini Toolbar, click the **Show Gridlines** button to select **Both** in the drop-down list. This will add major and minor grid lines for the X axis. Do the same for Y axis.

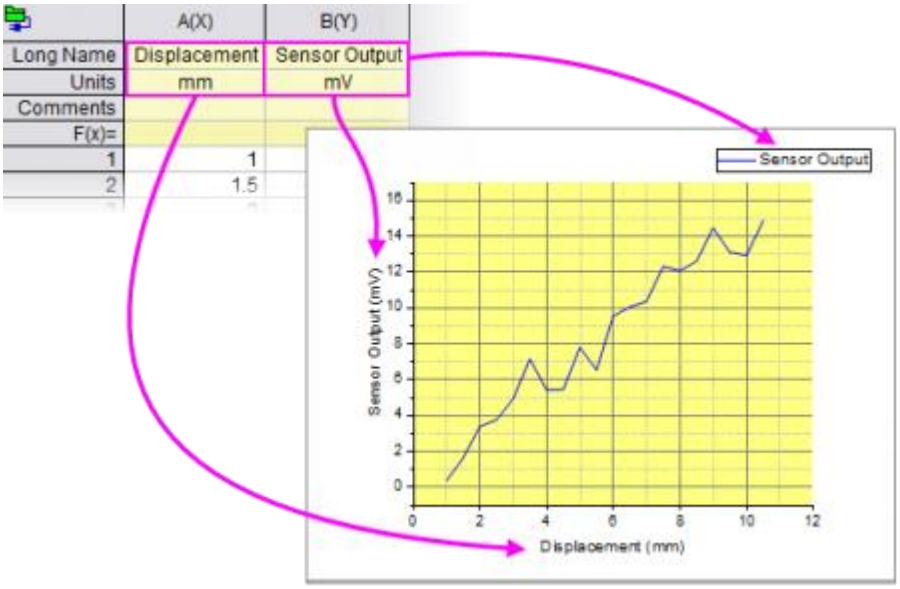


2. Click on the line plot. In the pop-up Mini Toolbar, click the **Line Color** button to change the line color to **Blue**.



3. Change the width to **3** by using the **Line Thickness** drop-down list  in the Mini Toolbar.

4. Single-click inside the layer, but not on the grid lines or plot. You may need to click once to deselect your plot and then again to select the layer. The graph layer will be selected, and this will be indicated by selection handles. Change the layer background color to **LT Yellow** by using the **Layer Background Color** button  on the Mini Toolbar. Your graph should look like below:



2.1.3 Explore data graphically

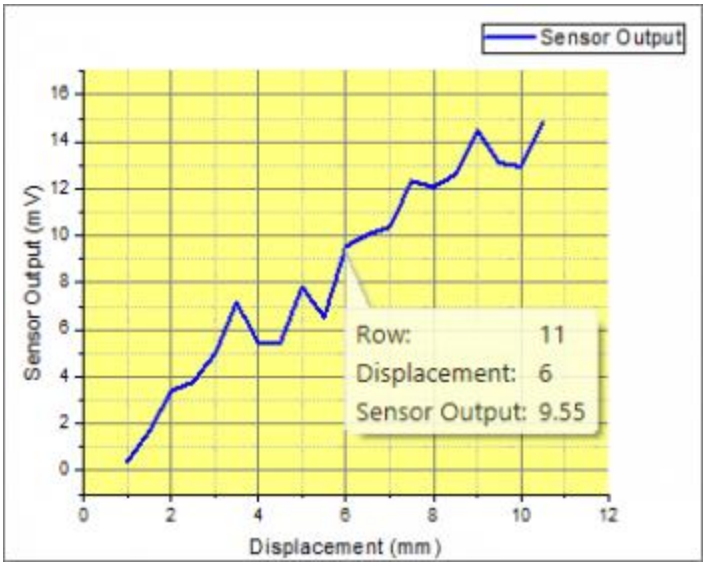
1. Let us now explore the data graphically. Make sure the graph window is active by clicking on the title bar.
   - Hold the **Z** key down and use the mouse wheel to zoom in and out on the X axis.
   - Hold the X key down, and use mouse wheel to pan across the x axis.

     Hold the **Shift** key down along with Z/X keys to zoom/pan in Y direction.

- Bring the plot back to full scale by clicking the yellow background, then clicking the **Rescale** button  on the Mini Toolbar.

  Use shortcut **CTRL+R** to rescale plots in the graph layer.

2. Hover your cursor on a point of the curve and a Data Point tooltip will show.



2.1.4 Save the Project

We will now save this Origin project for later use.

1. Move mouse over to the Project Explorer bar on the left side of the work space to expand it.
2. Right click on the **Folder1** in the upper **folders panel** and choose **Rename** from the context menu. Type ***My First Graph*** to rename the folder.
3. Choose menu **File: Save Project** to save the project. Give the project a name such as ***Getting Started Tutorials***.

Files created by the user such as projects, graph templates, fitting functions etc are by default saved in the **User Files Folder (UFF)**. You can access the **UFF** and other useful folder

locations with the main menu **Help: Open Folder**.

3 Graph Templates and Batch Plotting

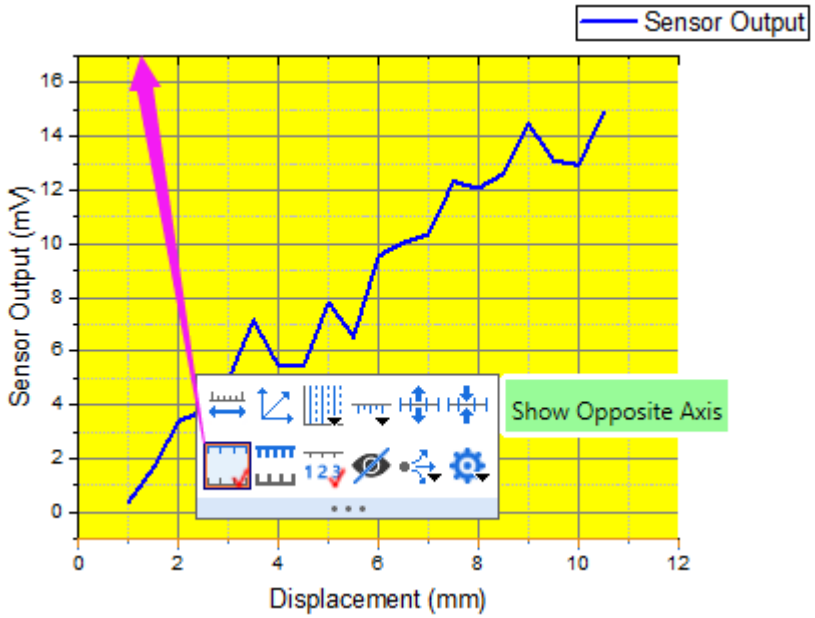
In this lesson we will learn about graph templates, and also how to perform batch plotting.

3.1 Graph Templates

Let's start with the project file we saved in lesson one: My First Graph. Click to select the graph window.

You can quickly open recently-saved project files from the **File: Recent Projects** list.

1. Click on the X axis, in the pop-up mini toolbar, click the **Show Opposite Axis** button to show the Top X axis. Do the same for Y axis to show the Right Y axis.

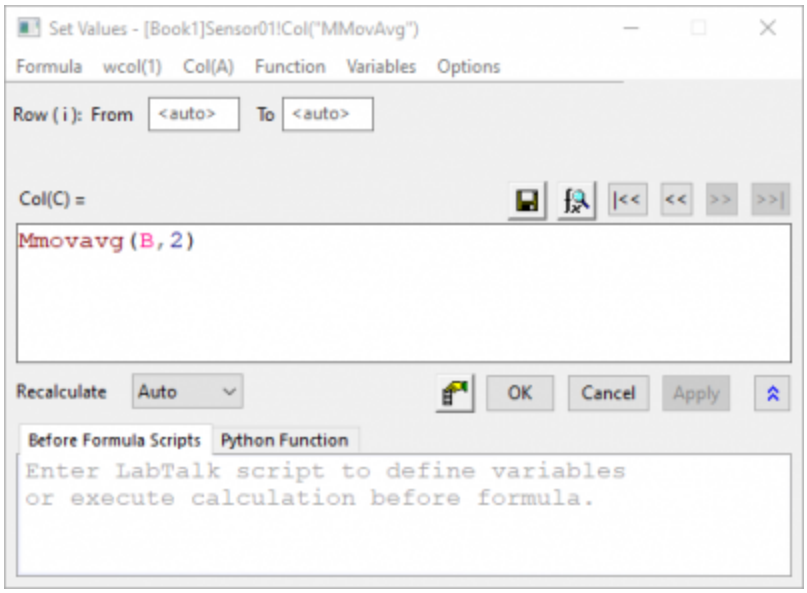


2. Now let's save the graph as a template. Right-click on the graph title bar, and choose **Save Template As...** from the context menu.
3. In the dialog, set the **Template Name** as **My Line** and click **OK** to save the template.
4. We will now generate a new column of data. Activate the worksheet, click the **Add New Column** button  on the **Standard** toolbar to add a new column to the rightmost.
5. Click inside the **F(x)** cell of this new column, then enter the following:

```
=Mmovavg(B,2)
```

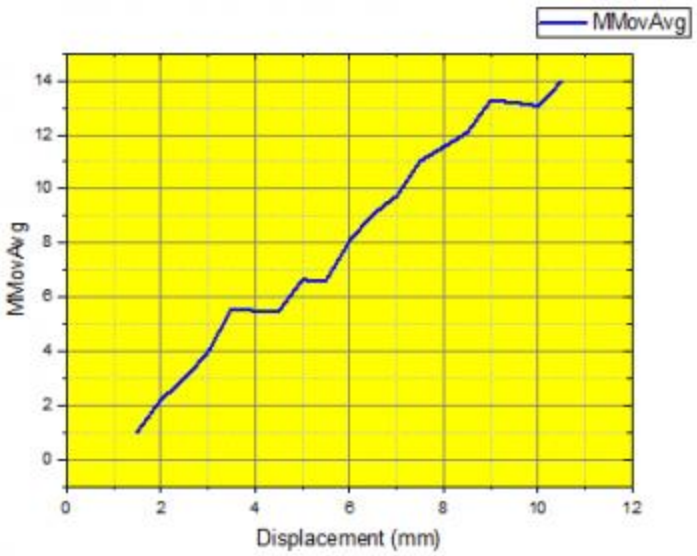
Note that when you enter "=" and then an expression, the possible expressions will be listed allowing you to choose to auto-complete the expression. And a message box will pop-up to show the simple description of the expression.

You can fill a column with an expression also by right-clicking the **F(x)** cell of this column and selecting **Open Dialog...** from the context menu.



In this dialog, use the **Formula: Load Samples** menu to view various examples on setting column values. And, the **Function** menu offers a large selection of functions. You can also search for suitable functions using the search button  .

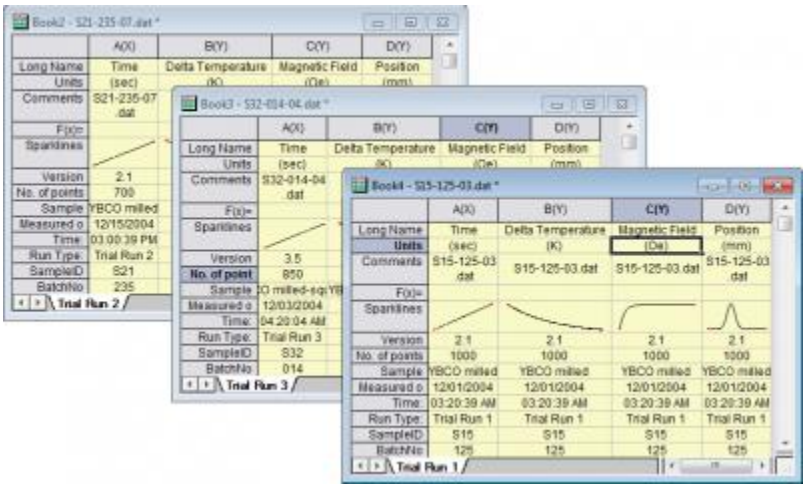
6. Press **Enter** key to return a dataset of modified moving averages using column B data, starting at row 2. Type **MMovAvg** into the **Long Name** cell of the column.
7. Click on the header of column C to select the entire column. From the menu, choose **Plot: User Templates** and select the **My Line** template we created before. A new graph will be created using data from column C.



3.2 Batch Plotting

In this section, we will perform batch plotting by first creating one graph and then cloning that graph using other data.

1. Go to **Project Explorer**. In the upper panel, right-click on the root level and choose **New Folder**.
2. Name the folder **Batch Plotting**. Click on the empty folder to open it.
3. Select **Help: Open Folder: Program Folder** to open the Origin program folder, find and open the **\Samples\Import and Export** subfolder. Press the **Shift** key and choose the following three files:
   - S15-125-03.dat
   - S21-235-07.dat
   - S32-014-04.dat
4. Drag and drop the selected files onto the Origin workspace. The selected files are imported into three new workbooks.

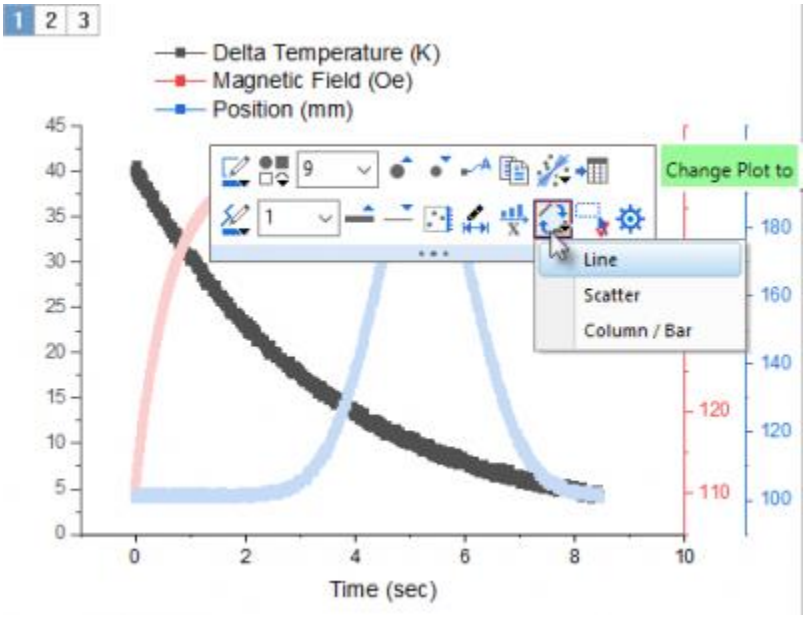


> **Note:** To import data files by drag-and-drop, you must not be running Origin as an administrator.

