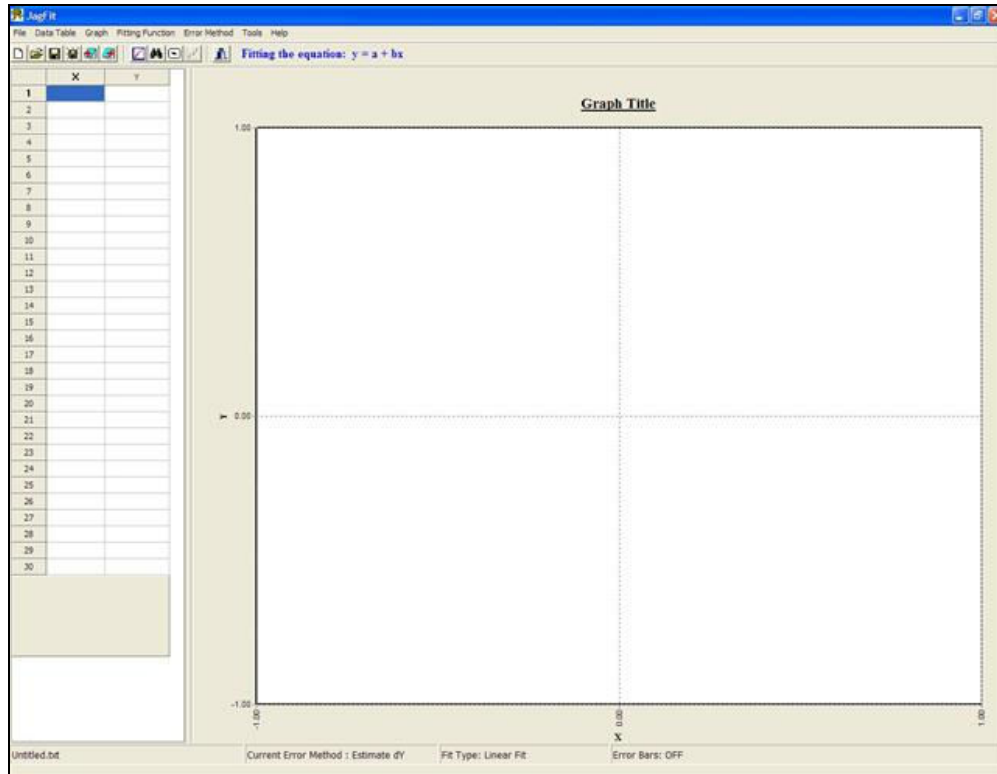


# Introduction to JagFit



JagFit is a graphing program which can perform least-squares fitting to data. Some features include:

- Linear, Exponential, Power Law, and Polynomial Fits.
- Fits can use user input error bars or use estimated values.
- Fit parameters given with uncertainties.  $\chi^2_\nu$  also returned.
- Graph can be exported to a bitmap or JPEG image.
- Export data table to ASCII file.
- Enter up to 200 Data Points.
- Add/Delete columns to the data table.
- Select which columns to use for plotting and which to use for error bars.
- Semi-Log and Log-Log plots.

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## Menu Options

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### File

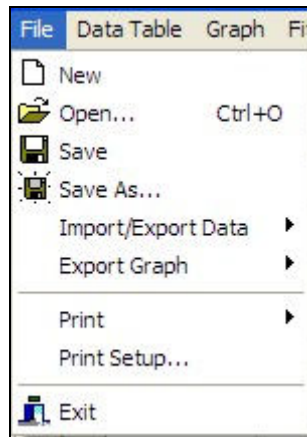


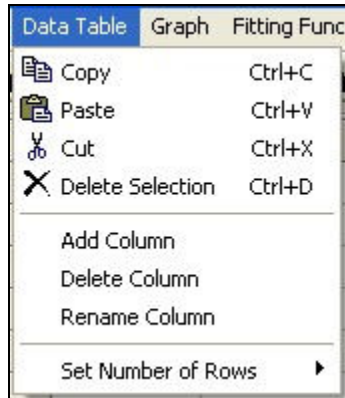


Figure 1: File Options

1. **New:** Create a new File.
2. **Open:** Open an existing file.
3. **Save:** Save current file with current file name.
4. **Save As...:** Prompted for new file name to save file to.
5. **Import/Export Data:**
  - a. **Import from ASCII** : Import data from a standard text file. The only format requirement is that the columns of data be separated by at least 1 space. When the ASCII file is imported, the number of columns in JagFit will be adjusted to match the number of columns in the 1<sup>st</sup> row of the text file.
  - b. **Export from ASCII** : Write data in JagFit into a standard text file. Each column of data is separated by one space.
6. **Export Graph:** Save the graph as a bitmap or as a JPEG image.
7. **Print:**
  - a. **Print Data...:** Print data table along with fit results.
  - b. **Print Graph...:** Print graph with fit results.
8. **Print Setup:** Set up printer.

