Homework for October 25, 2012

(Submission of work not required)

The following data is given:

X	-6	-4	-1	0	3	5	8
y	18	13	6	4	-1	-8	-15

a) Use linear least-squares regression to determine the coefficients m and b in the function $y = mx + b$ that best fit the data, using the formulas

$$m = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$$

$$b = \frac{(\sum x^2)(\sum y) - \sum xy \sum x}{n\sum x^2 - (\sum x)^2}$$

b) Calculate the overall error of the fitting E, using the formula

$$E = \sum_{i=1}^{n} [(mx_i + b) - y_i]^2$$

c) Calculate the linear correlation coefficient of the fitting r, using the formula

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$$

Solutions:

$a)\ y = -2.31395x + 4.081395$
$b)\ E = 4.325581$
$c)\ r = -0.99727$