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5. Scaffolded problem: find the best fit line through 4 points

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Lecture due Sep 13, 2021 20:30 IST Completed

Practice

Find the coefficients

4/4 points (graded)

In this problem, we will walk through how to find the best fit line through the points $(0,0)$, $(1,0)$, $(2,2)$, and $(4,3)$

Recall that in this problem, we are given four points, so $n=4$. We want to solve the following system

$$\left(\sum_{i=1}^{4} x_i^2\right) a + \left(\sum_{i=1}^{4} x_i\right) b = \sum_{i=1}^{4} x_i y_i \tag{4.206}$$

$$\left(\sum_{i=1}^{4} x_i\right) a + 4b = \sum_{i=1}^{4} y_i. \tag{4.207}$$

Find the coefficients in this system.

$\sum_{i=1}^{4} x_i^2 =$ 21 ✔ **Answer:** 21

$\sum_{i=1}^{4} x_i =$ 7 ✔ **Answer:** 7

$\sum_{i=1}^{4} x_i y_i =$ 16 ✔ **Answer:** 16

$\sum_{i=1}^{4} y_i =$ 5 ✔ **Answer:** 5

Solution:

$$\sum_{i=1}^{4} x_i^2 = 0^2 + 1^2 + 2^2 + 4^2 = 21 \tag{4.208}$$

$$\sum_{i=1}^{4} x_i = 0 + 1 + 2 + 4 = 7 \tag{4.209}$$

$$\sum_{i=1}^{4} x_i y_i = 0\,(0) + 1\,(0) + 2\,(2) + 4\,(3) = 16 \tag{4.210}$$

$$\sum_{i=1}^{4} y_i = 0 + 0 + 2 + 3 = 5 \tag{4.211}$$

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Answers are displayed within the problem

Solve for the best fit line

1.0/1 point (graded)

Solve the system you found above for the constants a and b.

Calculator Hide Notes

The equation for the best fit line in terms of these constants in the form $y = ax + b$. Give the equation of this line.

$y =$ (29/35)*x-1/5 ✔

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