

PH661 – Fall 2008
Statistical methods for physics and astrophysics
Assignment #7 – Thursday, Oct. 16 2008

1.

Consider the following two-dimensional data:

x_i	y_i
0.0	25
1.0	36
2.0	47
3.0	64
4.0	81

Assume that Y_i derive from a photon-counting experiment.

- (a) What uncertainties would you associate to the random variables Y_i ?
- (b) Find the best-fit parameters a , b of the linear regression curve

$$y(x) = a + bx; \tag{1}$$

(c) Find the errors in the best-fit parameters and the correlation coefficient between them;

(d) Using a "reasonable" range in the two parameters a , b , compute the χ^2 surface $\chi^2(a_i, b_i)$ for a grid of parameters a_i, b_i in the neighborhood of the best-fit values.