Easyplot in a Nutshell

Introduction
Easyplot allows you to do 2-D, 3-D, polar and multiple graphs and contour plots. You can also fit curves to your data or plot mathematical expressions. Easyplot is available on all the Physics Department computers and to Physics students across the campus via the Physics Department software. It is fast and easy to use, and generates publication-quality graphs.

Launching Easyplot
Click on the Easyplot icon (blue square with lines on it). It comes up with a menu giving you a choice of plotting data or an equation. Assuming you want to plot data:
Either: type in the name of a file containing the data (they should be in columns of numbers which represent x, y, z, error bar, r, or θ. The error bar corresponding to a particular column must be in the next column. You can have as many columns as you like. Missing data points can be written as //miss)
Or: choose *enter data* and enter your data (in columns) in the data table. (You can use the data table to edit the data file later on if you make a mistake in entering data). Click 'plot' when you have finished.

Defining what the columns should be
Easyplot assumes that the first column is an x and all the others are y. To change this, select TOOLS then DEFINE DATA. Type in a string like xyexyeixye (the i is for ignore). The menu explains how to define columns. You should now see the graph you are expecting.

Changing the symbols :
To change the size, colour or type of a marker or tic mark, go to STYLE then RESTYLE DATA.

Tic marks scaling the axes and choosing log Axes
To change where you want tic marks and labels on the axes, or to change the scale on the axes, or select log axes, select STYLE, then AXIS SETUP (you can also click on the axes). Note that the tic marks point OUT on the screen but IN when you print - see print preview. To change the size of annotations, use the FILE, PRINT OPTIONS menu. Click on the little squares next to the axes to enter axis titles.

Error bars
To get error bars you must first enter a column of error bars in your data, and tell Easyplot what it is (e.g. under TOOLS, DEFINE DATA xeye will define four columns, with errors on x and y). A column of errors must be placed immediately after the relevant data column. To show error bars, switch them on using STYLE, ERROR BARS then STYLE, RESTYLE DATA to see them.
Note that Easyplot should be set up to display error bars in the normal way, i.e. 5±1 means an error bar of 1 either side of 5. However, the program can interpret error bars in other ways, so always **check** that it is working correctly for your application. You can do this either by looking at the graph or by checking FILE, PREFERENCES, ERROR BARS. If the buttons 'error value' and 'half of entire bar' are on then the errors will be displayed in the normal way.

Multiple curves and graphs
ADD then CURVE allows you to plot a new data set on an existing graph which means you can have several data lines on one graph.
ADD then GRAPH allows you to define a new graph with new axes, title etc. You can change the size of a graph with the mouse (move one of the corners while holding the left-hand button down).

Thus, you can have several graphs on the screen at once (these will also print at the same time if you wish to do so).

Modifying data
You may want to re-scale a curve, or mathematically transform it. Use TOOLS, TRANSFORM, CURVE, then supply an equation (e.g. $y=y*10$ or $y=\log(y)$). Under EDIT, DATA you can edit your data set - either numerically or by moving points around on the graph. You can also transform the whole graph, but if you do this you will find that Easyplot retains both the original and modified graph (the original will be hidden behind the modified one: make it smaller to see both). Then any style changes you may have made will be found only on the original.

Printing.
FILE PRINT - modify plot using OPTIONS if required, and use s to see what the graph will look like (or use print preview). Then type P to send to printer. If you need to prepare lots of high quality graphs, printing to a Postscript printer is very much faster. To get colour plots, select an appropriate printer and if necessary choose the colour output print option. ALWAYS check your plot using the print preview before sending to the colour printer.
NOTE: If you would like to include an Easyplot graph for putting into a word processing package, just copy the whole graph to the clipboard (EDIT, COPY) and paste into the document.