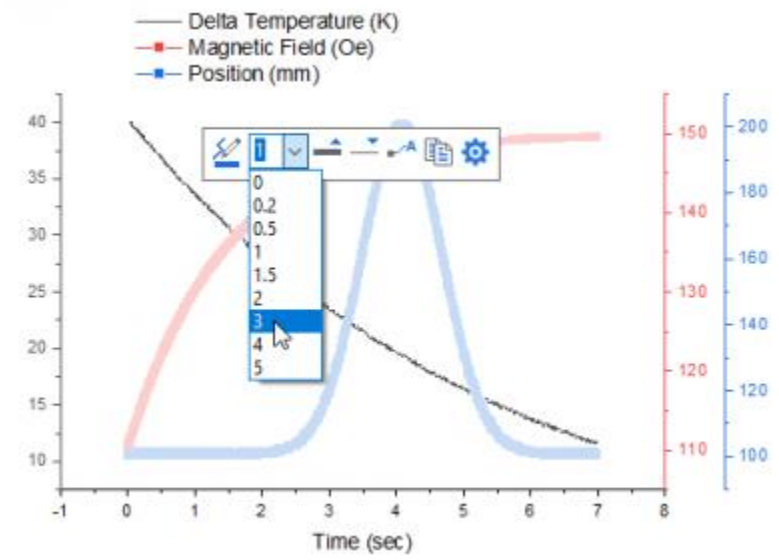
5. Select one of the workbooks, then click on the header of column B and drag the mouse to column D, selecting all three columns. Then select the menu: **Plot > Multi-Panel/Axis: 3Ys Y-YY**.

Origin will look to the left of the selection to find the X column and plot the selected data against the 1st column in the worksheet.

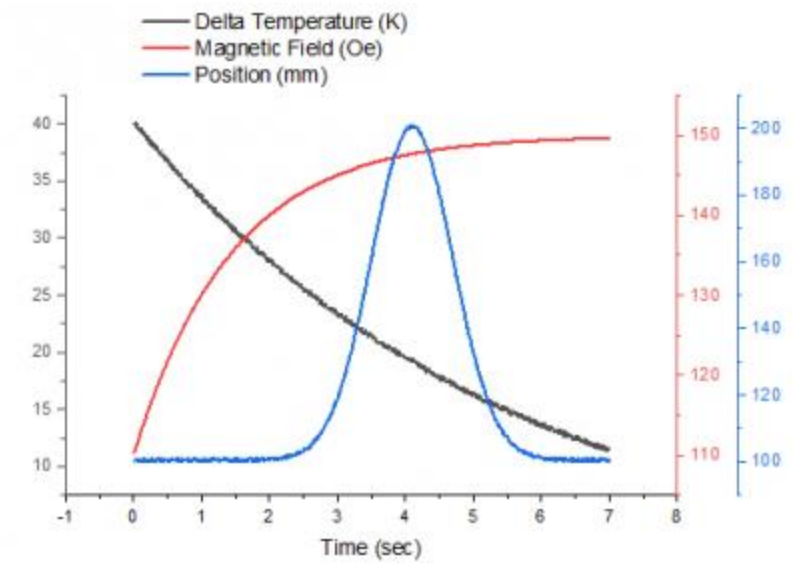
6. Click on one plot, in the pop-up mini toolbar, change the plot type of selected plot to **Line** by using the **Change Plot to** drop-down list  .



Click on the plot, in the pop-up mini toolbar, change the width to **3** by using the **Line Thickness** drop-down list  .

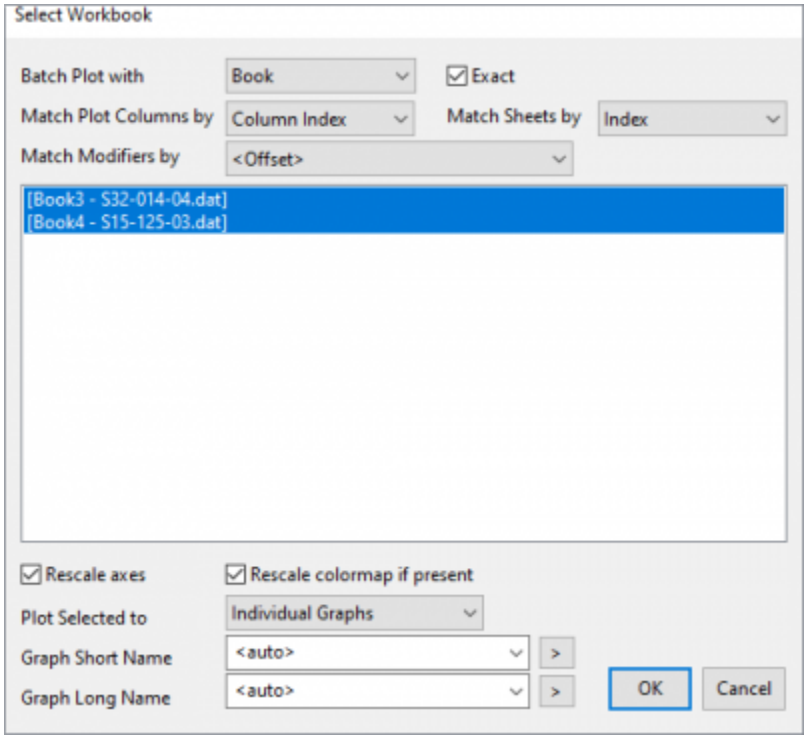


Then, do the same for other two plots to get the following line graph.

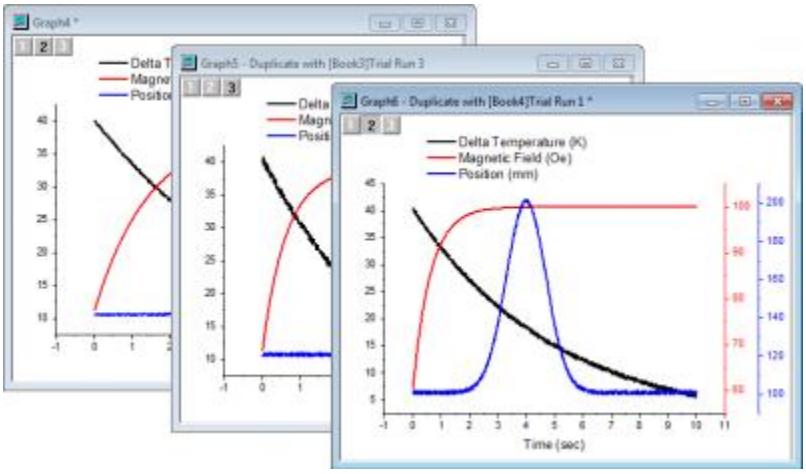


7. Now we will clone this graph using data in the other workbooks. Right-click on the title bar of the graph and select **Batch Plotting...**, and then the **Select Workbook** dialog will be opened.
8. In the dialog, set according to the image below. Make sure you highlight the books.

You can set the **Match Plot Columns by** drop-down appropriately to find worksheets in the project that match the data configuration of the current graph.

9. 

10. Click **OK**. If prompted to rescale the axes to show all data, answer *Yes* and click OK. Two similar graphs will be created with data from the other two books.



11. From the menu, click **Save Project** button on **Stardard** toolbar to save your modified project.

4 Data Selection

In this lesson we will learn about flexible ways of selecting data for plotting.

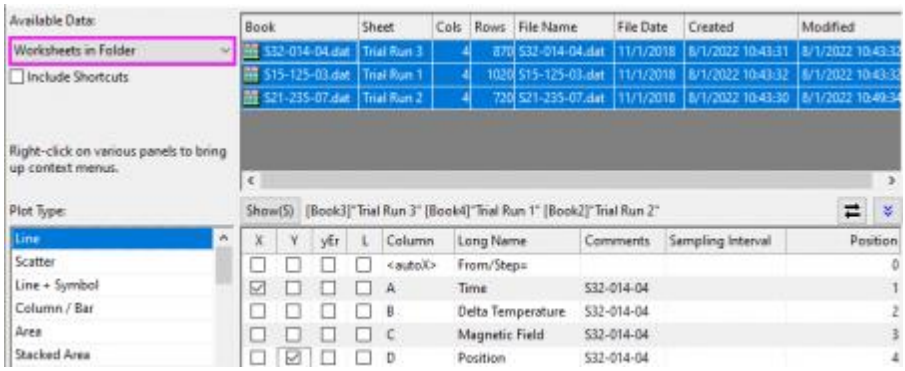
4.1.1 Plotting Data from Multiple Worksheets

1. Let's start with the project we saved in lesson two: Graph Templates and Batch Plotting. Select any workbook, and make sure no data columns are selected. You can click in the gray area outside of columns to remove selection.
2. Select menu **Plot > Basic 2D: Line**. The **Plot Setup** dialog will open.
3. Click the  button on the right side to expand the upper panel if it is not already open.
4. Set the **Available Data:** drop-down list in the left panel to **Worksheets in Folder**.

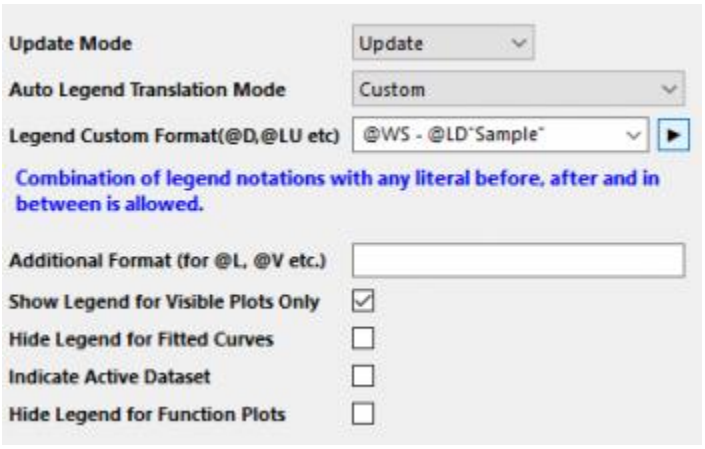
To pick up worksheets from anywhere in your project, set the drop down to **Worksheets in Project**.

5. Hold down shift key and select all three data sheets named **Trial Run 1**, **Trial Run 2** and **Trial Run 3**.
6. Using the check boxes in the middle panel, assign *Time* as **X** and *Position* as **Y**. Click **OK** button to create the graph.

This dialog has a third bottom panel which can be used to assign data to different layers in a multi-layer graph. If that panel is open, you can simply collapse it and then click **OK** to create the graph.

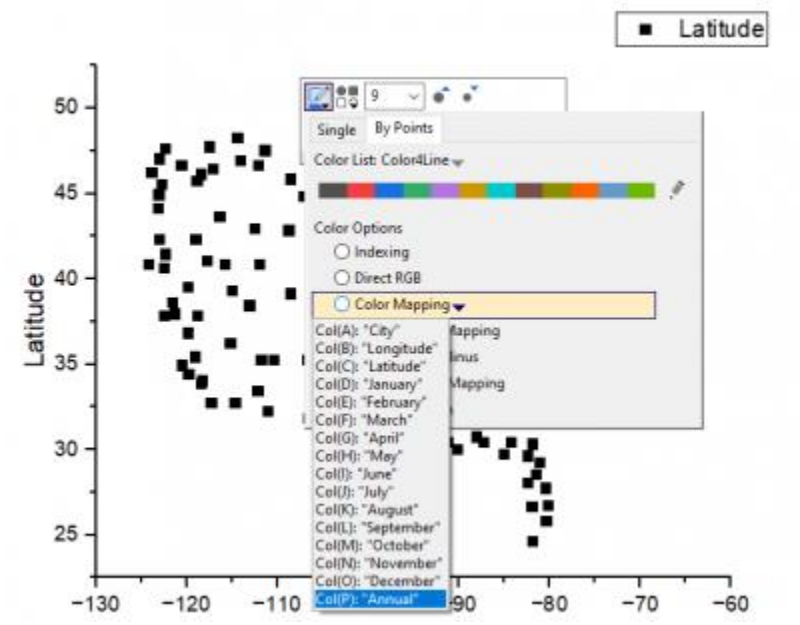
7. 

8. We will now customize the legend for this graph. Right click on the legend and select **Legend: Update Legend...**
9. In the dialog that opens, set **Auto Legend Transition Mode** as **Custom**. Clear the **Legend Custom Format (@D, @LU etc)** edit box and then click the  button on the right of this edit box, and in the fly-out menu select **@WS: Sheet Display Name**.
10. In the edit box, type a hyphen - after the string *@WS*, and again click the right arrow button. This time select **@LD"Sample": Sample**, which corresponds to column header row *Sample* in the worksheet. Click the **OK** button. The legend will now display the sheet name and the sample name.

11. 

4.1.2 Using another Column to Set Color of a Plot

1. Go to **Project Explorer**. In the upper panel, right-click on the root level and choose **New Folder**.
2. Right-click on newly created folder, select **Rename**, and assign the name ***Data Selection***. Click on the empty folder and open it.
3. Select **Help: Open Folder: Sample Folder...** to open the "Samples" folder. In this folder, open the *Graphing* subfolder and find the file *US Mean Temperature.dat*. Drag-and-drop this file into Origin workspace to import it into a new worksheet.
4. We want to plot the positions of US major cities (columns *Longitude* and *Latitude*) as a scatter plot and then colormap the data points with the annual mean temperature (column *Annual*). Click on the header of column named **January** and drag and expand the selection all the way to the column named **December**. Then right click to choose **Hide/Unhide Columns: Hide**.
5. Select the *Longitude* columns, in the pop-up mini toolbar, select **Set As: X** button  .
6. Select the *Latitude* and click **Scatter** button  on the bottom left toolbar to create the plot of longitude vs. latitude.
7. Click on the plot, in the pop-up mini toolbar, click the **Symbol Edge Color** button to expand the color chooser, switch to the **By Points** tab. In this tab, click the **Color Mapping** drop-down and select **Col(P): "Annual"** in the list. The symbol color will be mapped to the column *Annual*.

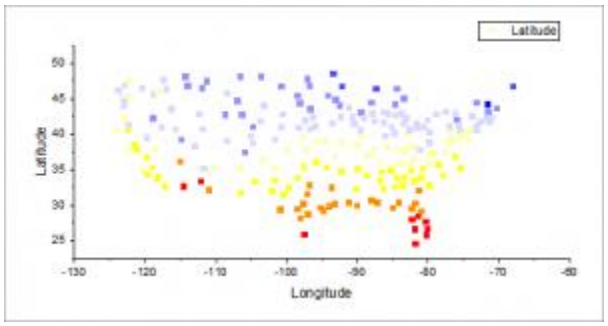
8. 

9. Let us now set the axes lengths to scale with the range of X and Y values represented in the graph. Click on the white space of the layer to select the layer, in the pop-up mini toolbar, click **Isometric** button  .

   You also can double-click on the white space of the layer to open the **Plot Details** dialog with the *Layer1* node been selected on the left panel. Then go to the **Size** tab on the right side. Check the **Link Axis Length to Scale with X:Y Ratio** box and keep the ratio as *1*.

