greatlearning

Lab Brief
Course - Statistical Learning

Covariance, Variance and Mean

Tools

- R/R Studio
- Pen and Paper

Problem Statement

Question No 1: (To be solved using R)

Let X1, X2, X3, X4, X5 be independent U (0, 1) random variables. Let X = X1 + X2 + X3 and Y = X3 + X4 + X5. Use the runif() function to simulate 1000 trials of each of these variables. Use these to estimate Cov (X, Y).

Question No 2

The random variable X takes values -1, 0, 1 with probabilities 1/8, 2/8, 5/8 respectively.

(a) Compute E(X).

(b) Give the pmf of Y = X2 and use it to compute E(Y). [PMF - Probability Mass Function]

(c) Instead, compute E(X2) directly from an extended table.

(d) Compute Var(X).

Reference Links -

1. PMF - https://www.probabilitycourse.com/chapter3/3_1_3_pmf.php

Steps

1.Solve Question 1 using R.

You can use set.seed(), runif(), matrix() and cov() functions in R to solve it.

2.Use R or Pen/Paper to solve Question 2 given in the previous slide.

Learning Outcomes

You will learn how to --

- To use R to calculate data distribution parameters like covariance.
- Calculate mean and variance of given data-points.

Submission -

- Each question carries 5 marks.
- Submit R code and your outputs with comments and necessary details in a pdf/doc file.
- Format of file name should be -- YourName_LAB_SL.extension