Entering text, lines and arrows
Easyplot allows you to type text directly on the screen. Use the ADD ANNOTATION menu for text. Once the text is written you can move it by 'dragging' with the mouse. Note that you change the size of lettering on the graph using the print options.
Use ADD LINE for lines. For lines, the cursor will change to a pencil shape. To return to the normal cursor press **Esc**. Lines can be adjusted by clicking and 'dragging' one end of a line with the mouse while the cursor is in its normal (+) mode. Hold the ALT key down as you draw the line to put an arrow at the end where you release the mouse button.

Changing the type of graph: STYLE menu. You can select a 3-D option for instance - see help pages for more info. on this.

Panic
There are ways in which Easyplot will get into a tangle. You may accidentally zoom or select a curve for instance and find you can't do anything. If EDIT-UNDO doesn't work, then try OPTIONS AUTORANGE to recover control. The **Esc** key can also get you out of trouble. Of course, you should always save your file at regular intervals.

Save and restore
Save a plot using FILE SAVE. To call it up again use ADD GRAPH.

Greek characters, subscripts, superscripts.
When you're typing text (e.g.axis titles, annotations) Easyplot comes up with a menu which you can use to select various options. Strangely, once you have chosen superscript (for instance) you can't go back to normal text. So it's easier to type everything in normally then go through selecting text with the mouse and converting to whatever you want. Alternatively (and more quickly) use the keyboard strokes:
Greek: type \a to get alpha etc. It does upper and lower case.
Superscripts: x^2 gives x^2; to get more figures in the exponent you have to use the menu method.
Subscripts: O_3 gives O_3.

Getting a table to label the different lines in multi-line plots
This is called a legend. Use OPTIONS LEGEND to introduce a box and click on curves to put something in it.

Highlighting curves
Use the right mouse button. You will see a little box in the lower left hand corner of the screen with a sample of curve in it. Keep hitting the rh mouse button until you see the curve you want. If you keep the button down, the curve glimmers. To delete a curve, highlight and hit delete.

Multiple axes
ADD X-AXIS or Y-AXIS. If you choose multiple y axes the **current** axis will have a little y above it. To choose a particular axis (e.g. to edit it) click on it using the mouse. To plot data against a given axis, highlight and, while holding down the rh mouse button, type y or x as appropriate. To enter a second title, choose EDIT, TITLE after selecting the second axis.

Zoom
You may zoom in (and zoom **in** only) on any part of a graph by clicking and 'dragging' with the mouse while the cursor is in normal (+) mode. The position of the cursor when you press the left mouse button and its position when you leave go define opposite corners of a rectangle for zooming in. In order to zoom out you must choose OPTIONS RANGE/AUTORANGE.

Histogram
You can enter all your data points as an x-y graph and convert that to a histogram using TOOLS, STATS, HISTOGRAM. See the help item histogram for more information - you set up the classes for the histogram by modifying the tick marks on the axes. Note that Easyplot keeps the x-y plot behind the newly-created histogram - use Window to switch between them.

Fitting curves: TOOLS menu
You may fit any curve of your choice by selecting TOOLS CURVEFIT. You may then choose to fit your curve to a few types of theoretical curves (including straight line) by making the appropriate choice. You can also fit splines etc or smooth your data using filters. Explot also calculates a Fourier Transform.

Batch commands
You can drive Easyplot in one of two ways: either from the screen or by commands placed in a batch file. When you start it is easier to use the screen mode, but as you get more experienced, and especially if you want to generate lots of very similar graphs, you can use batch commands. In fact, you can generate a plot without using the screen display at all if you want to. Some information on batch commands is given below. To know more, read the manual - which is surprisingly clear and easy to use. It is available in the Part 2 laboratory (not to be taken away!).

```
/et x "Day number"                    ;x-axis title
/et y "Temperature, K"                ;y-axis title
/et g "Variation in temperature"      ;graph title
/oll                                  ;start legend block
/sa l "January" 2                     ;label for curve 1 (data column 2)
/sa l "February" 3                    ;label for curve 2 (data column 3)
/td "xyei"                            ;define the columns
```
There are also various options that you set under FILE PREFERENCES (these correspond to the 'double-slash' commands described in the help page).