10. Now, let us select another color palette to apply it to the symbol color as colormap. Click on any data point in the graph, and then click on the **Palette** toolbar button  in the **Style** toolbar. Select the *Temperature* palette to better reflect the data. Click anywhere on the graph to deselect the plot.

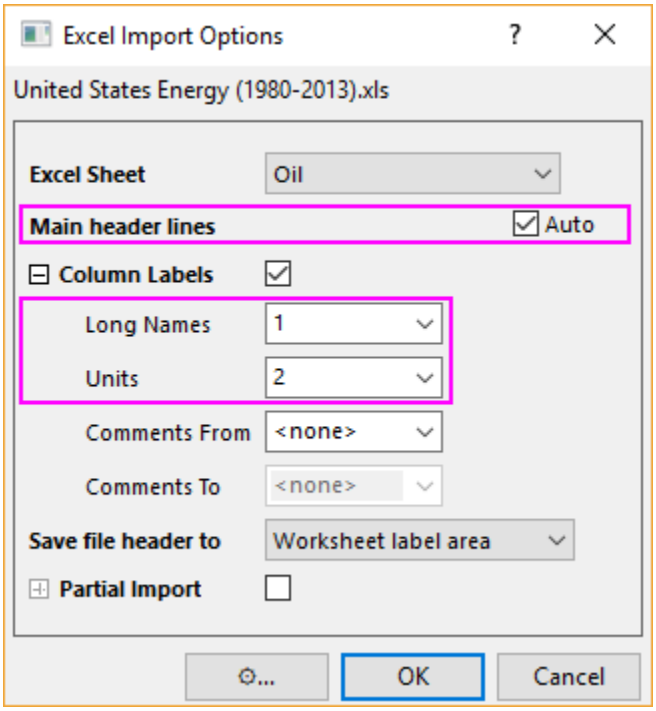
    You can add a map to a graph using the Maps Online App. This blog post is a good place to start.

11. 

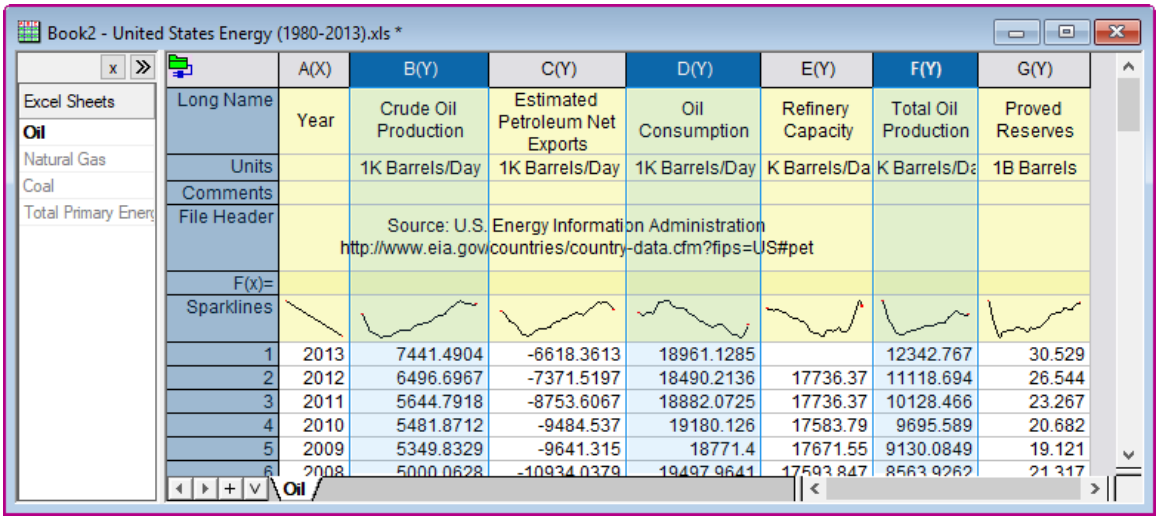
12. From the menu, choose **File: Save Project** and save your modified project.

4.1.3 Selecting Multiple Non-adjacent Columns for Plotting

1. Open a new workbook window by clicking on the **New Workbook** button in the **Standard** toolbar.
2. Select menu **Data: Connect to File: Excel**. In the file dialog that opens, browse to *<Origin EXE Path>\Samples\Import and Export* folder and select the file *United States Energy (1980-2013).xls*. Press **Open**.
3. In the Excel Import Options dialog that opens, make sure **Auto** checkbox to the right of **Main header lines** is checked and **Long Names** is set to 1 and **Units** to 2.



4. Press **OK** to import the file. Then go to the first sheet named *Oil*. Hold the **Ctrl** key to select *Crude Oil Production*, *Oil Consumption* and *Total Oil Production* columns.



5. Then go to menu **Plot > Multi-Panel/Axis: Stack...** and accept default settings in the dialog, to create a stacked plot.

6. Click **Save Project** button  on the **Standard** toolbar to save your project file.

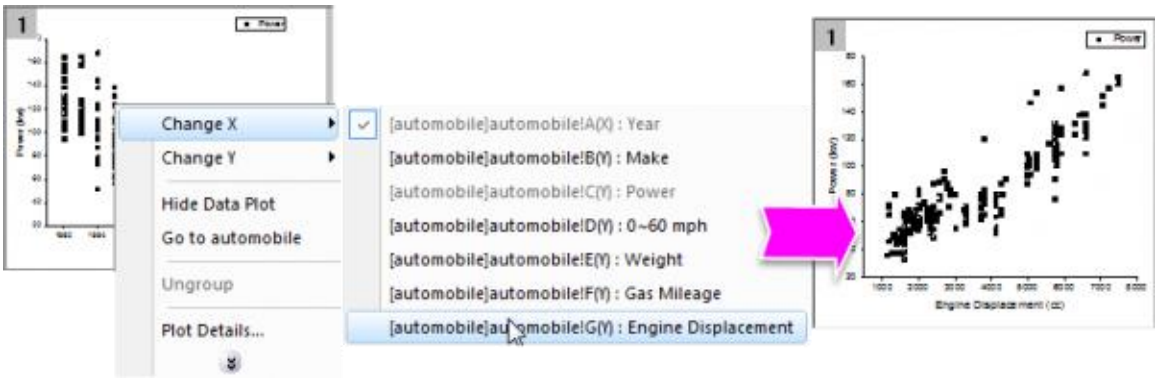
5 Merge and Arrange Graphs

In this lesson we will create some graphs, merge them, and then arrange layers in the merged graph. We will also save the graph as a cloneable template to quickly re-create the graph from similar data.

5.1.1 Import data and create graphs

1. Open the project file we saved in lesson three:Data Selection. In **Project Explorer**, create a new folder under the root folder and rename it as ***Merging Graphs***. Click on the empty folder to open it.
2. Click the **New Workbook** button on the Standard toolbar to new a workbook. Select **Help: Open Folder: Sample Folder...** to open the "Samples" folder. In this folder, open the *Statistics* subfolder and find the file *automobile.dat*. Drag-and-drop this file into the empty worksheet to import it.
3. Click on the header of column C to select the entire column. Click the **Scatter** button on the **2D Graphs** toolbar to create a scatter graph.
4. Click on the scatter plot to select it, then right-click on the plot and select **Change X: [automobile]automobile!G(Y):EnginDisplacement** from the context menu to change the X data. A reminder message pops up asking if you would like to rescale the graph. Select **Yes** and press **OK**.

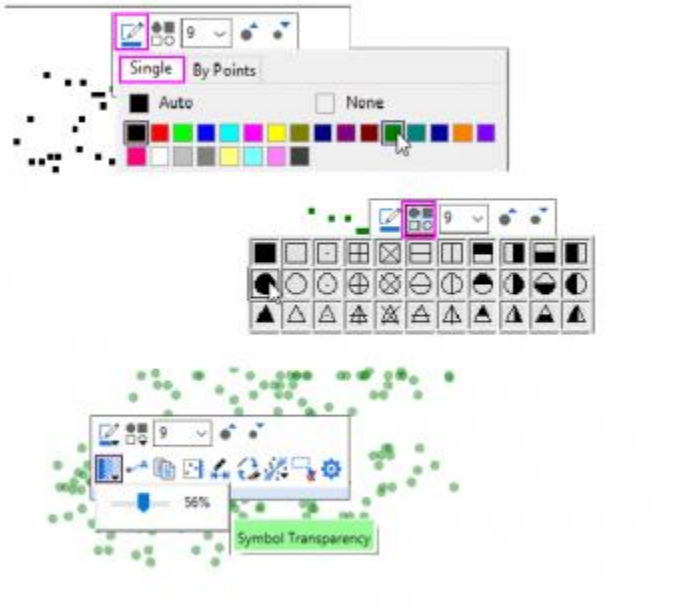
> Reminder messages have multiple options. If you select **Yes, and do the same in the future, no need to ask again**, the dialog will not show again. You can reactivate all reminder messages from the menu **Help: Reactivate Reminder Messages**.

5. 

6. Select the legend and press the **Delete** key to delete it.
7. We will now make copies of this graph and change the data in the copies. First go back to the worksheet, and press the **X** button on the top right of the title bar, and in the dialog that pops up, select **Hide**. This simply hides the window from the interface.

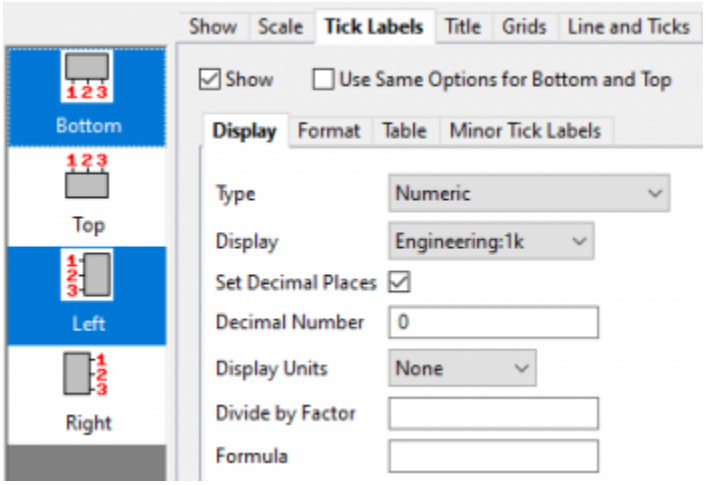
> Hidden windows are displayed with a dimmed icon in the lower panel of Project Explorer. You can double-click on the entry to re-open the window.

8. Right-click on the graph window title bar and select **Duplicate** to create a copy. Do this two more times, so you end up with four graph windows.
9. Select the menu **Window: Tile Vertically** to arrange the 4 graphs without overlap.
10. Use the **Change X**/**Change Y** menu described before, to change X/Y designations for the copy graphs as below, and rescale when promoted:
    - Copy 1: Change Y to *[automobile]automobile!D(Y):0^60 mph*
    - Copy 2: Change X to *[automobile]automobile!E(Y):Weight*
    - Copy 3: Change X to *[automobile]automobile!F(Y):Gas Mileage*
11. Activate the graph of "Power" vs. "Weight". Let's do some customization. Click on the data plot, in the pop-up mini toolbar, change the plot properties as follows:
    - Change **Symbol Color** to Olive.
    - Change **Plot Symbol** to Circle.
    - Set **Symbol Transparency** to 56%.

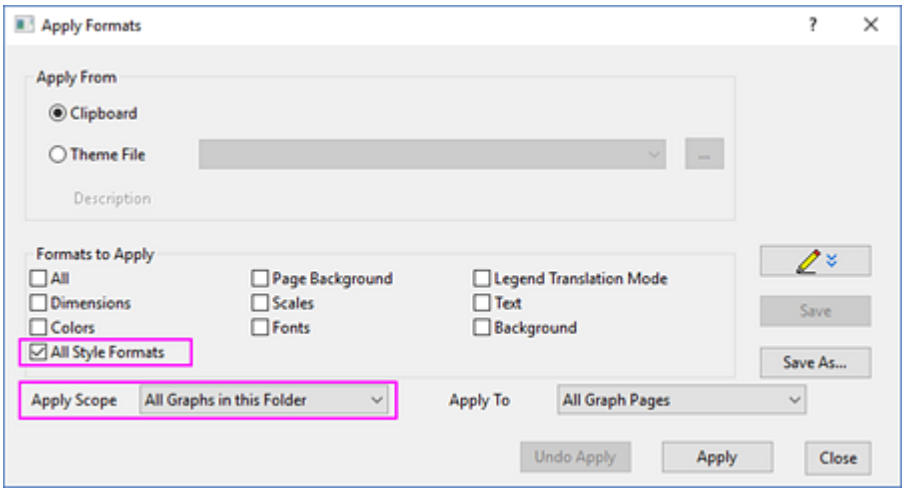


12. Double-click on the Y axis to open the **Axis** dialog. Change the axis properties as follows:
    - Activate the **Tick Labels** tab. Press the **Ctrl** key on the keyboard and click **Bottom** and **Left** in the left table to select both axes.
    - In the **Display** sub-tab, select **Engineering:1k** for **Display**.

- Check the **Set Decimal Places** check box and set **Decimal Number** to 0. Press **OK** to close the dialog.



13. Now we can copy the customized formats from this graph to the other three graphs. Right-click on a blank area of the graph such as outside the axes, and select **Copy Format: All Style Formats** from the context menu.
14. Select **Edit: Paste Format (Advanced)...** from the main menu. In the **Apply Formats** dialog that opens, uncheck **All** under **Formats to Apply** group, and check **All Style Formats** checkbox. Change **Apply Scope** drop-down at the bottom to **All Graphs in this Folder**. Click the **Apply** button to paste the format to the other graph, and then click **Close**.



5.1.2 Merge and arrange graphs

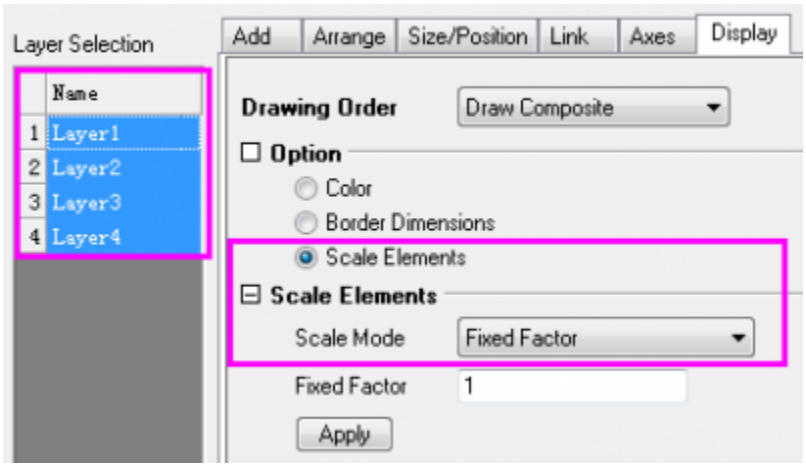
1. We will now merge these 4 graphs windows. Select **Graph: Merge Graph Windows** from the main menu.
2. The **Merge Graph Windows** dialog opens. Accept the default settings and click **OK**. A new graph window with 4 layers is generated.
3. Now we will re-arrange the 4 layers in the merged graph. Select **Graph: Layer Management** from the main menu. The **Layer Management** dialog will open.

