Gan/Kass Physics 416

Problem Set 6 November 29, 2007

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 ≥ 8 nm?