This tutorial guides you to plot data files and fitting functions using gnuplot. For a more detailed tutorial refer the on-line link:

```
http://www.duke.edu/~hpgavin/gnuplot.html
```

I. PLOTTING

Open gnuplot by typing the following command at the shell prompt:

```
gnuplot
```

You would get the following on screen:

```
        G N U P L O T
        Version 4.4 patchlevel 2
        last modified Wed Sep 22 12:10:34 PDT 2010
        System: Linux 2.6.38-13-generic

        Copyright (C) 1986-1993, 1998, 2004, 2007-2010
        Thomas Williams, Colin Kelley and many others

        gnuplot home:     http://www.gnuplot.info
        faq, bugs, etc:   type "help seeking-assistance"
        immediate help:   type "help"
        plot window:      hit 'h'

Terminal type set to 'wxt'
gnuplot>
```

At the prompt type the following:

```
gnuplot> plot ``file.dat" using 1:2 title `sample file' w l
```

where we plot the file file.dat using the first column as the x axis and the second column as the y axis. In addition we set a title called "sample file" and we use lines instead of points for the figures. If you omit w l, then the default style uses points. For readabilty, we are going to label the axes etc.

```
gnuplot> set xlabel ``x axis" #labels x axis
gnuplot> set ylabel ``y axis" #labels y axis
gnuplot> set label "My parameters a = 0.1" at 0.1, 1    #this sets the label
within quotes at the coordinates specified
gnuplot> set xrange[0:10] #sets the x range
gnuplot> set pointsize 1.5 #sets the size of the points used for the data
gnuplot> set key top left #places the legend at a specified corner
gnuplot> set timestamp #set time and date indicator
```

Next we need to save our file. Let us call the output 'file.ps'. The following commands create the output file and save it.

```
gnuplot> set output `file.ps'
gnuplot> set terminal postscript enhanced color #hitting enter gives the
following message
 Terminal type set to `postscript'
 Options are 'landscape enhanced defaultplex \
   leveldefault color colortext \
   dashed dashlength 1.0 linewidth 1.0 butt noclip \
   palfuncparam 2000,0.003 \
```

```
  "Helvetica" 14 '
gnuplot> replot
gnuplot> quit
```

Now will have a postscript file called 'file.ps'. You can convert a postscript file to a pdf file using the following command:

```
ps2pdf file.ps
```

This creates a pdf file called 'file.pdf'.

II. FITTING

We are going to fit a straightline to the data in the sample file called 'file.dat'. Once again open gnuplot and plot the file. If there are both linear and non-linear regions, adjust the range of x so that you can see only the linear part. Then use the following commands:

```
gnuplot> f(x) = a*x + b
gnuplot> fit f(x) 'file.dat' using 1:2 via a,b
```

This would give the value of a and b and the results are stored in a file called fit.log in your current working directory (the result is also displayed immediately on the screen).

III. OPERATIONS ON DATA FILE

Suppose we want to plot the log of the columns in the data file, we could do the following for natural logs

```
gnuplot> plot "file.dat" using (log($1)):(log($2))
```

or to the base10

```
gnuplot> plot "file.dat" using (log10($1)):(log10($2))
```

Another example:

```
gnuplot> plot "file.dat" using ($1):($2-$1)
```

where the y axis is the difference between the second and the first columns.