4. Activate the **Arrange** tab, then expand the **Spacing (in % of Page Dimensions)** branch. Set as follows:
   - Horizontal Gap = 15
   - Vertical Gap = 15
   - Left Margin = 10
   - Right Margin = 5
   - Top Margin = 5
   - Bottom Margin = 15

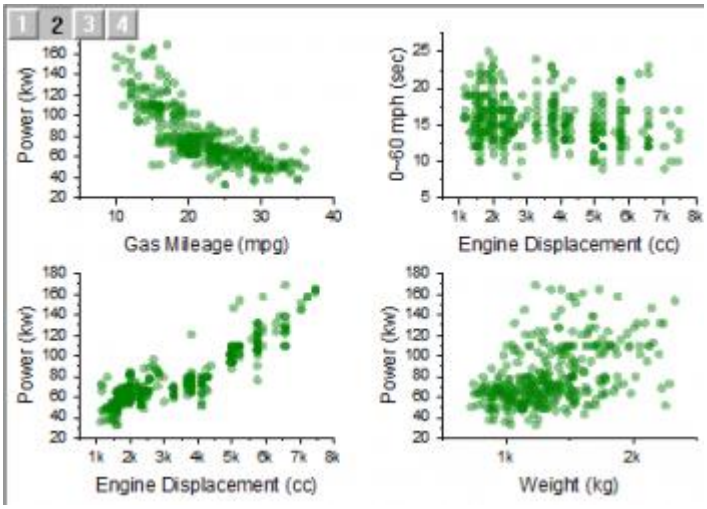
   Click the **Apply** button.
5. Activate the **Display** tab. Press the **Ctrl** key on the keyboard and select all 4 layers in the **Layer Selection** table on the left. Then select the **Scale Elements** checkbox under the **Option** branch. Set **Scale Mode** to **Fixed Factor** and set the **Fixed Factor** to 1.
6.

   By default, if you drag and resize a graph layer, or the layer gets resized when merging, text fonts and other graph objects get rescaled. Setting **Scale Mode** to **Fixed Factor** can prevent scaling of font size/line thickness when layer is resized. (This behavior can also be controlled in the **Size** tab of **Plot Details** dialog (layer level))

7. Click the **Apply** button. Click OK to close the dialog.



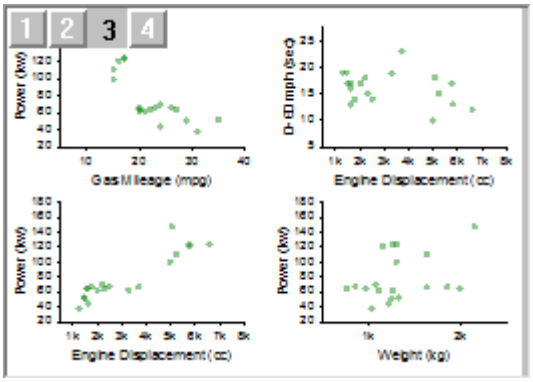
The merged graph should now appear as below:



8. Activate the *automobile* workbook by double-clicking on the icon in the lower panel of Project Explorer.

   Select column B, click the **Add or Remove Data Filter** toolbar button  to add a filter.

9. Click on the filter icon at the top-left corner of the column header. In the context menu that appears, click **Select All** once to de-select all items, and then select the **Honda** checkbox and click OK, to only show rows where Make is *Honda*. All other rows will be hidden, and all graphs will update to reflect the change in the data.



5.1.3 Cloneable Template and Smart Plotting

1. Let us now save the final merged graph as a template. Right click on its window title bar and select **Save Template As**. This will open the **template_saveas** dialog.
2. Make sure **Mark as Cloneable Template** is selected and **Match Plot Columns by** is set to **Long Name**. Enter *MyMergeGraph* for **Template Name** and click **OK**. A message is dumped to the Message Log telling you the template is saved.

Cloneable Templates save the column positions or column names along with all other graph properties. This allows for duplication of complex graph arrangements from other data with same arrangement of column positions or names.

3. Activate the *automobile* workbook. Select the filter on column B and select both *Honda* and *Lexus* and click OK to show both makes.
4. With the book still active, select **Plot > User Templates: MyMergeGraph** from the main menu. A new graph is created, with the same data assignments and formats as present in the previous merged graph.
5. Save your project file.

6 Publishing Graphs

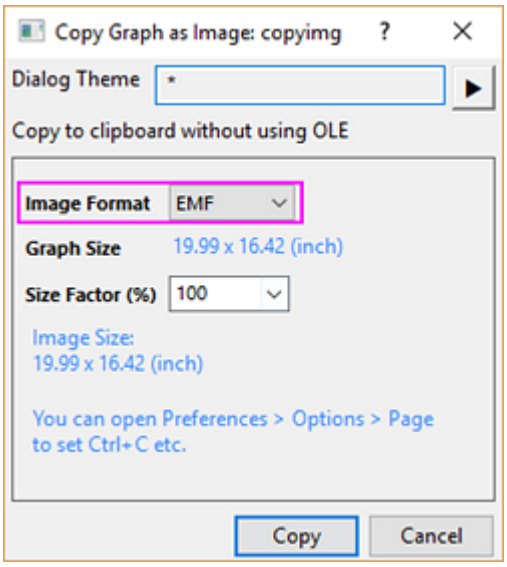
In this lesson we will learn about some of the options available for publishing graphs.

6.1.1 Pasting Graphs in Other Applications

1. Open the project file saved from lesson four: Merge and Arrange Graphs. Click to select the last graph window that you created.
2. Use the menu **Edit:Copy Page**, or the shortcut **CTRL+J**, to copy the graph page.
3. Launch Microsoft® WORD, then press **Ctrl+V**. The graph will be pasted as an embedded object in Word.
4. Double-click on the graph in Word. A new instance of Origin will be launched. Note that in this instance, only the graph and data related to the graph are available in the project.
5. Use menu **Format: Page** to open the **Plot Details** dialog in the page level. Then in the right panel, change the background color by choosing the **Display** tab and setting **Color** as **LT Gray**. Click OK.
6. From the menu, choose **File: Exit & Return to Document1**. This will close the instance of Origin, and the graph image in the document will be updated.
7. Repeat step 1. This time we will copy the graph page as an EMF image. Press shortcut keys **CTRL+C** to copy the graph page as an EMF image.

There is another tool **Copy Page as Image** that provides more options. Move mouse to the edge of graph page, the page level mini toolbar will pop up. Select **Copy Page as Image** button  .

In the dialog that opens, you can select EMF or other formats from **Image Format** drop-down list.

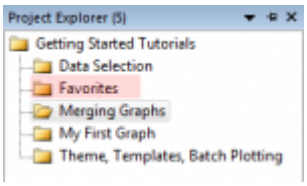


8. Then go back to the Word document, de-select the graph and press **Enter** to move to a new line in the document. Press **Ctrl + V** to paste the Origin graph as a picture object. To edit the picture, you can select **Format** tab, or right click the picture and select **Format Picture** menu to open the Format Picture panel.

When the Origin graph is placed as an embedded object in applications such as Word or PowerPoint, all the data associated with the graph are also saved with the Word document. This provides the flexibility of double-clicking and editing the graph in a new instance of Origin. However, if many graphs are placed as objects in a document, the document file size will become large if there is a lot of data associated with the graphs.

6.1.2 Sending Graphs to PowerPoint

1. With the graph window active in Origin, press the **Send Graphs to PowerPoint** button  .
2. Accept all default settings in the opened dialog and click **Send**. The graph will be pasted as a new slide in the PowerPoint file.
3. Right-click on the graph title bar (in Origin) and select **Add Shortcut to Favorites**. This will add a **Favorites** folder to the project, visible in **Project Explorer**.



4. In **Project Explorer**, select the **My First Graph** folder. Then select the graph window, right-click on the title, and **Add Shortcut to Favorites** folder. Add shortcuts from other graph windows in the project as desired.
5. Go to **Project Explorer** and activate the **Favorites** folder. In the bottom panel, without selecting any item, right-click on the white area and choose **View:Extra Large Icons** from the context menu. This will show the graphs as extra large icons.

Double-click on the icons in **Favorites** folder to open the graph for viewing or editing. Right-click on the icon or the graph window title bar for a context menu command to go to the original folder for that graph.

6. Right-click on the **Favorites** folder in the upper panel of **Project Explorer** and choose **Send Graphs to PowerPoint**. Accept defaults in the dialog that opens. All graphs in the folder will be sent to PowerPoint. Note that you can do this operation in any folder, and not just the Favorites folder.

The dialog for sending graphs to PowerPoint has options for selecting all graphs in the project, specifying graphs by name, and placing the graphs on duplicate copies of a specific PowerPoint file slide that you can prepare prior to the operation.

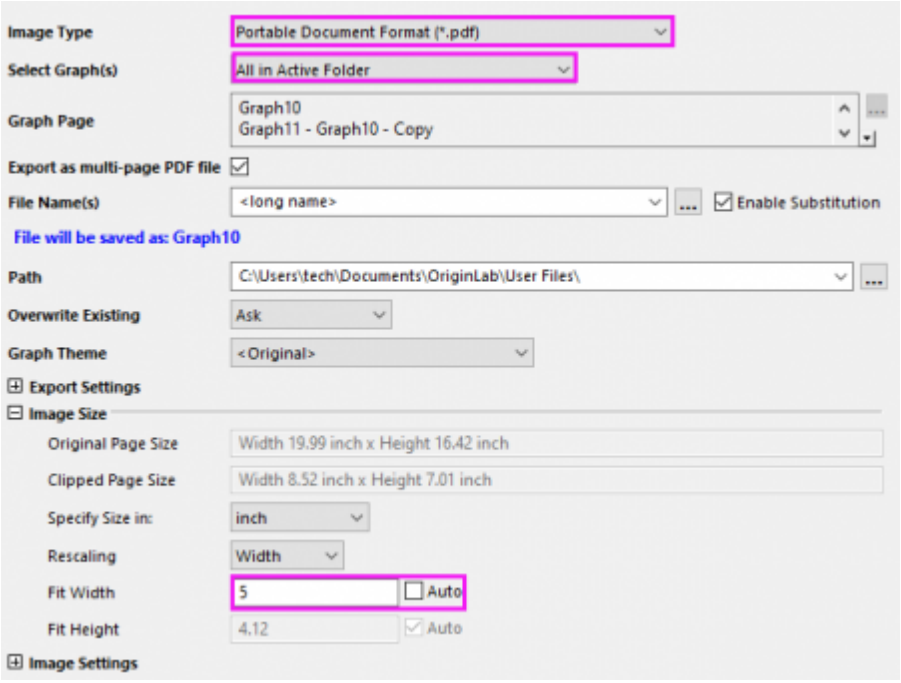
6.1.3 Slide Show in Origin

1. Right-click on the **Favorites** folder in the upper panel of **Project Explorer** and choose **Slide Show of Graphs** from the context menu.
2. Accept defaults in the dialog. The slide show will start. Use arrow keys to view the next or previous graph in the sequence.

In the bottom panel of Project Explorer, switch to **Details** view (right-click in an empty location and choose **View: Details**). Right-click on the lower panel title bar and enable **Slide**. Note that you can drag to reorder the columns. Use the added **Slide** column to arrange the order of the graphs. Click on the slide column header once, and then you can drag and rearrange the graph entries to set the order. This order will be followed for operations such as slide show, pushing graphs to PowerPoint, and exporting.

6.1.4 Exporting Graphs

1. Go back to Project Explorer and select the **Merging Graph** folder in the upper panel.
2. Activate the graph and choose **File: Export Graphs (Advanced)** and change the following dialog box settings.
   - Select **Portable Document Format (*.pdf)** from the **Image Type** drop-down list.
   - Change the **Select Graph(s)** drop-down to **All in Active Folder**.
   - Expand the **Image Size** branch and enter **5** in the **Fit Width** text box.



3. Click the **OK** button to close the dialog.
4. Click on the **Messages Log** tab on the left side of the interface. The export file path dumped here is displayed as a hyperlink. By default, it will be your User Files Folder (UFF) path. Clicking the path link will open the exported PDF file in Origin built-in viewer. You can also copy the path, paste to **Windows Explorer** to open the folder, then view and edit the PDF files.

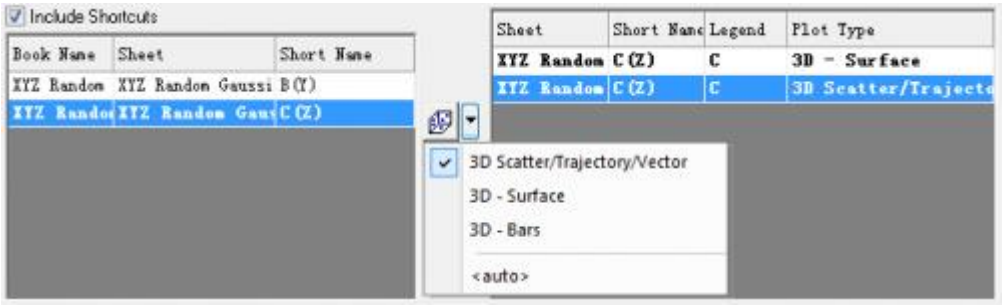
5. Save your project file.

7 3D and Contour

In this lesson we will learn how to plot 3D, contour, and profile plots. Data for such plots can be organized as XYZ columns or an array of cells in a worksheet, or in a matrix window.

7.1.1 3D Surface

1. Start with the project saved from the previous lesson and add a new folder named **3D and Contour**. Click to open the empty folder.
2. Click the **New Workbook** button on the Standard toolbar.
3. Select menu **Data: Connect to File: Text/CSV**. Browse to select the file *<Origin EXE Path>\Samples\Matrix Conversion and Gridding*\XYZ Random Gaussian.dat*. Import it with default settings.*
4. Click on the header of column C and select **Set as: Z** button from the pop-up mini toolbar.
5. Keep column C highlighted. Then select the menu **Plot > 3D: 3D Color Map Surface** to create a surface plot.
6. Double-click on the layer icon on the upper left corner of the graph page, indicated by **1**, to open the **Layer Contents** dialog box.
7. In the left-hand panel, select **C(Z)**. In the middle section, click the drop-down arrow next to the **A** button. From the drop-down, select **3D Scatter/Trajectory/Vector**. Click the **Add Plot** button to add the plot to the right-hand panel.



8. Click **OK** to close the dialog. The graph will now display the individual data points on the surface.
9. Hold the **R** key and use the mouse to freely rotate the surface plot.