## Data Table



**Figure 2: Data Table Options.**

From the Data Table menu option you can control the configuration of the data table on the left side of the screen.

### **Copy / Cut / Paste**

You have the standard Copy (Ctrl-C), Cut (Ctrl-X), & Paste (Ctrl-V) to move data around in the data table. These options allow you to manipulate the data table on the left side of the screen.

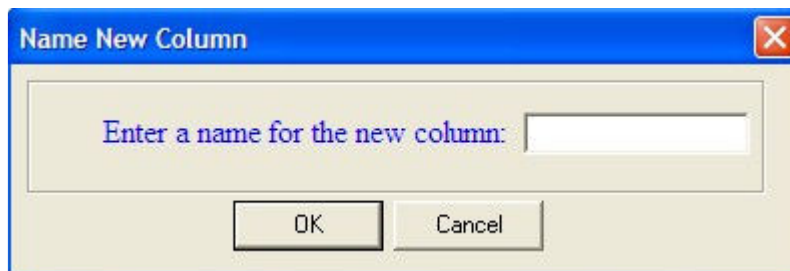
### **Delete Selection (Ctrl-D)**

This deletes the highlighted selection of data without copying it to the clipboard.

### **Add Column**

Select Add Column to add an additional column to the data table. Once selected, you will be given a pop-up box in which to give a name to the new column.

*(NOTE: You cannot leave the column name blank nor use a name already in use)*



**Figure 3: New Column Name**

### Delete Column

Choose a column from the drop down menu to delete and click OK.

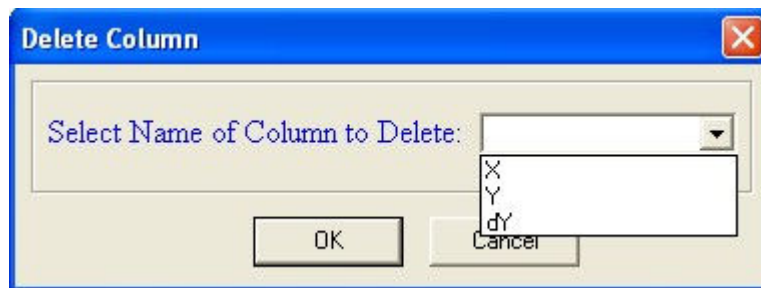


Figure 4: Delete Column

### Rename Column

To rename a Column:

1. Select any cell in the column that you want to rename.
2. Choose **Data Table** → **Rename Column**.  
*OR*  
(Double-click the name of the column in the data table.)
3. Enter the new name in the pop up box and click OK.

*(NOTE: You cannot leave the column name blank nor use a name already in use.)*

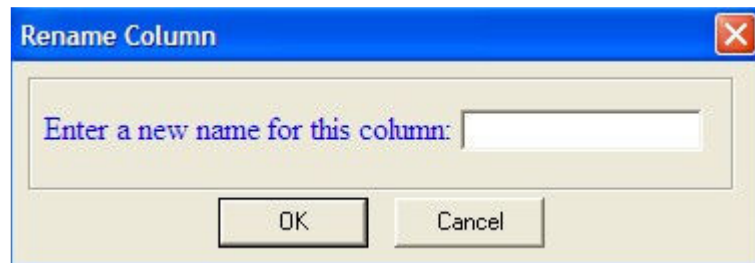


Figure 5: Rename Column

### Set Number of Rows

Set the number of rows in the data table (up to 200). The default is 30 because that number of rows will print on one sheet of paper.

# Graph

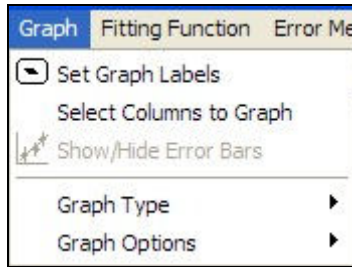


Figure 6: Graph Options

## Set Graph Labels

Title the graph and label the axes. When the X-Axis and Y-Axis labels are entered, the corresponding columns in the data table are also renamed.

