Lab Assignment - 8

Instructor: Dr. Arabin Kumar Dey

1 Due date:

- 16/ 10 /2022.

2 Notes:

- Make a proper documentation preferably in latex or using some other software and submit the printout of the report in .pdf form.

- Each student needs to write his/ her own solutions, even though discussions of the assignments between students are encouraged.

3 Assignments:

1. Suppose that Y is an exponential random variable with mean 1. Suppose further that conditional on $Y = y$, the random variable X is Normal with mean y and variance 4. You are interested in estimating $\theta = P(X > 1)$.

   Suggest an estimate using method of conditioning to improve the variance efficiency of estimating θ. Use antithetic procedure on top the suggested procedure to find out the estimate.

2. Suppose that Y is an exponential random variable with mean 1 and you want to estimate $E(Y)$. Use importance sampling method to find out the estimate [Use Esscher transformation to calculate proposal density for this setup]. Find out the amount of variance getting reduced for the problem.