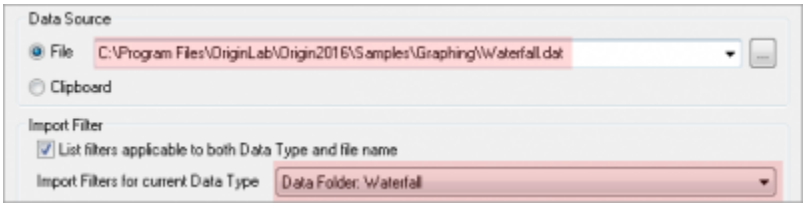
7.1.2 Image Profile

1. Click on the **New Matrix** button in the **Standard** toolbar to open a new matrix window.
2. Select the menu **Data: Import from File: Image to Matrix**, then browse to *<Origin EXE Path>\Samples\Image Processing and Analysis* folder and select *cell.jpg* file and import it into the matrix.
3. With the matrix active, select the menu **Plot > Contour: Image Profiles**. Click **Yes** in the prompted message dialog. An image profile graph will be created, and the **Image/Contour Profile** dialog will open.
4. In the dialog, select the **HLine** tab then make the horizontal line thicker by expanding the **Width** branch and changing **Pixels** to **50**.
5.

You can add multiple horizontal, vertical, or arbitrary lines using the buttons in the dialog. The graph layers will display overlaid curves for the profiles in the appropriate layers. Profile plots can also be made from data in a matrix or worksheet.

7.1.3 Contour and Surface Plots from Virtual Matrix

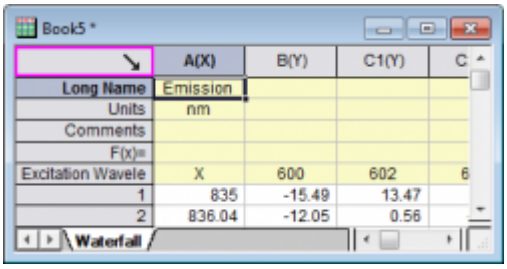
1. Click on the **New Workbook** button to create a new workbook.
2. Click on the **Import Wizard** button. In the dialog that opens, choose the **...** button next to **File** box, browse to *<Origin EXE Path>\Samples\Graphing* folder, choose *waterfall.dat* file. Click **Finish** to import the file.



3.

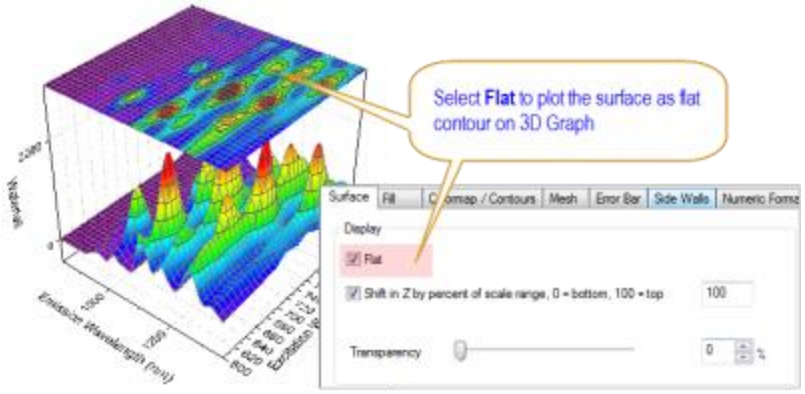
The **Import Wizard** can be used to parse an ASCII file to extract variables from header lines. The file you chose already has a predefined filter which is applied when you click the Finish button.

4. Move the cursor to the upper left corner of the workbook until the shape of the pointer changes as in the following image, and click to select all columns of the worksheet.



5. Select menu **Plot > Contour: Contour - Color Fill**. This will open the **plotvm** dialog box, where you need to specify the data organization for your **Virtual Matrix**, as the data is contained in a worksheet instead of a matrix window.
6. Change **Y Values in** to **Column Label**, and then set **Column Label** to **Excitation Wavelength(nm)**.
7. Click the **OK** button to apply the settings and create the contour graph.
8. Go back to the workbook with waterfall data. Keep the whole worksheet highlighted and this time select the menu **Plot > 3D: 3D Color Map Surface with Projection**.
9. The **plotvm** dialog opens. Note that the **Theme** box on the top of dialog is set as **<sheet>**. This is because the settings used last time were saved in the worksheet. Click **OK** to accept the same settings. A surface graph with contour projection will be created.
10. Double-click on the contour projection to open the **Plot Details** dialog. Note that on the **Surface** tab, the **Flat** check box is checked, and an offset of 100% has been applied. This setting makes the data plot

appear as a flat contour on top of the cube. Click OK to close Plot Details.



11.

Data from different matrices or virtual matrices can be plotted in the same 3D graph layer by specifying an appropriate offset value for each, and further specifying which datasets to flatten. This allows to examine related data together in the same graph.

12. Double click on the **Z** axis to open the **Axis** dialog. Switch to the **Scale** tab and set the **To** value to 4000 and click OK. This allows better viewing of the 3D surface. The contour project will stay on the top plane of the cube.

7.1.4 3D Function Plot

1. Select the menu **File: New: Function Plot: 3D Function Plot**.
2. In the dialog box, click the triangle button next to the **Theme** box on the top. Then select **Mexican Hat(System)** in the context menu to load the settings for this example.
3. Press **OK** to create the plot.
4.

A parametric function can be added to an existing graph, thus allowing you to combine such plots with real data. Visit 3D Function Gallery to view and download more examples.

Save your project file.

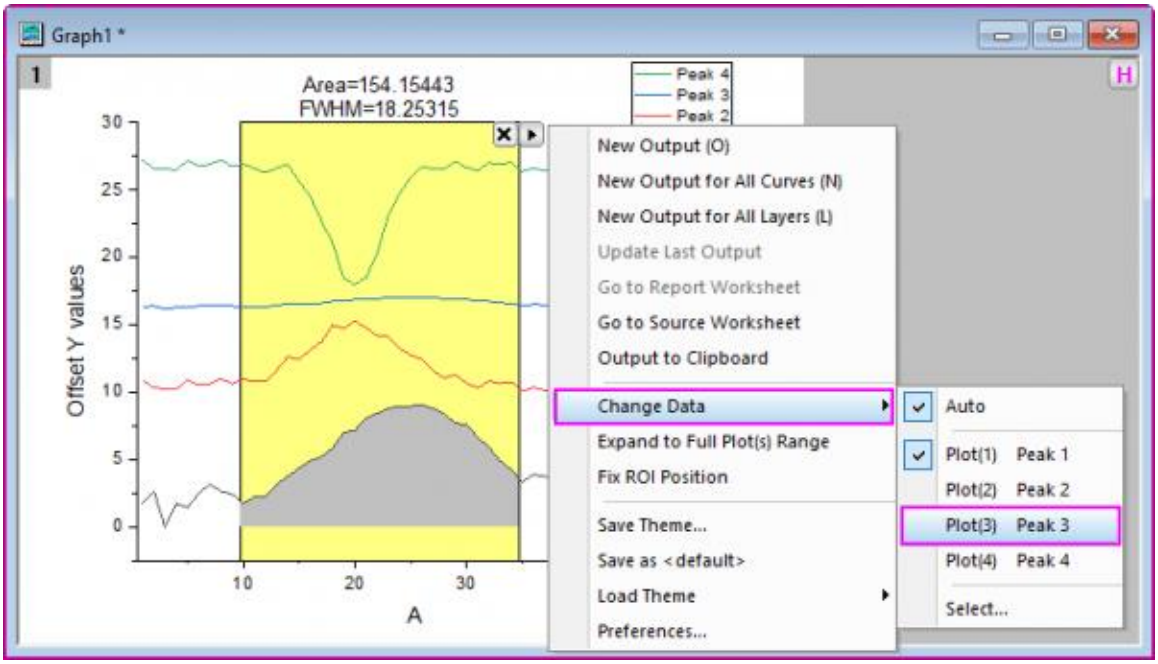
8 Gadgets

In this lesson, we will use gadgets to perform exploratory analysis of data in a graph.

8.1.1 Integrate Gadget

1. Start with the project saved from the previous lesson and add a new folder named **Gadgets** at the root level in Project Explorer, then go to that folder.
2. With the new workbook active, select **Help: Open Folder: Sample Folder...** to open the "Samples" folder. In this folder, open the *Curve Fitting* subfolder and find the file *Multiple Gaussians.dat*. Drag-and-drop this file into the empty worksheet to import it.
3. We will add long names for the datasets. Enter "*Peak 1*" in the **Long Name** label row of column B. Click and select the long name cell. Then move the mouse to the lower-right corner of the cell so that the cursor changes to "+". Click the left mouse button and drag from column C to E. Origin will auto-fill the names as *Peak 2*, *Peak 3* and *Peak 4*.
4. Click and drag on the column headers to highlight columns B to E. From the main menu, select **Plot > Basic 2D: Stacked Lines by Y Offsets** to create a stacked lines graph.
5. With the graph active, select **Gadgets: Integrate...** from the main menu.
6. Accept the default settings and press the **OK** button. A region-of-interest (ROI) box will be placed on the graph. Move and/or resize the ROI to cover a desired range of the data.
7. Click on the triangle button at the top-right corner of the ROI box and select **Preferences** to re-open the dialog.
8. In the **Output** tab, expand the **Output Quantities to** branch and select the **Append to Worksheet** check box . Click **OK** to close the dialog box.
9. When there are multiple plots in a layer, the gadget acts on the active data plot by default. In this case, the active plot is *Peak 1*. To change the data to Peak 3 for example, click on the triangle button at the top-

right corner of the ROI box and select **Change Data: Plot(3): Peak 3** from the context menu.

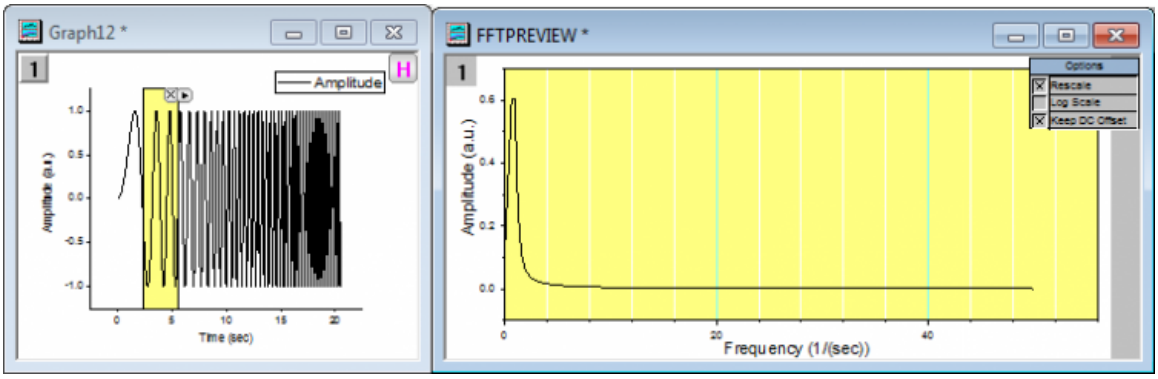


10. Click on the triangle button again and select **New Output for All Curves**. A workbook with integration results for all curves will be generated. Click the triangle button and select **Go to Report Worksheet** to switch to the output workbook.
11. Click the **X** button at the top-right corner of the ROI box in the graph to remove the gadget.

8.1.2 FFT Gadget

1. Start with a new workbook, and import the file *<Origin EXE Path>\Samples\Signal Processing\Chirp Signal.dat*.
2. Highlight column B, then select **Plot > Basic 2D: Line** from the main menu to create a line graph.
3. With the graph active, select **Gadgets: FFT** from the main menu. Accept defaults in the dialog that opens, and click **OK**. An ROI box will be placed on the graph, and another graph named FFTPREVIEW will be created, displaying the FFT result.
4. In the top right corner of the FFTPREVIEW graph, uncheck **Log Scale**. Then reposition the source line graph and FFTPREVIEW window side by side. Move and resize the ROI to cover a small range of the beginning of the data curve.

5. Now you can use the arrow keys to move the ROI to the right, while watching the FFT result update in the other graph.



6. Save the project file.

9 Curve Fitting

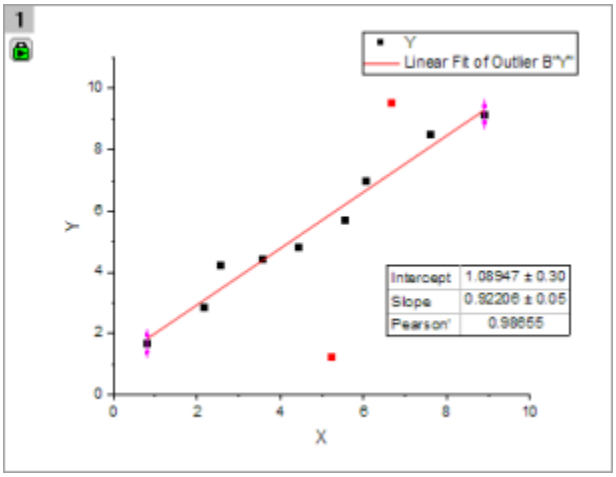
In this lesson we will learn how to perform linear and nonlinear regression.

9.1.1 Linear Fit with Outliers

1. Start with the project saved from the previous lesson, and add a new folder at the root level in Project Explorer named ***Curve Fitting***.
2. Import the file *<Origin EXE Path>\Samples\Curve Fitting\Outlier.dat* by draging-and-droping the file into an empty worksheet.
3. Select the 2nd column and create a scatter plot.
4. Select the menu item **Analysis: Fitting: Linear Fit**. In the dialog that opens, accept default settings and click **OK** to perform the linear fit.
5. In the graph, click on the fitting results table and select **Quantities in Table** button  from pop-up mini toolbar. Remove all entries except **Intercept**, **Slope** and **Pearson's r** (use CTRL + select for multiple selections). Click **OK** and resize the results table as needed.
6. Now click the **Mask Points on Active Plot** button  on the left side toolbar and mask the point at the right bottom, which is distinctly
   separated from the rest of data points.
7. The lock on the top left of the graph page turns yellow  indicating that the data has changed, but the fit results are in need of an update.
8. Hit the ESC key to switch the cursor back to pointer mode. Then click on the yellow lock, and from the fly-out menu select **Recalculate Mode: Auto**. The fit results will be updated.
9.

 You can update all pending operations in a project by clicking on the **Recalculate** button  located in the Standard toolbar.

