Physics 259 Assignment 2 Data Analysis

Due at start of your Lab period Sept 26 or 27

1. Download the file **rc.dat** from the webpage into your own directory. Use any text editor to examine the file. It should contain a list of 30 data triplets (t_i, V_i, dV_i) where dV_i is the error in V_i. Using any one of the data analysis programs plot V(t) on the **top** half of the page. Be sure that each axis is labelled properly.

2. Using an exponential function with two parameters, a_0 and a_1 perform a weighted least-squares fit and determine the parameters and their uncertainties (errors). Plot the data with the fitted curve superimposed on the **bottom** half of the page.

3. Add your name and student number somewhere INSIDE the box formed by the axes for the graph. PRINT a copy for your report.

4. Compute the Residuals $R_i(t_i) = V_i - FIT_i$ and plot R(t) on the **top** half of another page.

5. Fit a polynomial function to these Residuals to determine the coefficients and their uncertainties. Plot the residual data with the fitted curve superimposed on the **bottom** half of page 2. Once again be sure to add your name and student number INSIDE the box. PRINT a copy for your report. Examine the errors on the coefficients – how many parameters should you use ?? Is it better to include more ?? HINT – look at the correlation matrix.

6. Print out the commands you have used to perform your data analysis and submit this as page 3 of your report along with a **brief description** of the analysis that you have done. What value did you obtain for the Time Constant and what is its uncertainty ??

7-12. Download the data file **lcr.dat** and repeat items 1-6 for the resonance data using a proper theoretical model. Again you should discuss the parameters of your model and their uncertainties.