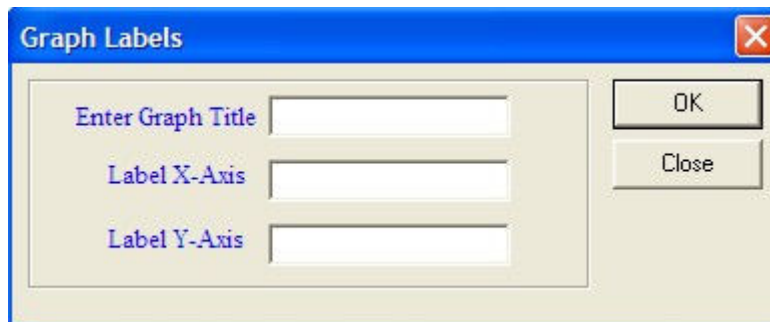


Figure 7: Set graph labels.

### Select Columns to Graph

Select this menu option and choose which columns to use for plotting and fitting.

*Note: If the current error method is **Estimate dY**, the “Choose dX Column” and “Choose dY Column” options are disabled. If the current error method is **Y Error Bars**, the “Choose dX Column” option is disabled.*

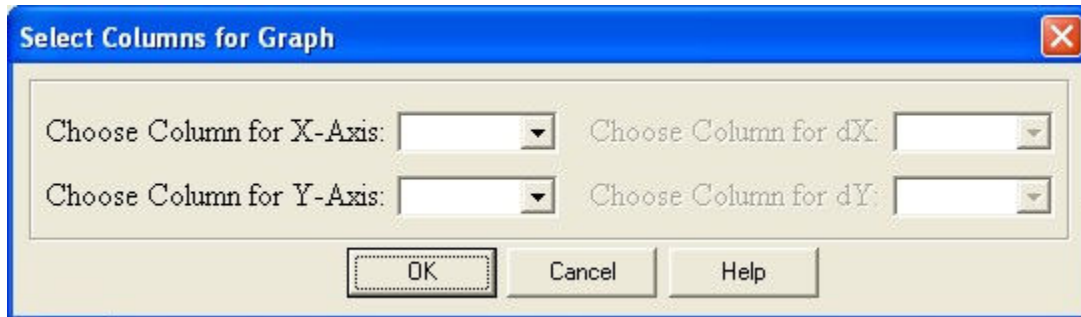


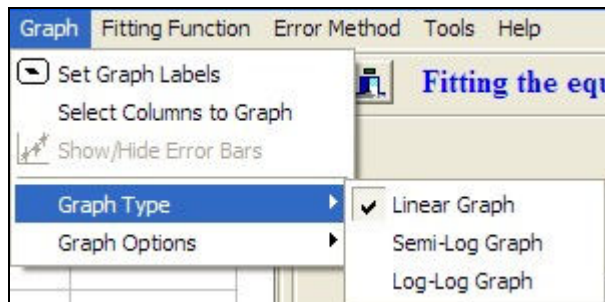
Figure 8: Select Columns if "Estimate dY" error method chosen.

### Show/Hide Error Bars

Toggle error bars on and off when either the *Y Error Bars*, or the *X and Y Error Bars* error method is chosen.

### Graph Type → Linear/Semi-Log/Log-Log

Select the type of ‘Graph Paper’ to plot the data on. Choose from Linear, Semi-Log or Log-Log.



## Graph Options

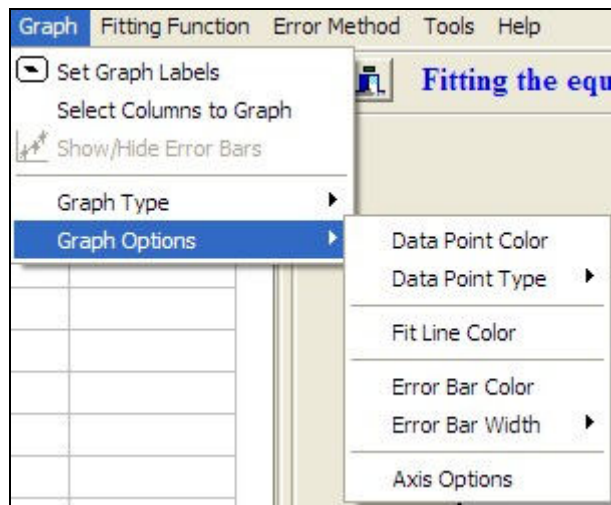


Figure 9: Graph Options menu.