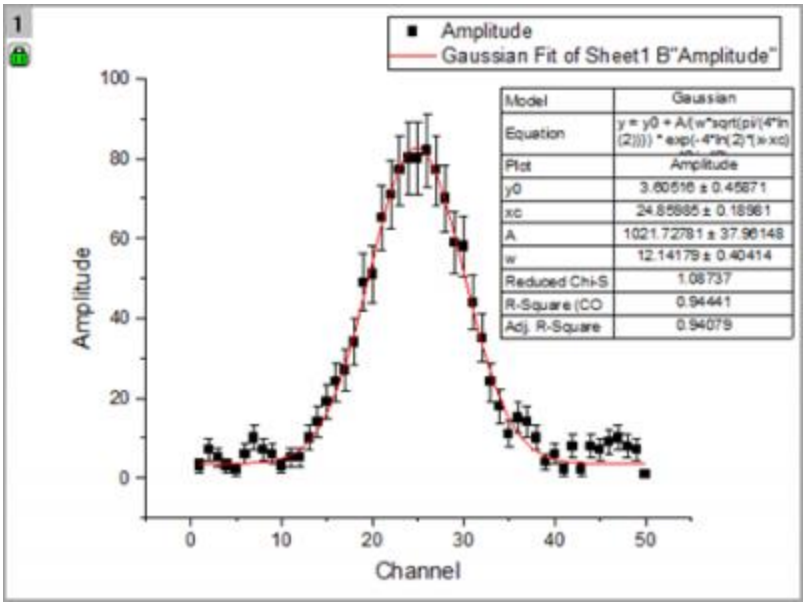
10. Go back to the graph and use the masking tool to mask the outlier point towards the top. You will notice that the results automatically update. Your graph should now look similar to this image:



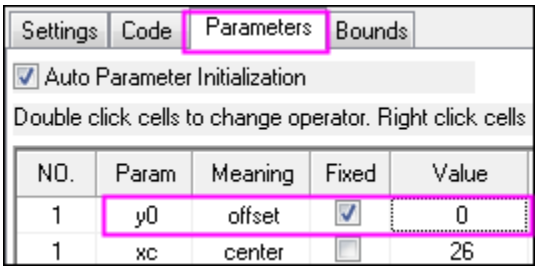
9.1.2 Nonlinear Curve Fit

1. Start with a new workbook, and import the file *<Origin EXE Path>\Samples\Curve Fitting\Gaussian.dat*.
2. Highlight the column named *Amplitude* and make a scatter plot.
3. Go back to workbook, highlight column named *Error*, then select **Set As Y Error** button  from pop-up mini toolbar.
4. Place the mouse cursor close to the right edge of the highlighted column. The cursor will change to  . At this point, drag and drop the column onto the graph. The data will be added as error bars on the scatter plot.
5. Now let's fit this data. Select the menu **Analysis: Fitting: Nonlinear Curve Fit** to open then **NLFit** dialog.
6. In the **Function Selection** page, set **Category** drop down to **Peak Functions**, and set the **Function** drop down to **Gauss**.

7. Click **Fit** button to perform fitting and choose **No** in the prompt dialog, to keep the graph window active.



8. Now we want to fix *y0* as *0* and update the results. Click on the green lock on the top left of the graph page, and select **Change Parameters**.
9. The dialog re-opens with the settings that were used last time the operation was performed. Go to the **Parameters** tab, check the **Fixed** box for *y0* and enter **Value** as *0*.

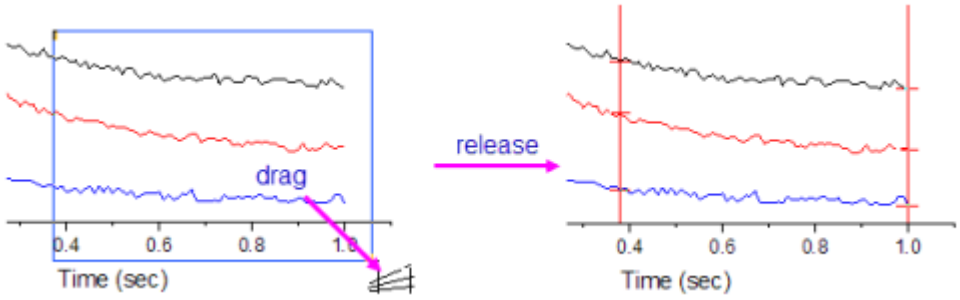


10. Click the **Fit** button to update the file and close the dialog. From the updated table on the graph, we can see that $y0 = 0 \pm 0$.

9.1.3 Global Fit with Parameter Sharing

1. Start a new workbook and import the file *<Origin EXE Path>\Samples\Curve Fitting\Exponential Decay.dat*.
2. Drag and select the three Y columns and create a line plot.
3. We want to fit all three data plots simultaneously over the x range of 0.4 s to 1.0 s. In the **Tools** toolbar docked to the left side of the interface, click the down arrow button on the right of **Selection on Active Plot** button  . From the fly-out, choose **Selection on All Plots**. Go to the graph and drag and draw a

rectangle to roughly cover the x range of 0.4 to 1.0, including all the three curves in the process.



4. Press **CTRL+Y** to quickly launch the **NLFit** dialog. Then set **Category** as **Exponential** and **Function** as **ExpDec1**.
5. Click on **Data Selection** under the **Settings** tab, expand the **Input Data** node and you will find all three curves are added. You can expand the **Range#** node to further adjust data ranges either by row index or by x value.
6.

   If no range selection has been made on the multiple plots, Origin will only pick up the active data plot from the graph layer containing multiple plots. In that case you can click the button on the right side of **Input Data** and select **Add all plots in active page**.

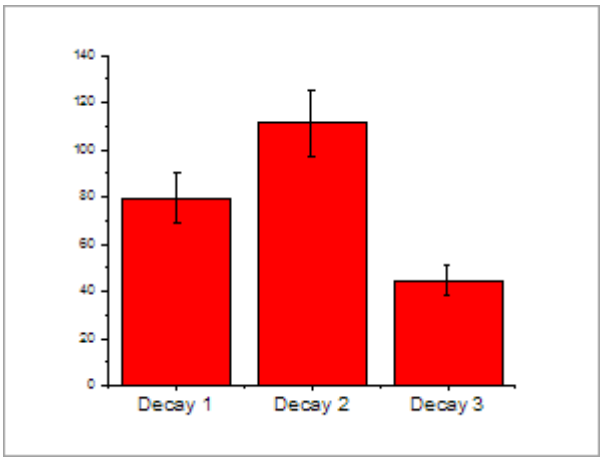
7. Change **Multi-Data Fit Mode** to **Global Fit**, switch to the **Parameters** tab and click the **Fit until converged** button to fit all three curves simultaneously, keeping the dialog open.
8. You can share parameters during a global fit. Check the **Share** box for the time constant ***t1***. You will notice that the time parameter for the other curves has been removed from the parameters list.
9. Click the **Fit** button and select **Yes** in the prompt that appears, to switch to report sheet. If the prompt does not come up, you can click on the green lock in the graph and select **Go to Results**.
10. Scroll down to the *Summary* table in the report. You will find that all time constants ***t1*** share the same values.

Summary

	y0		A1		t1		k	tau
	Value	Standard Error	Value	Standard Error	Value	Standard Error	Value	
Decay 1	97.76426	1.04512	75.32799	11.78854	0.28532	0.03567	3.5049	0.19777
Decay 2	50.44112	1.39417	107.39208	16.22812	0.28532	0.03567	3.5049	0.19777
Decay 3	14.46759	0.73292	43.06541	7.60772	0.28532	0.03567	3.5049	0.19777

11. Now click on the down arrow button beside the **Summary** node and choose **Create Copy as New Sheet**. A new worksheet with the fit results will be added to the book.

12. Select column D, E and create a column plot to display how the amplitude parameter (A1) changed across the three datasets.



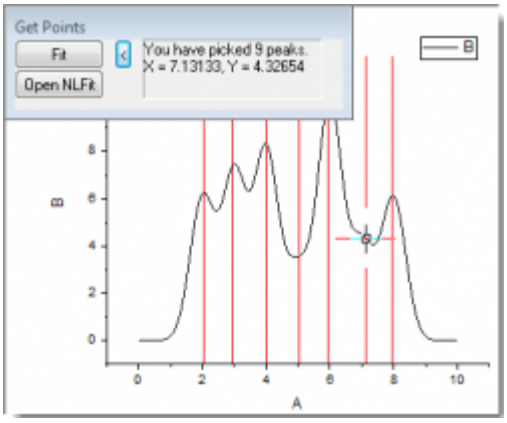
13. Save the project file.

10 Peak Analysis

In this lesson we will perform fitting, including deconvolution of overlapping peaks and baseline correction.

10.1.1 Multiple Peak Fit with Deconvolution

1. Let's continue with the project file we saved in the previous lesson. Create a new folder in Project Explorer, rename it as ***Peak Analysis***, then go to the empty folder.
2. In a new workbook, import the file *<Origin EXE Path>\Samples\Spectroscopy\HiddenPeaks.dat*.
3. Highlight column B and create a line plot.
4. With the graph window active, click **Analysis: Peaks and Baseline: Multiple Peak Fit**. This will open the **Multiple Peak Fit** dialog. Set the **Peak Function** drop-down as *Gauss* and click **OK**.
5. A **Get Points** dialog will open within the graph window. Note that you can re-position this dialog within the window. Double-click on a peak center to select it. Select a total of 7 peaks as in the following image, including two hidden peaks:



6.

> If you click the **Open NLFit** button in the **Get Points** dialog, the NLFit dialog will open with the peak centers initialized with your selection. You can further control the fitting process as desired.

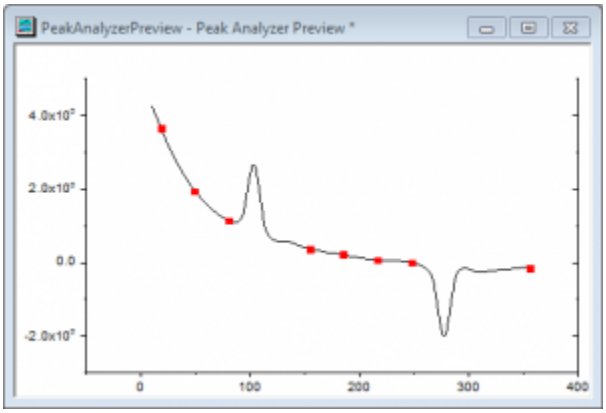
7. After selecting all seven peaks, click the **Fit** button. A fit report will be added to the workbook.

10.1.2 Fit Peaks with Baseline

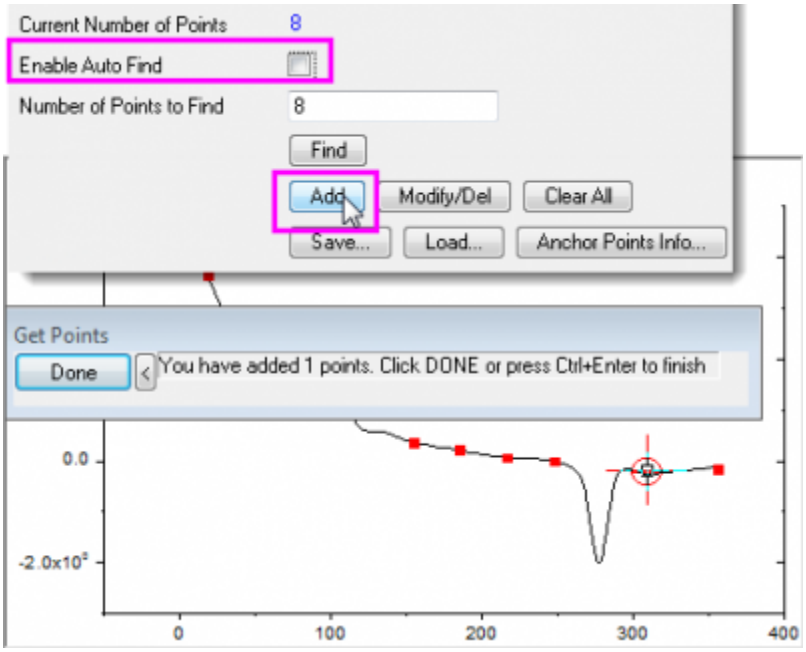
1. This part of the lesson assumes you have OriginPro. Start with a new workbook and import the file *<Origin EXE Path>\Samples\Spectroscopy\Peaks_on_Exponential_Baseline.dat*.
2. Highlight column B and then click **Analysis: Peaks and Baseline: Peak Analyzer**. This will open the **Peak Analyzer** dialog, and a preview window displaying the selected data.
3. In the bottom panel, select the **Fit Peaks (Pro)** choice under **Goal**. The top panel will update, displaying a map of the steps involved in the peak fitting process.
4. Click **Next**. On the **Baseline Mode** page, select **User Defined** for **Baseline Mode**. Click **Next** to go to the **Create Baseline** page. You can then see in the preview window that 8 anchor points connected by a

red line, are added to the spectrum. This is the baseline created using the current settings. Now click the **Prev** button to go back to the **Baseline Mode** page to adjust the baseline mode settings.

5. Click the **Find** button below **Number of Points to Find**, to find the baseline anchor points in the spectrum. Eight (8) anchor points are added.



6. Clear the **Enable Auto Find** checkbox and then click the **Add** button to add one or more anchor points on the spectrum. Double-click on the tail of the spectrum like the following image to add 1 anchor point.



7. Note that you can also select and delete anchor points. Click **Done** to return to the **Peak Analyzer**.
8. Select the **Snap to Spectrum** checkbox to force anchor points to snap to the closest data point in the spectrum. Click **Next**.
9. On the **Create Baseline** page, select **Fitting** in the **Connect by** option. Select **ExpDec2** for **Function** under the **Fitting** branch. Click **Next** twice to go to the **Find Peaks** page.
10. Click the **Find** button. Two (2) peaks are found in the preview.
11.

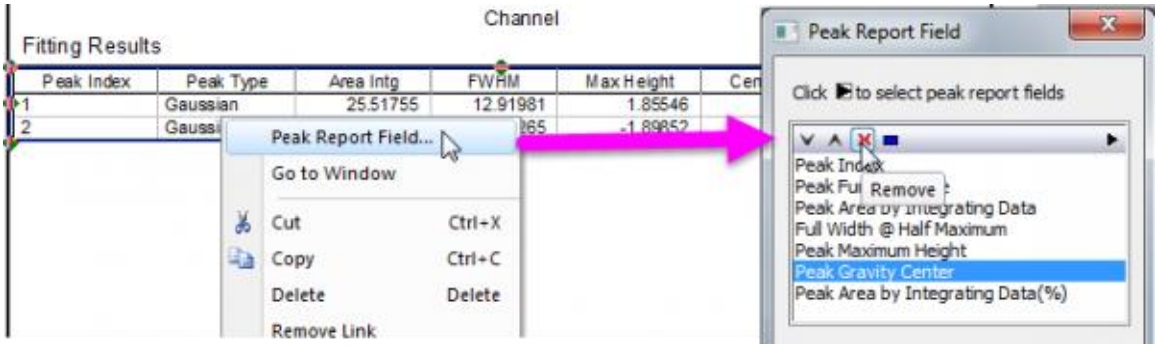
There are several options available for peak finding including a 2nd derivative method to find overlapping peaks. You can also view the 2nd derivative curve, and turn on smoothing to help

find peaks in noisy data.

