Exponential Distribution in R

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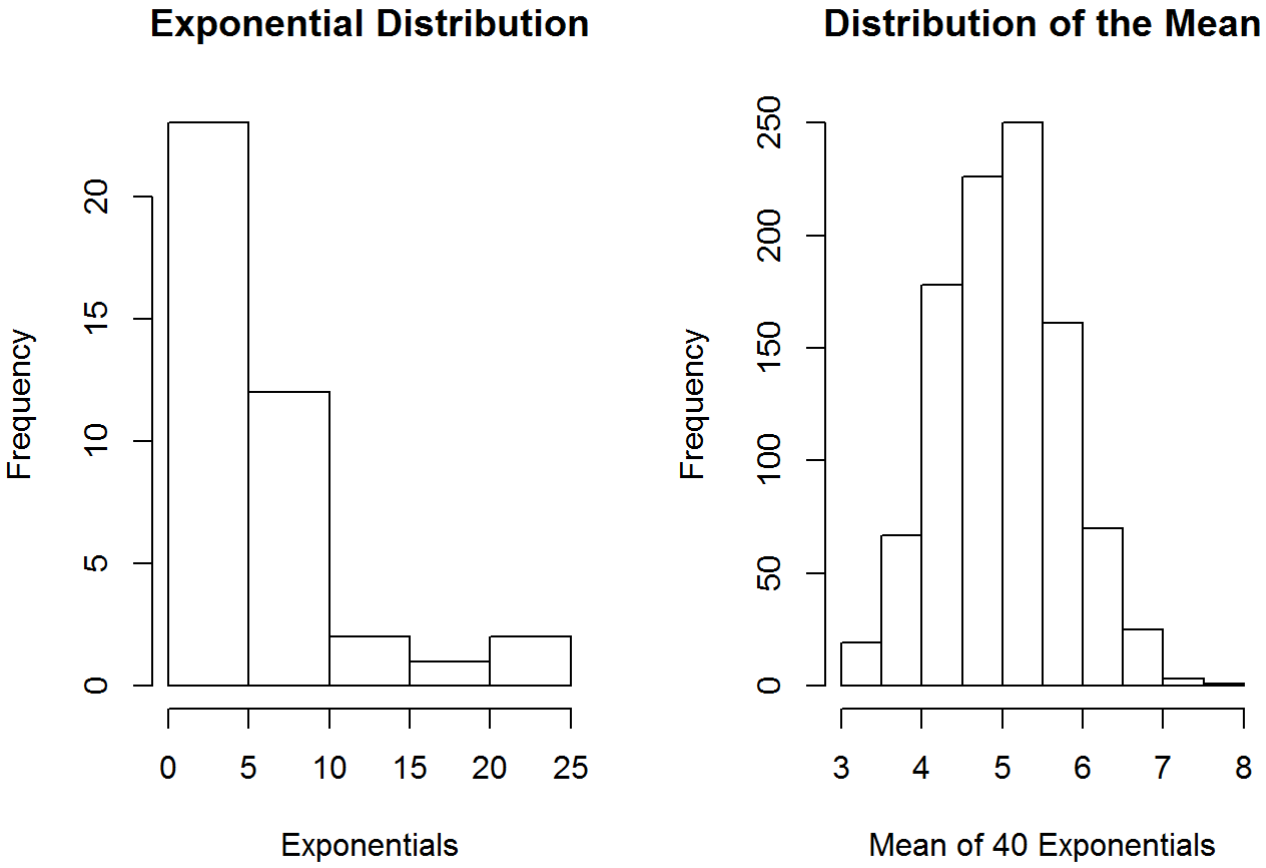
Overview

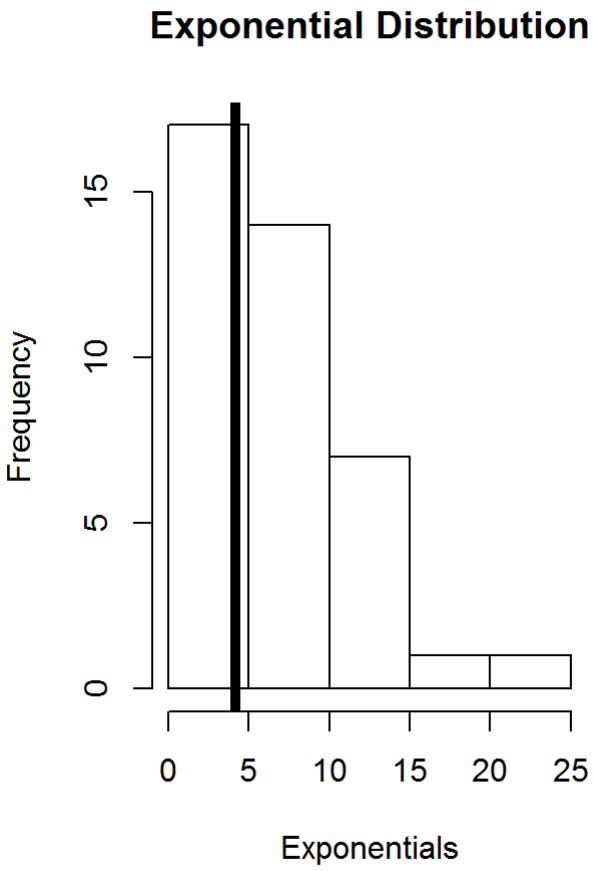
In this project, I will investigate the exponential distribution in R and compare it with the Central Limit Theorem. I will investigate the distribution of averages of 40 exponentials with a thousand simulations.