### Data Point Color, Fit Line Color, & Error Bar Color

I think these are self-explanatory.

### Data Point Type

Choose the style of the data points plotted. Choose from Circle, Rectangle, Triangle, Cross, & Star

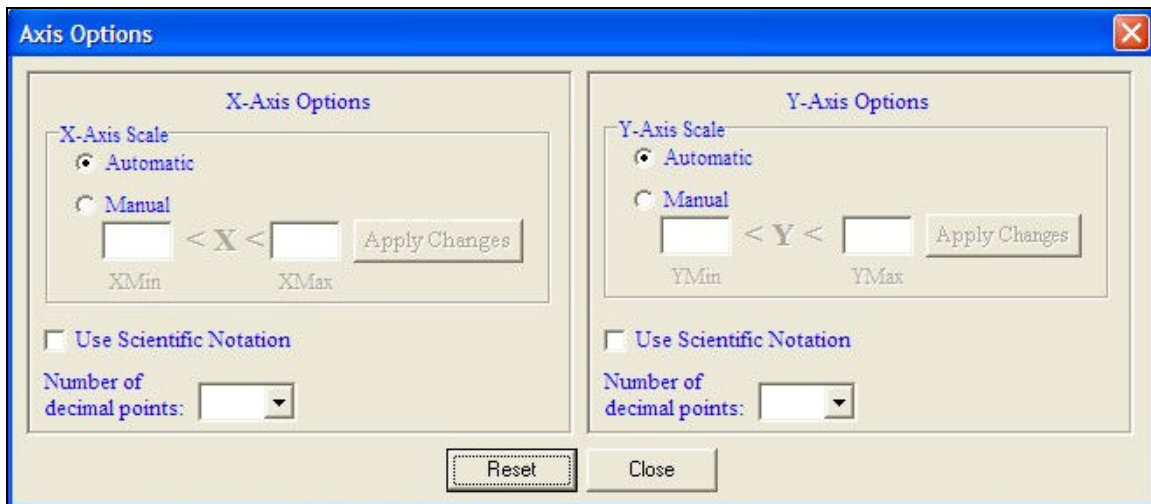
### Error Bar Width

Set the width of the error bars from 1-5.

## Axis Options

Set options for the axes (*See screenshot below*). You can:

1. Choose to manually or automatically scale the axes.
2. Display axis values in scientific notation
3. Change the precision displayed.



**Figure 10: Set axis options.**

## Fitting Function

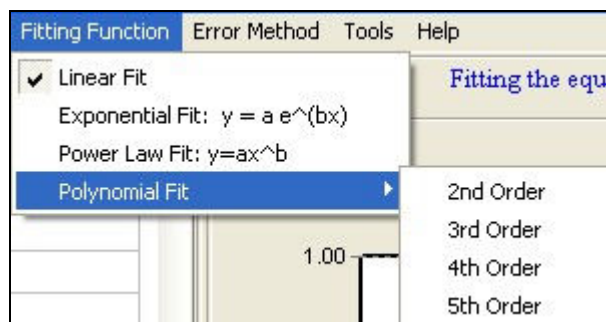


Figure 11: Fit Options

Select the type of fit you want to perform:

- Linear:** Fit  $y = a + bx$
- Exponential:** Fit  $y = ae^{bx}$
- Power Law:** Fit  $y = ax^b$
- Polynomial:** Fit a polynomial up to 5<sup>th</sup> order:  $y = a + bx + \dots + fx^5$

## Error Method

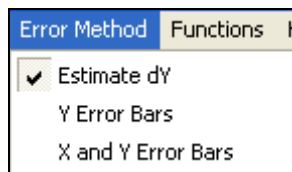
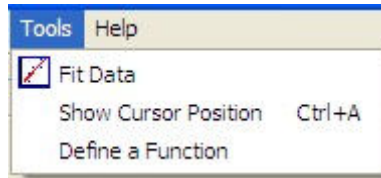


Figure 12: Select Error Method


Choose your error method. Choose from the *Estimate dY*, the *Y Error Bars*, or the *X and Y Error Bars* method. These methods are explained in detail in the Error Methods Guide. Go to **Help** → **Error Methods Guide**.

