How to get started with GNUPLOT

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Plotting graphs is an essential activity in an experiment; graphs convey a lot of information about the measurements, and most importantly convey the trends in the interdependence of physical quantities.

Several computer-aids for plotting graphs are available. Most spreadsheets, for instance, offer graph plotting capabilities, and besides, there are several dedicated graph plotting software packages. GNUPLOT is one of them and is highly recommended for scientific plotting.

GNUPLOT differs from other popular software in a few ways. First, it is free to use and works on all operating systems. Second, it is a command-driven program, not point and click software. This requires some getting used to, but the advantage is that you know what exactly is happening, and what is intended. Another major advantage is that analysing or plotting several sets of data (by iteratively running the same commands) is extremely straightforward and efficient.

To get going on GNUPLOT it is necessary learn a few things. Data to be plotted by GNUPLOT is to be entered in a plain text file as columns (any number of columns). Each data point (e.g. the values of x, y and the error, constituting one data point) is entered in a row, with the three values separated by tabs (or commas, but the file is neater and easier to read with tabs)

```
x       y       yerr
```

The data values are entered row after row, to create the file of data values.

```
x1      y1      yerr1
x2      y2      yerr2
x4      y3      yerr3
x4      y4      yerr4
```

You need a plain text editor to do this and more. The editor NOTEPAD++ is recommended under Windows, the default notepad is not. The former is already installed in the lab machines.

GNUPLOT commands can be written out in the GNUPLOT command window, one by one, but it is better to create a command file (again using NOTEPAD++) and save it as a `.plt` file. For the commands you can refer to the sample files provided on your computers. Somewhere in your command file, you should have the plot command

```
plot "mydata.dat" u 1:2:3 with yerr
```

which will use the data file you created to get the data points and associated error bars.

To plot the graph simply load the command file at the GNUPLOT command window

```
reset
load "myplot.plt"
```

and hey presto! You will see a graph in another window. You can do lots of things with this simple plot. An important thing of course is to be able to create a portable picture out of this plot. To do this you can either use the print or save as command in the graph window menu, or you can issue the following commands at the terminal

```
set term pngcairo
set output "mygraph.png"
replot
```

which will create a png file of your graph with the file name mygraph.png
You can also create a pdf file by setting

```
set term pdf
set output "mygraph.pdf"
replot
```

The main thing you will find GNUPLOT useful for it to fit functions to data. You can follow the example files to figure out how to do that.