

Simulation Lab

Assignment- 1

Solve all the questions

Problem 1. Define $x \leftarrow c(4, -5, 2)$ & $y \leftarrow c(6, 1, -3)$ find

(i) length of x and y individually.

(ii) $x + y$ and $x - y$

(iii) total summation over x and same for the y .

(iv) Find the covariance of x and y using “cov” in R. Then using the formula to find the same.

Formula:
$$\text{cov}(x, y) = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{n-1}$$

Problem 2. Write a R code to generate a vector of length 100, in which 1st 10 elements are 50, next 30 elements are the combinations of 1 and 2, next 50 elements are from -1 to 3, next 8 elements are 2 and last 2 elements are the last two digits of your roll number.

Description: Here you need to merge 5 vectors x_1, x_2, x_3, x_4, x_5 (say). Length of x_1, x_2, x_3, x_4, x_5 are 10, 30, 50, 8, 2 respectively. As an example $x_2 = 1, 2, 1, 2, \dots$

Problem 3. $A = \begin{pmatrix} 1.5 & -1 \\ -1 & 3 \end{pmatrix}$ and $x \leftarrow c(4, 7), y \leftarrow c(1, 0)$. Generate a matrix C of order 2×4 whose 1st two columns are 1st two columns of A and last two columns are x & y respectively.

Problem 4. $A = \begin{pmatrix} 3 & -2 & 1 \\ -1 & 4 & -2 \end{pmatrix}$ and $B = \begin{pmatrix} -7 & 4 \\ 9 & 5 \\ 2 & -1 \end{pmatrix}$

(i) Write the codes to generate A and B using rbind and cbind both the commands.

(ii) Find matrix-matrix multiplication (AB)

(iii) Find $(AB)^t$ and $(AB)^{-1}$

(iv) Find the mean, standard deviation for each column and row for the matrices $A, B, AB, (AB)^t, (AB)^{-1}$.

Problem 5. Generate a vector x using “seq (-1, 3, 0.01)”. Find a vector y which contains those elements from x do not exceed 1.25. Then find the difference between the lengths of x and y .

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