# Tools



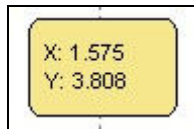
**Figure 13: Tools Menu**

## Fit Data

Perform linear fit with the currently selected error method. You can also click the fit button: 

## Cursor Position

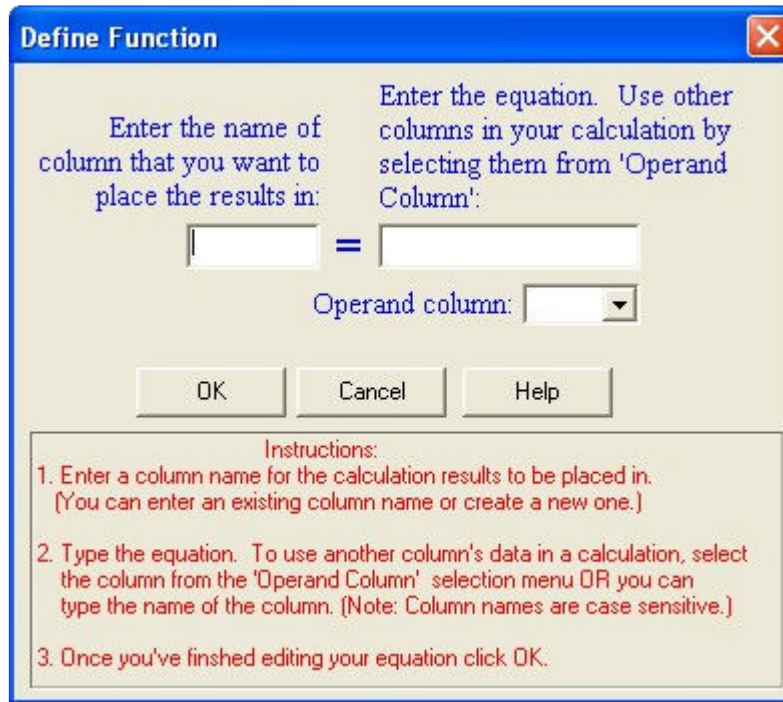
Select this option to activate a small window that follows the mouse and displays the current mouse position in scale values. Use **Alt-A** as a shortcut to toggle this tool on and off.



**Figure 14: The Show Cursor Position window follows the mouse updating the X & Y values of the current mouse position**

## Define a Function

Define your own function using any column or columns as input and selecting any column as output. When you select this option the following window pops up:



The image shows a 'Define Function' dialog box with a blue title bar and a close button. It contains two columns of text. The left column says 'Enter the name of column that you want to place the results in:' followed by a text input field. The right column says 'Enter the equation. Use other columns in your calculation by selecting them from 'Operand Column':' followed by an equation input field with an equals sign. Below these is a label 'Operand column:' followed by a dropdown menu. At the bottom are three buttons: 'OK', 'Cancel', and 'Help'. A section at the bottom contains instructions in red text.

Enter the name of column that you want to place the results in:

Enter the equation. Use other columns in your calculation by selecting them from 'Operand Column':

Operand column:

OK Cancel Help

Instructions:

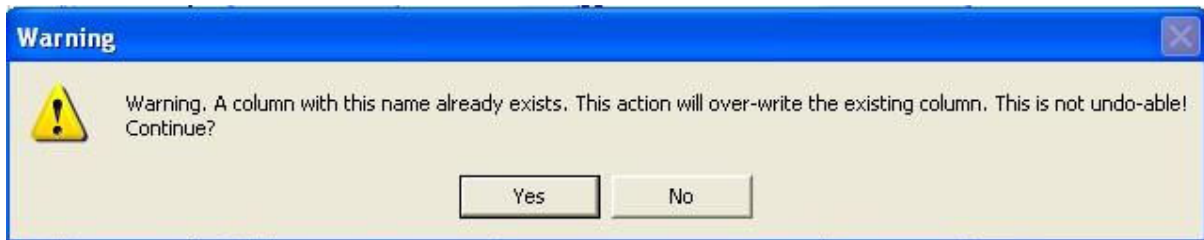
1. Enter a column name for the calculation results to be placed in. (You can enter an existing column name or create a new one.)
2. Type the equation. To use another column's data in a calculation, select the column from the 'Operand Column' selection menu OR you can type the name of the column. (Note: Column names are case sensitive.)
3. Once you've finished editing your equation click OK.

Figure 15: Define your own function window.

