

UC Berkeley Math 10B, Spring 2016: Homework 11

Due May 4

Least squares, Linear regression

1. Find the least square line $y = \beta_0 + \beta_1 x$ for the data points given by the table

x	0	1	2	3	4	5
y	2	3	0	6	2	4

Estimate the value of y when $x = 2.5$.

2. Same problem, for the average weight of a group of children given by these data:

Age	10	11	12	13	14
Average weight	100 lbs	110 lbs	115 lbs	124 lbs	126 lbs

and estimating the average weight at age 8.

3. Find the least-square solution x to the linear system $Ax = b$ below:

$$\begin{pmatrix} 1 & 1 & 0 \\ 1 & 0 & -1 \\ 0 & 1 & 1 \\ -1 & 0 & -1 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 2 \\ 5 \\ 6 \\ 6 \end{pmatrix},$$

that is, the solution that minimizes the sum of the squares of the residuals $r = b - Ax$.