Data Analytics – Lab Instruction 8

This lab instruction is to use some sampling methods to generate random samples from different distributions.

You should start to use the inversion method that was explained in the lecturer (using the inverse of a random variable CDF) to generate samples from an Exponential distribution with $\lambda = 1$.

Q1.

- Generate 2000 samples from an Exponential distribution with $\lambda = 1$.
- Plot the histogram of the sample as well as the line for the pdf of the distribution to check if the samples follow the Exponential distribution with $\lambda = 1$.
- Use the Smirnov-Kolmogorov test to check if the samples follow Exponential distribution with $\lambda = 1$.

Q2.

- For an integer k, knowing that a Gamma random variable is the sum of iid Exponential random variables ($X = X_1 + X_2 + \cdots + X_k$), generate samples from a Gamma distribution with k=5 and lambda=3.
- Plot the histogram of the sample as well as the line for the pdf of the distribution to check if the samples follow the Gamma distribution with k=5 and lambda=3.
- Use the Smirnov-Kolmogorov test to check if the samples follow Gamma distribution with k=5 and lambda=3.

- Q3. As an introduction for the next lab, think how you would approach to the question for a Gamma when k is not interger.