Gan/Kass
Physics 416

Problem Set 6
May 26, 2008

1) Taylor P8.4, page 200.

2) Taylor P8.10, page 201. Just do the first part of the problem (weighted LSQ estimate of A and B). Skip everything after "Compare…"

3) Suppose our variables x and y are related by:
$$y = \alpha x + \beta x^3$$
Assume we have n measurement pairs: $(x_i, y_i \pm \sigma)$ (all y's have the same uncertainty, σ).
Use the method of Least Squares to derive formulas for the best estimate of α and β.

4) Suppose the size of nanotubes is given by a Gaussian distribution with mean = 6 nm and standard deviation = 1 nm.
a) What is the 90% confidence interval (symmetric) for the size of these nanotubes?
b) What is the confidence level for measuring a nanotube with size $\geq$ 8 nm?