12. Click **Next** to go to the **Fit Peaks** page. Accept defaults and click **Finish** to perform peak fitting. A graph containing fitting results is generated.
13.

You can click the **Fit Control** button to control the fitting process including fixing and sharing parameters, and specifying bounds and constraints.

14. Now, let's customize the **Fitting Results** table to hide some peak properties we don't want to display. Right-click on the table and select **Peak Report Field...** from the context menu. The **Peak Report Field** dialog will open, listing all properties that can be included in the table. You can remove or change the order properties in this dialog. Select **Peak Gravity Center** and click the **Remove** button to hide it. Do the same for **Peak Area by Integrating Data(%)**. Press **OK** to update the table in the graph.



Save your project file.

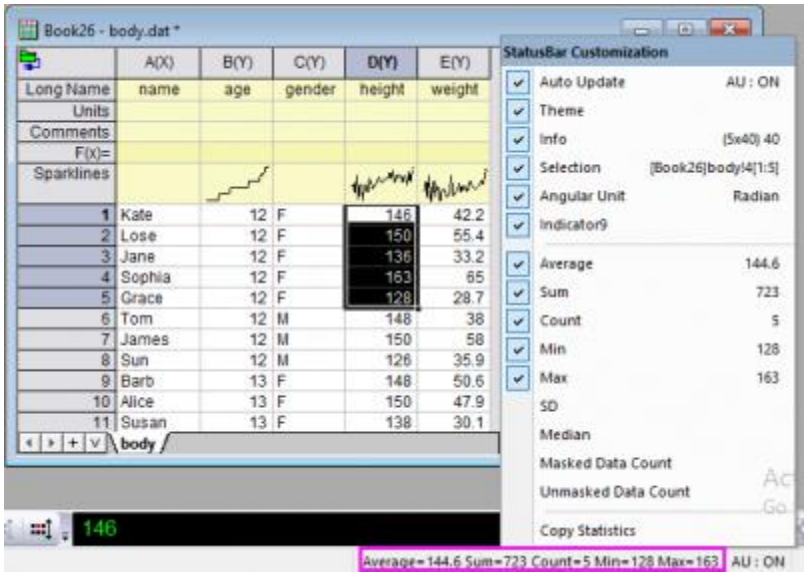
11 Statistics

Origin provides many tools for statistical analysis. Advanced statistical tools are available in OriginPro. In this lesson, we will work with tools available in standard Origin.

11.1.1 Descriptive Statistics

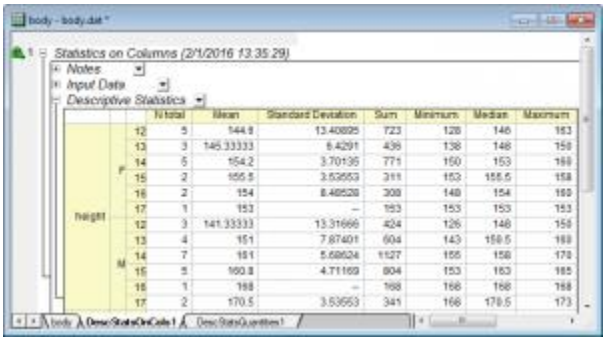
1. Start with the project saved from the previous lesson, create a new folder in Project Explorer and rename it as ***Statistics***. Open the empty folder.
2. Create a new workbook and import the file *<Origin EXE Path>\Samples\Statistics\body.dat*.
3. Drag and select the first **5** rows of column **D(Height)**. Basic statistics (average, sum, count) for your selected data will be displayed in the status bar at the bottom right side of the interface.

You can right-click on the statistics listed in the status bar to customize what quantities to display there.

4. 

5. From the menu, select **Statistics: Descriptive Statistics: Statistics on Columns**. In the dialog, select the **Input** tab, then expand **Range 1**. Click on the interactive button  to the right of **Data Range**. Return to the worksheet, then drag and select columns **D** and **E**. Click the interactive button again to restore the dialog.
6. In the **Group** control, click the triangle button  and select **B(Y): age**. Click the button again and select **C(Y): gender**. In the list, select **..."gender"** in the **Group** box, then use the **Move Up** button  to move it to the top.

7. Click **OK** to generate the report.



8. Click the downward-pointing triangle button on the right of the **Descriptive Statistics** node in the report sheet and select **Digits...** from the context menu.
9. In the opened dialog, change **Digits** to **Set Decimal Places=** and set **Decimal Number** as **1**. Click **OK** to update the display format in all tables of the report.
10.

> The numeric display in all report sheets can be globally set using the **Digits in Report** control on the **Numeric Format** tab of the **Options** dialog accessible from the **Preference: Options** main menu.

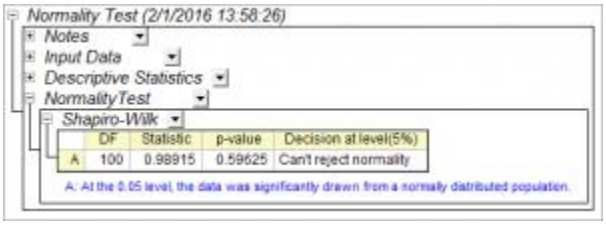
11.1.2 Normality Test

1. Create a new workbook by clicking the **New Workbook** button .
2. Double-click in the **F(x)** label row of column A. This will put you into edit mode for that cell. Type the formula:

```
nint(100+20*normal(100))
```

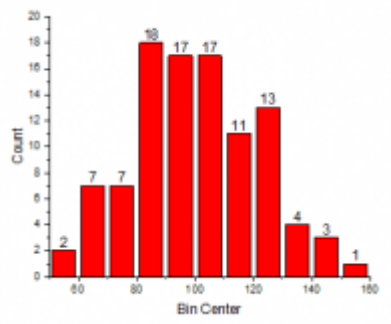
The column will be filled with random integer numbers centered around 100.

3. Highlight column A and click **Statistics: Descriptive Statistics: Normality Test** to open the dialog. The selected column is set as **Input Data** automatically. Accept default settings and click **OK**. This will generate the report sheet for **Normality Test**. The footnote under the **Shapiro-Wilk** table indicates that this data is normally distributed, as expected.



11.1.3 Frequency Counts

1. Activate **Sheet1** of the workbook from the previous section. Keep column A highlighted, then click **Statistics: Descriptive Statistics: Frequency Counts**.
2. Accept all default settings in the dialog and press **OK**.
3. In the result sheet, highlight the column **C(Y)** . On the **2D Graphs** toolbar, click the triangle button next to the **Column** button  , then choose **Column + Label**  to create a column graph with labels. This will create a histogram plot with counts as labels.



4.

The **Plot: Statistical** menu provides multiple histogram plot options when a worksheet is active. This **Frequency Counts** tool provides an alternate way to first perform counting, and then plot a histogram from the results. This allows for more flexibility and customization such as adding labels to the columns.

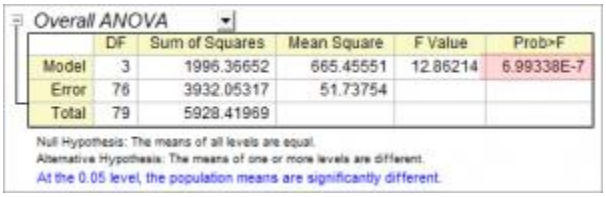
11.1.4 One Way ANOVA

1. Create a new workbook. Select **Help: Open Folder: Sample Folder...** to open the "Samples" folder. In this folder, open the *Statistics* subfolder and find the file *nitrogen.txt*. Drag-and-drop this file into the empty worksheet to import it.
2. Select the menu **Statistics: ANOVA: One Way ANOVA** to open the **One Way ANOVA** dialog. In the **Input** tab, set **Input Data** to **Indexed**. Press the triangle button to the right of **Factor** and select **A(X): plant**. Press the triangle button to the right of **Data** and select **B(Y): nitrogen**.
3.

The **ANOVA** dialog box provides two options for input mode: **Indexed** or **Raw**. You can refer to the FAQ-333: What is indexed versus raw data and how to transform from one to another? to learn more about how data can be arranged for either mode.

4. In the **Means Comparison** tab of the dialog, select the **Tukey** check box. Then switch to the **Plots** tab and select **Means Comparison Plot**. Click **OK** to close the dialog and generate the report.
5. Go to the report sheet **ANOVA1Way1**. From the result, we can draw following conclusions:

- The ANOVA table (**Overall ANOVA**) reports a p-value that is smaller than 0.05, hence at least two of the four groups have significantly different means.

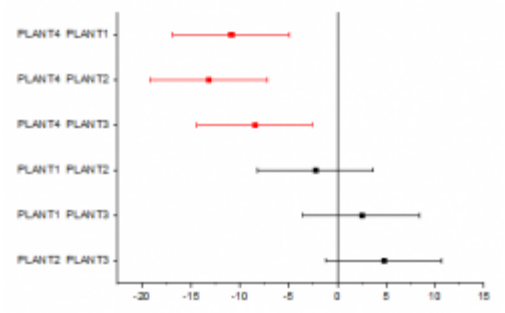


Overall ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	1996.35652	665.45551	12.86214	6.99338E-7
Error	76	3932.05317	51.73754		
Total	79	5928.41969			

Null Hypothesis: The means of all levels are equal.
Alternative Hypothesis: The means of one or more levels are different.
At the 0.05 level, the population means are significantly different.

- Double-click on the **Means Comparison Plot** to open it. The red plots indicate significantly different mean values. **PLANT4** has the smallest mean and is significantly different from the other three groups.

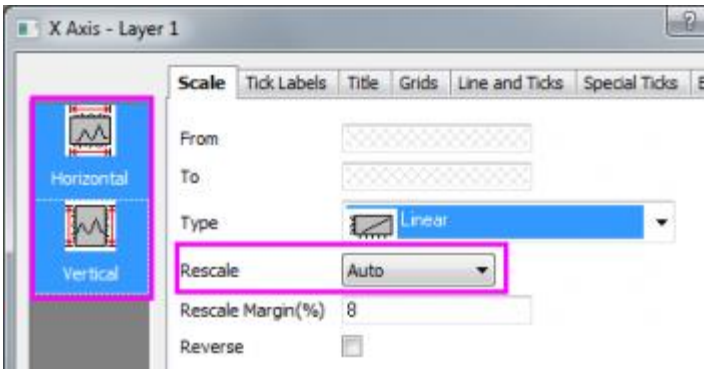


- Save your project file.

12 Analysis Template

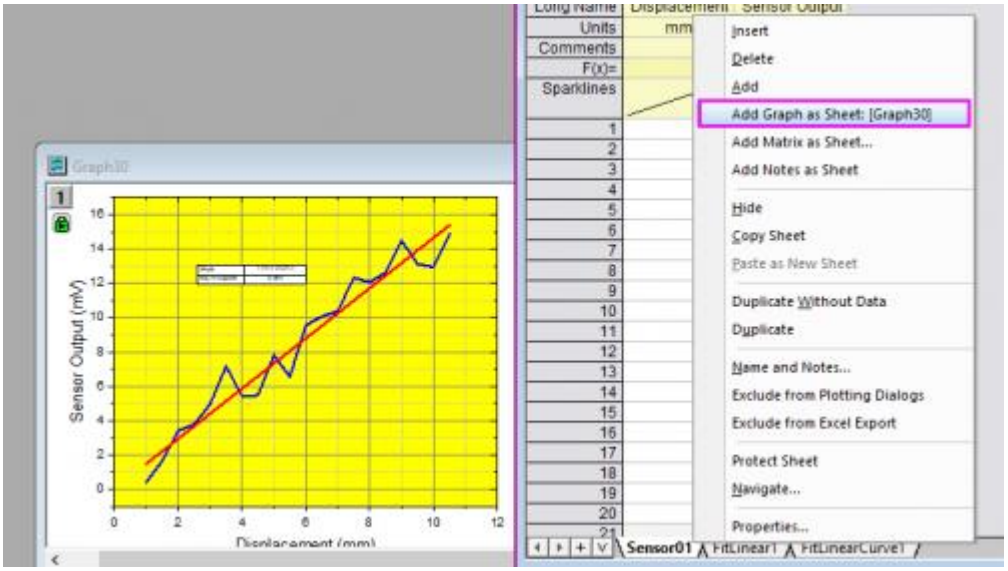
In this lesson we will learn how create an **Analysis Template** and re-use it for new data.

1. Continue with the project file saved from the previous lesson. Create a new folder in Project Explorer and rename it as ***Analysis Template***. Open the empty folder.
2. Create a new workbook and import the file *<Origin EXE Path>\Samples\Curve Fitting\Sensor01.dat*.
3. Highlight column B and select **Plot > User Templates: My Line** to create a line graph from the graph template *My_Line.otp* that we saved in lesson 1.
4. With the graph window active, select **Analysis: Fitting: Linear Fit** from menu. This will bring up the **Linear Fit** dialog.
5. In the **Fit Control** tab, select the **Fix Intercept** check box to force the fitted curve go through (0,0). Select **Auto** for **Recalculate**. Click **OK** to perform the linear fit. The fitted curve and a result table will be added to the graph.
6. Click on the result table and select **Quantities in Table** button  from the popped-up mini toolbar. In the dialog, remove all entries other than **Slope** and **Adj. R-Square**, then click **OK** to update the table.
7. Double-click on the X axis to open the **Axis** dialog. With the **Scale** tab active, hold down the **Ctrl** key and select both **Horizontal** and **Vertical** in the list box on the left. Change **Rescale** to **Auto** and click OK. This is to make sure the axis range will update when data changes.



8. Select the legend on the graph and delete it.

9. Go back to the source workbook. Right-click on any one of the sheet tabs and select **Add Graph as Sheet** from the context menu to insert it as an embedded graph inside a new worksheet.



10. Now we have source data and all analysis results in one book. Let's save it as an Analysis Template. Select **File: Save Workbook as Analysis Template...** from menu. Save the workbook as *My Sensor Analysis.ogw*.
11.

    Any work book which has an operation linking input and output, indicated by a lock on output sheets or columns, can be saved as an analysis template. The simplest example would be a sheet where column value calculations have been performed.

12. Now use the **File: Recent Books** menu command to open **My Sensor Analysis.ogw**. The analysis template will open. Note that the date sheet, results and graphs are empty.
13. With the first data worksheet active, select **Help> Open Folder: Sample Folder**. Then go to the **Curve Fitting** subfolder. Drag **Sensor02.dat** to the sheet.
14. The linear regression results and the embedded graph will update automatically, because we had set the **Recalculate** mode in the linear fit tool to **Auto**.

Analysis templates can be used manually to process one file at a time, or can be used to perform batch analysis of multiple data files or datasets. Please view the Batch Processing tutorial to learn more.