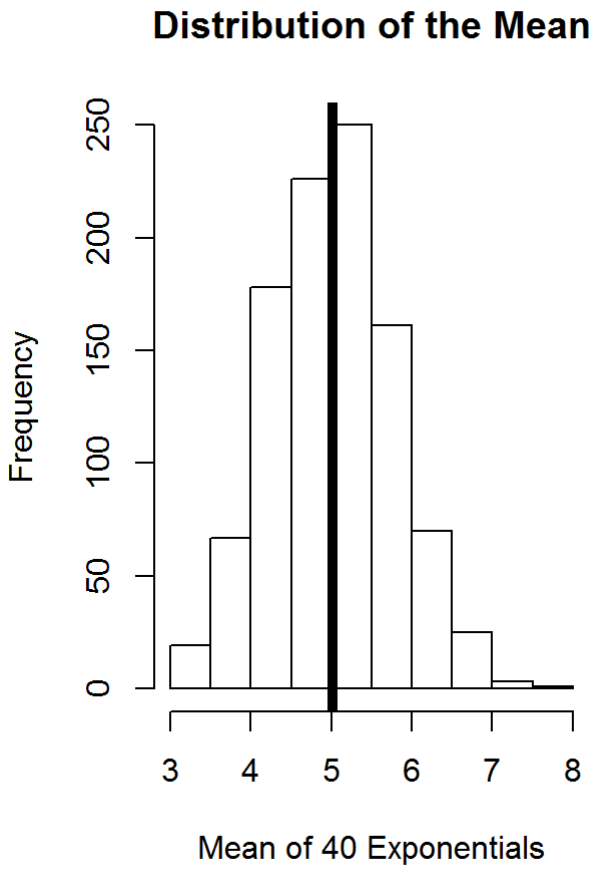
Simulations



The figures show the exponential distribution compared to the means of 1000 simulations of 40 samples of the exponential distribution. The rate parameter is set to 0.2