### To define a function

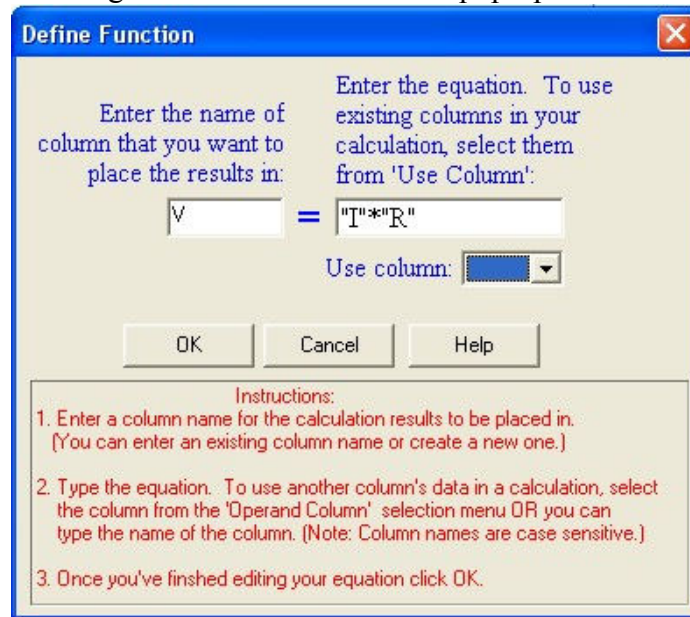
1. Type the name of the column in which to put the calculation results..
2. Type your equation. While typing, use the 'Operand Column' drop-down box to insert the name of the column you want to use. Alternatively you can just type in the column name in the equation box yourself. Note that the column names are case-sensitive.
3. Click OK.

Note: If the column name you give for the results doesn't exist it will be automatically created for you. If the column name does exist you will be given a warning that to may overwrite existing data.



**Figure 16: Column name already in use warning.**

For example: Suppose you have two existing columns named I and R (for current and resistance). To create a new column (named V) in which you calculate voltages (using  $V=IR$ ), enter the following in the function definition pop-up window:



The image shows a 'Define Function' dialog box with a blue title bar and a close button. It contains two main sections. The top section has two columns of text. The left column says 'Enter the name of column that you want to place the results in:' followed by a text box containing 'V'. The right column says 'Enter the equation. To use existing columns in your calculation, select them from 'Use Column':' followed by an equals sign and a text box containing 'I'\*R'. Below the equation, there is a 'Use column:' label and a dropdown menu. The bottom section of the dialog box contains three buttons: 'OK', 'Cancel', and 'Help'. Below the buttons is a section titled 'Instructions:' with three numbered steps: 1. Enter a column name for the calculation results to be placed in. (You can enter an existing column name or create a new one.) 2. Type the equation. To use another column's data in a calculation, select the column from the 'Operand Column' selection menu OR you can type the name of the column. (Note: Column names are case sensitive.) 3. Once you've finished editing your equation click OK.

Define Function

Enter the name of column that you want to place the results in:

Enter the equation. To use existing columns in your calculation, select them from 'Use Column':

V = I\*R

Use column:

OK Cancel Help

Instructions:

1. Enter a column name for the calculation results to be placed in. (You can enter an existing column name or create a new one.)
2. Type the equation. To use another column's data in a calculation, select the column from the 'Operand Column' selection menu OR you can type the name of the column. (Note: Column names are case sensitive.)
3. Once you've finished editing your equation click OK.

**Figure 17: Example function definition.**

This action will create a new column named 'Voltage' and will contain the result of multiplying the data in column 'I' times the data in column 'R'.

## Zooming in and Out / Scrolling

### Zooming In

To zoom in on a particular area of a graph, define a ‘zoom box’ by *left-clicking* the *top-left* of the region you wish to zoom in on and drag to the *bottom-right*. Upon releasing the mouse button, the graph will be redrawn.

### Zooming Out

To zoom back out of a particular area of a graph, *left-click* the mouse anywhere on the graph and drag a zoom box from the *bottom-right* to the *top-left*. Release the mouse button and the graph will be redrawn to the original scale.

### Scrolling

The graph can be scrolled and moved in any direction by *right-clicking* the mouse anywhere on the graph and dragging in the direction that you want to scroll. Reset the graph’s scale using the “Zooming Out” procedure above.

## Locating a Data Point

You can click on any data point in your graph and the corresponding row of the data table will be highlighted. This is useful if you have an apparent ‘bad’ data point in your graph. You can click on the point and then easily make sure that the point was entered into the data table correctly.