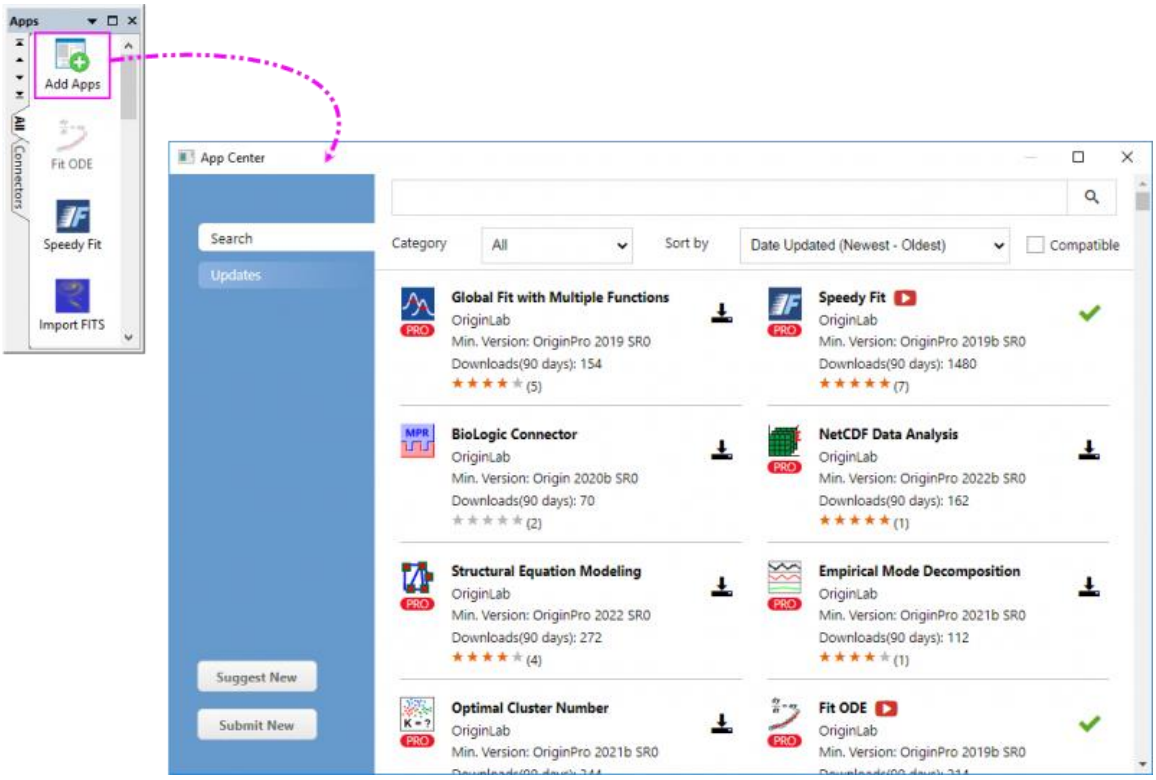
Save your project file.

13 Apps in Origin

Besides the tools and capabilities pre-shipped and included in Origin, you are able to install the free Apps to extend graphing and analysis functionality of Origin.
In this lesson, we will show you how to search an App, install and use it to plot a tangent curve at specified point of a line+Scatter plot.

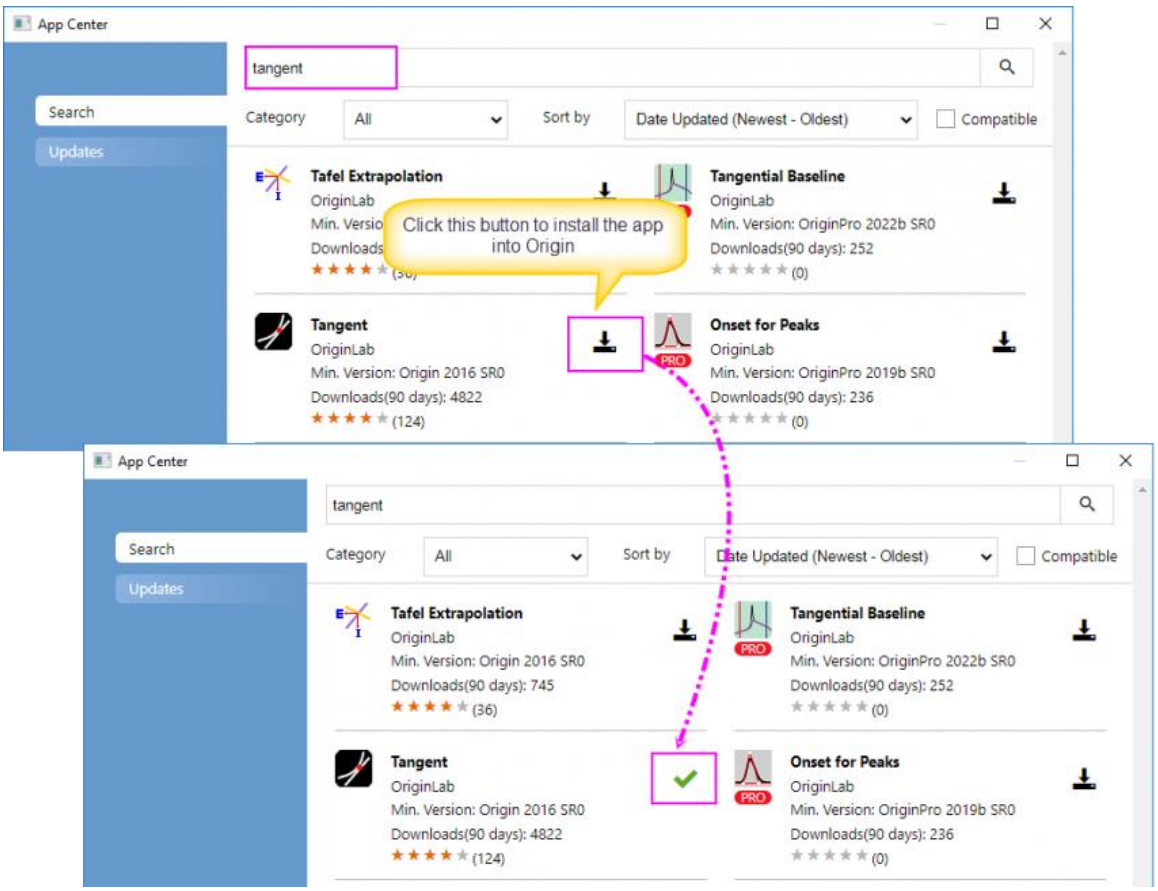
1. Continue with the project file saved from the previous lesson. Create a new folder in Project Explorer and rename it as ***Apps***. Open the empty folder.
2. Select the **F10** key to open the App Center dialog.

   Note: You can as well open the **App Center** dialog by selecting **Add Apps** in the **Apps Gallery** Window.



3. Select the Search tab and input **Tangent** into the search engine and select the Search icon in order to search for the app. Click the **download and install** icon. Once the App is installed, the download and

install icon will change to a green check-mark (**Up-to-date Version** icon).

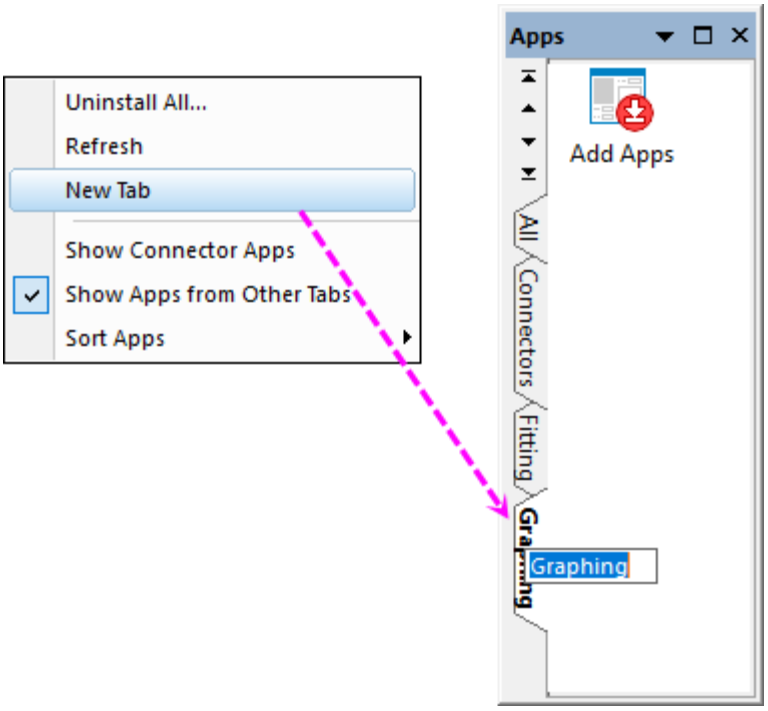


Besides installing apps from App Gallery, you can also go to the OriginLab File Exchange to download the app you desired, drag and drop the opx file into Origin workspace to install it. You can see the details here.

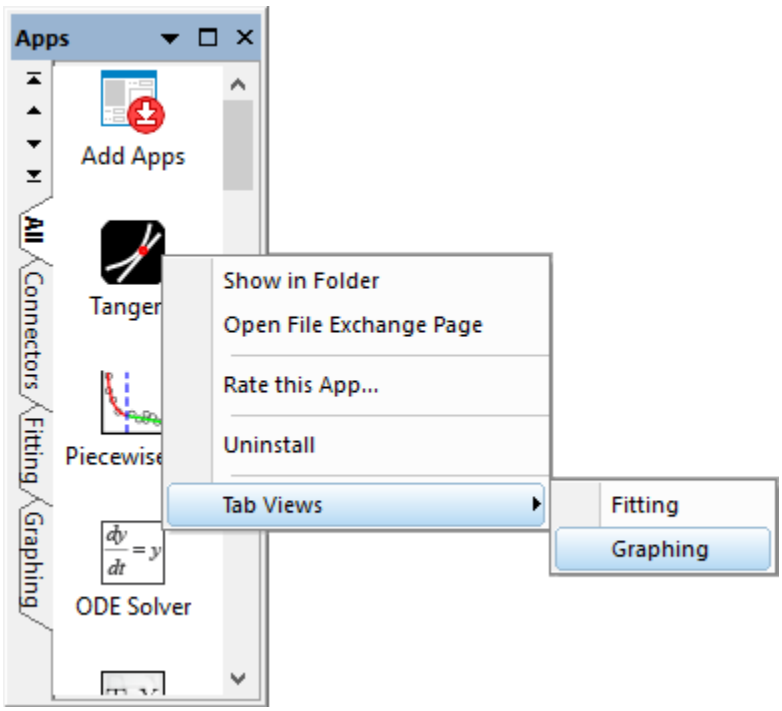
4. Close App Center. An icon named **Tangent** will appear in the **Apps Gallery** window docked to the right end of the workspace.

5. Here, we are allowed to add new tabs in App Gallery to manage the installed apps. Right-click in an empty portion of the Gallery and choose **New Tab**, then double-click on the default tab name and enter

"Graphing" as the tab name.



6. Go back to the tab **All**, right-click on the icon of Tangent app we just installed, select **Tab Views: Graphing**. This app will show in the **Graphing** tab.



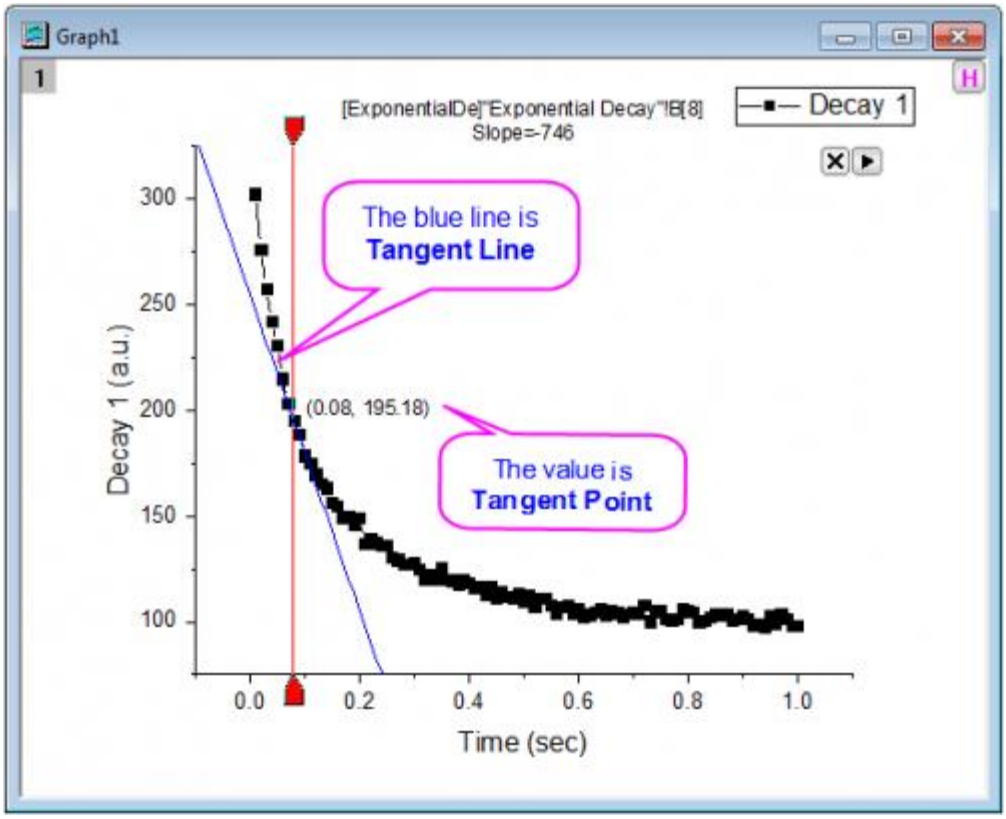
7. Now import the file *<Origin EXE Path>\Samples\Curve Fitting\Exponential Decay.dat* into a new workbook.
8. Highlight col(A) and col(B) to select **Plot > Basic 2D : Line + Symbol** from the main menu to plot a scatter plot.
9. Click the **Tangent** button in the Apps Gallery to open the **Tangent: addtool_tangent** dialog.

10.

App operations may be window-specific,

- If the App is dimmed (grayed out), the active window cannot be operated on by the App. Check the required window type (hover on the dimmed App icon in the Apps Gallery).
- If the Origin window type (worksheet, graph, etc.) is matched to the App, you can launch the App by clicking on it in the Apps Gallery.

11. Keep the default setting and click OK. A red vertical line and a blue tangent line are added to the plot. The value of slope is shown at the top. The tangent point is intersected point of the two lines.



12. You can move the red anchor to a position, click the triangle button at the top right corner of the layer to select **New Output(O)** to output the results. You can also select **Preferences...** from this context menu to open the Tangent Preferences dialog to do more settings such modifying the Smooth method.

You can always access to the document of an App by right-clicking App icon and selecting:

- **Open App Webpage** to open this App's OriginLab File Exchange web page for the detailed document.
- **Open App Tutorial Webpage** to read or request a tutorial of how to use this App.

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