PHYS 240 homework #14 – due Mar 15 2013, 5:00pm, upload to Canvas

Polynomial fits and confidence regions

1. Finish off the code that we started in class, `lsfdemo2.py`, to include polynomial fits. Verify that the answers that you get with 2 coefficients agree with the linear regression results. Demonstrate that the code works for a mock data set with 3 coefficients.

2. Use this code to fit a real data set with a polynomial of at least 3 coefficients.

3. Fit a data set (real or mock) with linear regression, and also generate a contour plot of $\Delta\chi^2$ relative to the best fit. Do this by calculating the χ^2 over a grid of (a_1, a_2) values. Show contours of $\Delta\chi^2 = 1$ and 4, and explain what they mean. Also mark the best-fit solution.

4. Include any discussion in a report generated in LaTeX and submitted in PDF format. Also submit your Python code separately.