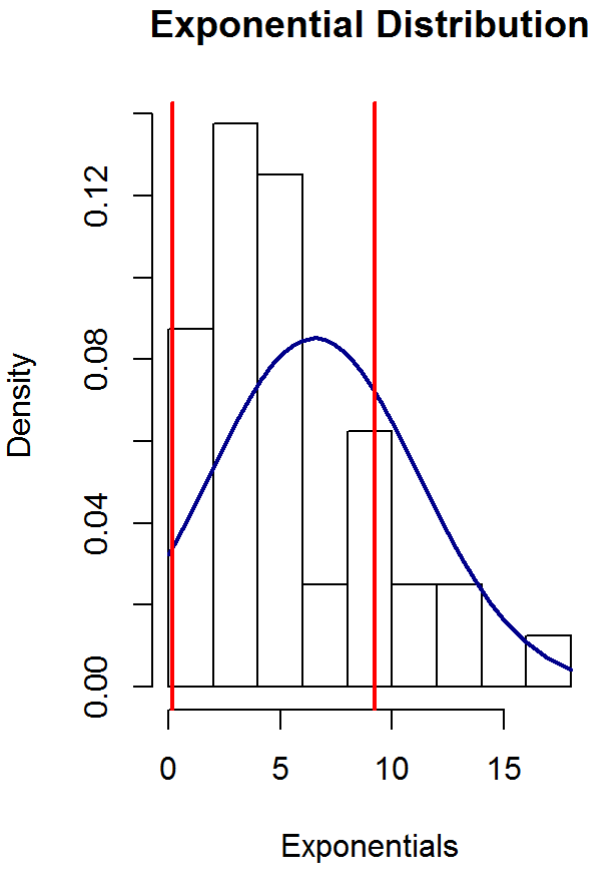
Sample mean versus theoretical mean

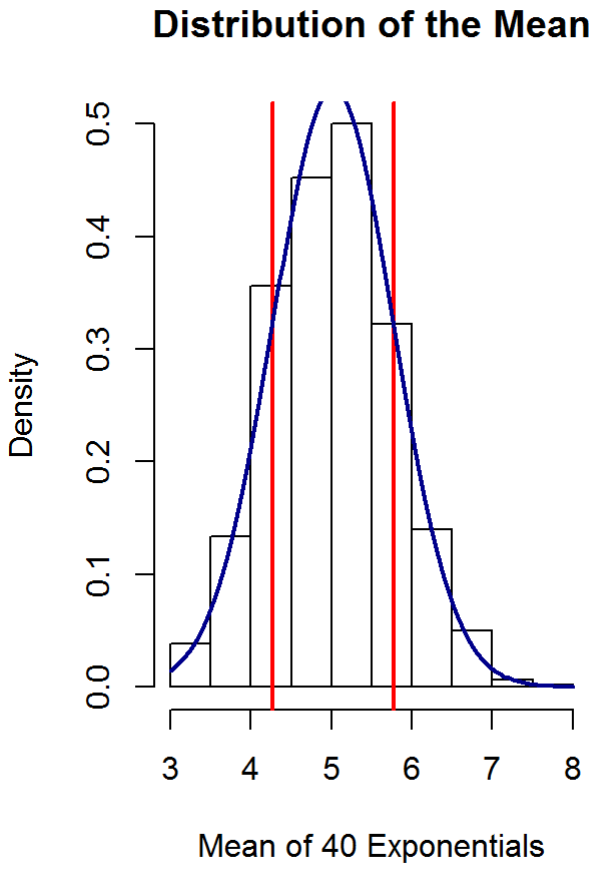




The mean of the sample means is 5.41, slightly higher than the exponential mean which is 5.0

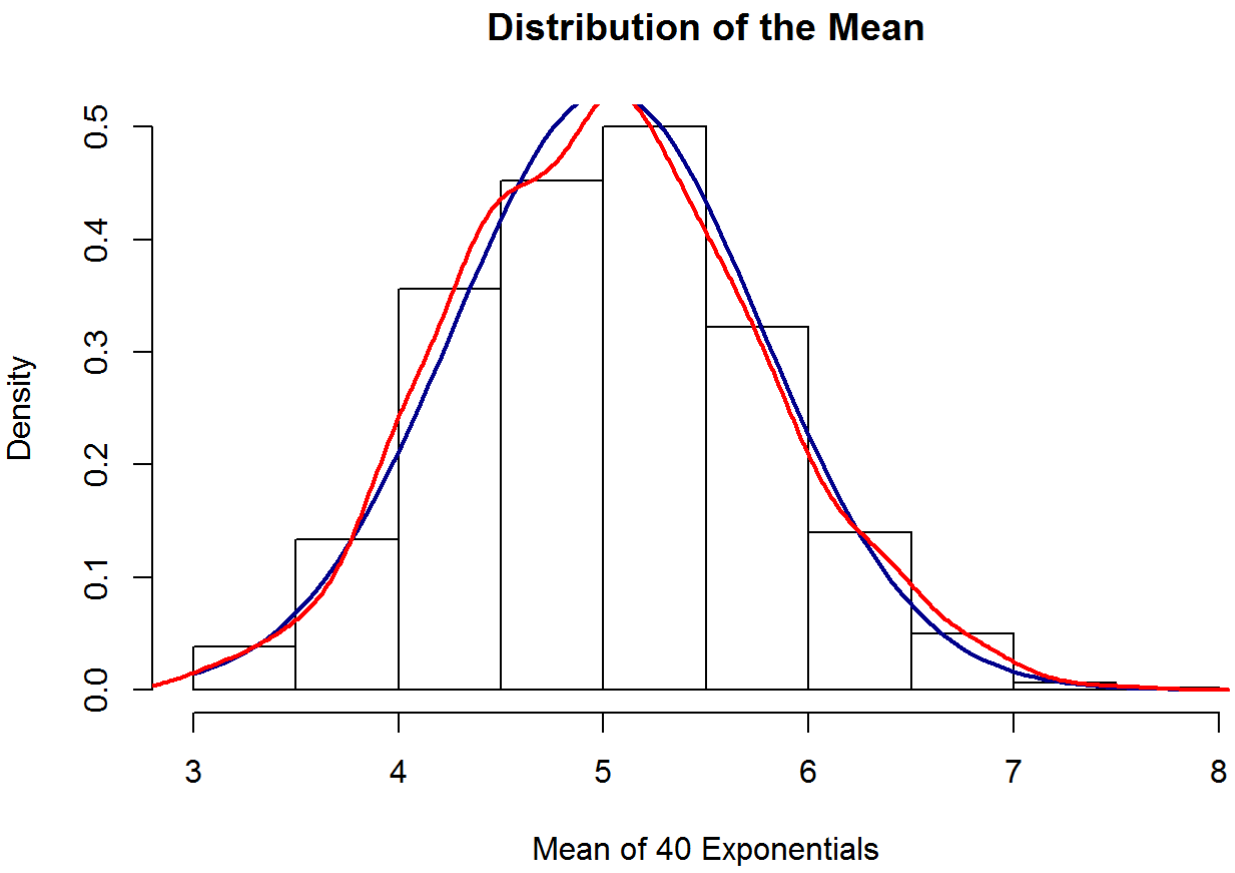
Sample variance versus theoretical variance





The distribution of means has a lower variance. The variance of the sample of means is 0.67 while the theoretical variance of the exponential distribution is 2.23

Sample distribution



The red curve shows the distribution of the sample of means while the blue curve shows the normal distribution. The distribution of means is a little skewed but it is approximately a normal distribution. Another property of a normal distribution is that the mean is equal to the median, the mean of the distribution is 5 and the median is 4.93.