PHYS-3901 Intermediate Physics Lab
Fitting Data Assignment
Due: Wed. Nov. 26, 2014

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1. You notice that by removing one data point from your dataset, the reduced χ^2 drops from 3.00 to 0.50. Should you throw out the data point because of this statistical fact? Why or why not?

2. Suppose the dataset from question 1 contains three degrees of freedom without throwing the data point out. It therefore contains two degrees of freedom if the point would be thrown out. What are the probabilities corresponding to each value of χ^2 for the given numbers of degrees of freedom?

3. Do problem 7.2 from the text.

4. Do problem 8.5 from the text.

5. Do problem 8.25 from the text.

6. For problem 8.25, calculate the value of the reduced χ^2 and thereby comment on the goodness of fit. What is the associated probability corresponding to these parameters?

7. Copy the files from `http://t2kwinnipeg.uwinnipeg.ca/~jamieson/courses/intermediate_lab/root_fitting/linear_fit/` into a directory, then try running the macro in ROOT. Go through the script and describe line by line what the macro is doing.

8. Copy the files from `http://t2kwinnipeg.uwinnipeg.ca/~jamieson/courses/intermediate_lab/root_fitting/spectrum_fit/` into a directory, then try running the macro in ROOT. Modify the script to fit the 1335 keV peak with each of the different background models. Based on the results of the three different fits to the same peak, what is a reasonable systematic uncertainty in the peak position, and in the peak resolution (sigma) due to the background? Make sure to keep enough digits to match the uncertainties reported by the fit.