Solution for Exersize 4

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Abstract

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1 Question 1

1.1 a)

Mean μ of givin points
$x : \frac{1+2+4+5}{4} = \frac{12}{4} = 3$
$y : \frac{-1+1+-1+1}{4} = \frac{0}{4} = 0$
$\mu = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$

1.2 b)

The Covariancematrix C has the following form:

$$C = \begin{pmatrix} covariance(x,x) & covariance(x,y) \\ covariance(y,x) & covariance(y,y) \end{pmatrix} = \begin{pmatrix} variance(x) & covariance(x,y) \\ covariance(y,x) & variance(y) \end{pmatrix}$$

$$covariance(x,y) = covariance(y,x) = \frac{\sum_{i=0}^{n}(x_i - \bar{x}) * (y_i - \bar{y})}{n-1}$$

$$covariance(x,y) = \frac{(1-3)*(-1-0)+(2-3)*(1-0)+(4-3)*(-1-0)+(5-3)*(1-0)}{4-1} = \frac{2}{3}$$

$$variance(x) = \frac{\sum_{i=0}^{n}(x_i - \bar{x})^2}{n-1}$$

$$variance(x) = \frac{(1-3)^2+(2-3)^2+(4-3)^2+(5-3)^2}{4-1} = \frac{4+1+1+4}{3} = \frac{10}{3}$$

$$variance(y) = \frac{(-1-0)^2+(1-0)^2+(-1-0)^2+(1-0)^2}{4-1} = \frac{1++1+1+1}{3} = \frac{4}{3}$$

$$C = \begin{pmatrix} \frac{10}{3} & \frac{2}{3} \\ \\ \frac{2}{3} & \frac{4}{3} \end{pmatrix}$$

2 Previous work

3 Results

In this section we describe the results.

4 Conclusions

We worked hard, and achieved very little.