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22:41:21





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Recitation due Sep 13, 2021 20:30 IST Completed



Explore

In the last video, Christine explains how one can try to fit a collection of data (x_i,y_i) to a parabola using the formula:

$$y_i = ax_i^2 + bx_i + c$$

The deviation formula is now a function of three variables, a, b, and c.

$$f(a,b,c) = \sum_{i=1}^{n} (y_i - ax_i^2 - bx_i - c)^2$$
(4.220)

Find partial with respect to a

4/4 points (graded)

The deviation formula is:

$$f(a,b,c) = \sum_{i=1}^{n} (y_i - ax_i^2 - bx_i - c)^2.$$
 (4.221)

Find the partial derivatives of $f\left(a,b,c\right)$ and obtain a system of three equations and three unknowns.

 $rac{\partial f}{\partial a}=0$ can be written as a linear equation of a, b, and c of the form

$$a\sum_{i=1}^{n}{(A)} + b\sum_{i=1}^{n}{(B)} + c\sum_{i=1}^{n}{(C)} = \sum_{i=1}^{n}{(D)}$$
 .

Find the expressions A, B, C, and D in terms of x_i and y_i .

(Type x_i for x_i . Type y_i for y_i .)

$$A = \begin{bmatrix} x_i^4 \end{bmatrix}$$
 Answer: x_i^4

$$B = \begin{bmatrix} x_i^3 \end{bmatrix}$$
 Answer: x_i^3

$$C = \begin{bmatrix} x_i^2 \end{bmatrix}$$
 Answer: x_i^2

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You have used 1 of 25 attempts

• Answers are displayed within the problem

Partial with respect to b

4/4 points (graded)

The deviation formula is:

$$f(a,b,c) = \sum_{i=1}^{n} (y_i - ax_i^2 - bx_i - c)^2.$$
 (4.222)

 $rac{\partial f}{\partial b}=0$ can be written as a linear equation of a, b, and c of the form

$$a\sum_{i=1}^{n}{(A)} + b\sum_{i=1}^{n}{(B)} + c\sum_{i=1}^{n}{(C)} = \sum_{i=1}^{n}{(D)}.$$

Find the expressions A, B, C, and D in terms of x_i and y_i .

(Type x_i for x_i . Type y_i for y_i .)

$$B = \begin{bmatrix} x_i^2 \end{bmatrix}$$
 Answer: x_i^2

$$D = \begin{vmatrix} y_i * x_i \end{vmatrix}$$
 Answer: $x_i * y_i$

Submit

You have used 1 of 25 attempts

1 Answers are displayed within the problem

Partial with respect to c

4/4 points (graded)

The deviation formula is:

$$f(a,b,c) = \sum_{i=1}^{n} (y_i - ax_i^2 - bx_i - c)^2.$$
 (4.223)

 $rac{\partial f}{\partial c}=0$ can be written as a linear equation of a, b, and c of the form

$$a\sum_{i=1}^n\left(A
ight)+b\sum_{i=1}^n\left(B
ight)+c\sum_{i=1}^n\left(C
ight)=\sum_{i=1}^n\left(D
ight).$$

Find the expressions A, B, C, and D in terms of x_i and y_i .

(Type $\mathbf{x_i}$ for x_i . Type $\mathbf{y_i}$ for y_i .)

$$\mathbf{A} = \begin{bmatrix} \mathbf{x}_i^2 \end{bmatrix}$$
 \checkmark Answer: \mathbf{x}_i^2

$$B = \begin{bmatrix} x_i \end{bmatrix}$$
 Answer: x_i

$$C = 1$$
 Answer: 1

Submit

You have used 1 of 25 attempts

• Answers are displayed within the problem

Find the best fit quadratic

3/3 points (graded)

Find the parameters a, b, and c that minimize $f\left(a,b,c\right)$ for the function defined above on the set of data

$$b = \begin{vmatrix} -1/2 \end{vmatrix}$$
 Answer: -1/2

$$c= 1$$
 Answer: 1

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You have used 1 of 25 attempts

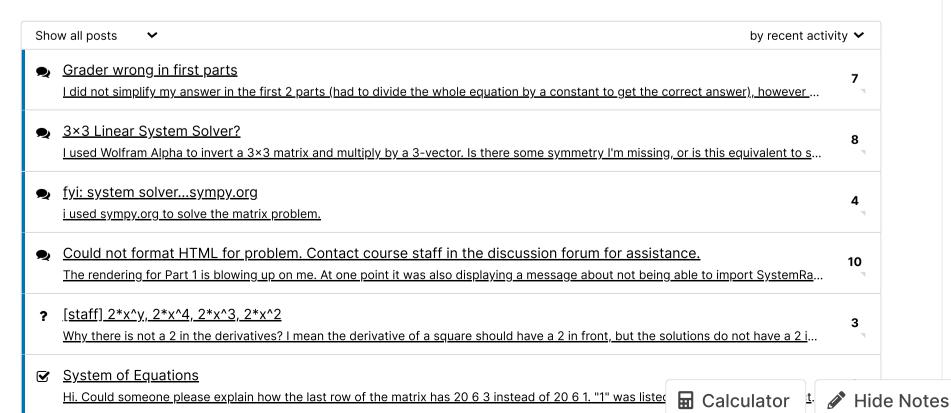
• Answers are displayed within the problem

2. Best fit parabola

Topic: Unit 3: Optimization / 2. Best fit parabola

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	At 8:38pm EDT 8/26, I read the question as asking to fit to points: (0,1);(2,1);(4,3). But in previous video, the points were (0,1);(2,1);(3,	
$ \mathbf{Z} $	[Staff] Issue with the grader / very last question.	13
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■ Calculator



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