Statistical Inference Course Project

Swati

18/03/2022

Statistical Inference Course Project

Peer Graded Assignment: Statistical Inference Course Project

```
setwd("C:/R Programming/Coursera/Statistical Inference/Project")
set.seed(19413)
```

Instructions

The project consists of two parts:

A simulation exercise.

Basic inferential data analysis.

Part 1: Simulation Exercise Instructions Overview

In this project you will investigate the exponential distribution in R and compare it with the Central Limit Theorem. The exponential distribution can be simulated in R with rexp(n, lambda) where lambda is the rate parameter. The mean of an exponential distribution is 1/lambda and the standard deviation is also 1/lambda. Set lambda = 0.2 for all of the simulations. You will investigate the distribution of averages of 40 exponentials. Note that you will need to do a thousand simulations.

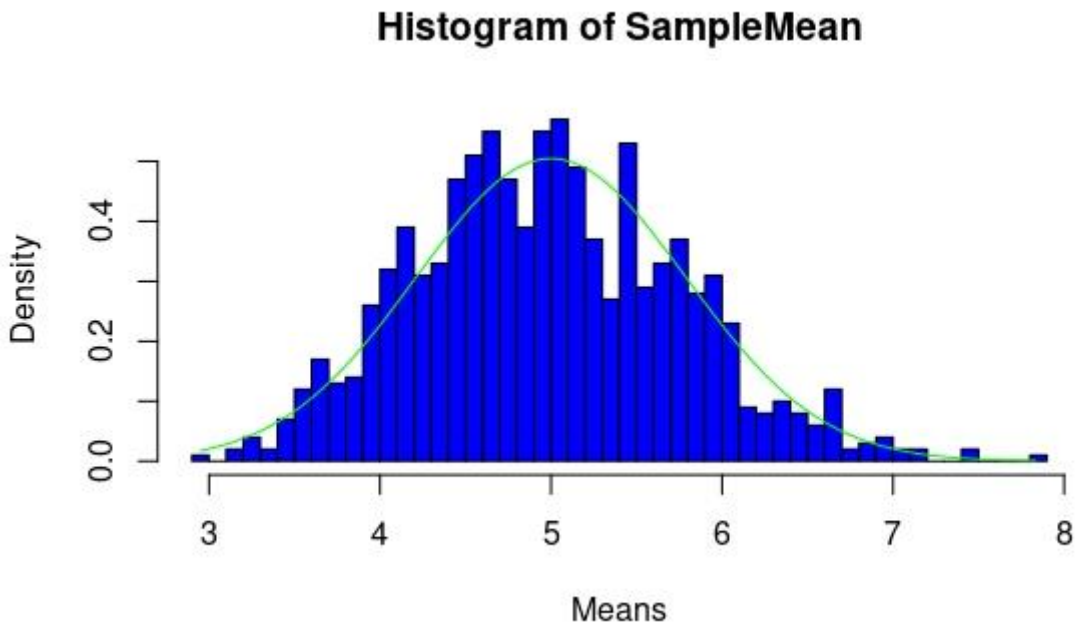
Question 1 : Show the sample mean and compare it to the theoretical mean distribution

```
n <- 40 Simulations <- 1000 Lambda <- 0.2
```

```
SampleMean <- NULL
for(i in 1:Simulations) {
SampleMean <- c(SampleMean, mean(rexp(n, Lambda)))
}
mean(SampleMean)
```

```
## [1] 4.978479
```

So, as we can see, compared to the theoretical mean distribution of 5, our mean 5 is close.



Question 2: Show the sample is (via variance) and compare it to the theoretical variance of the distribution.

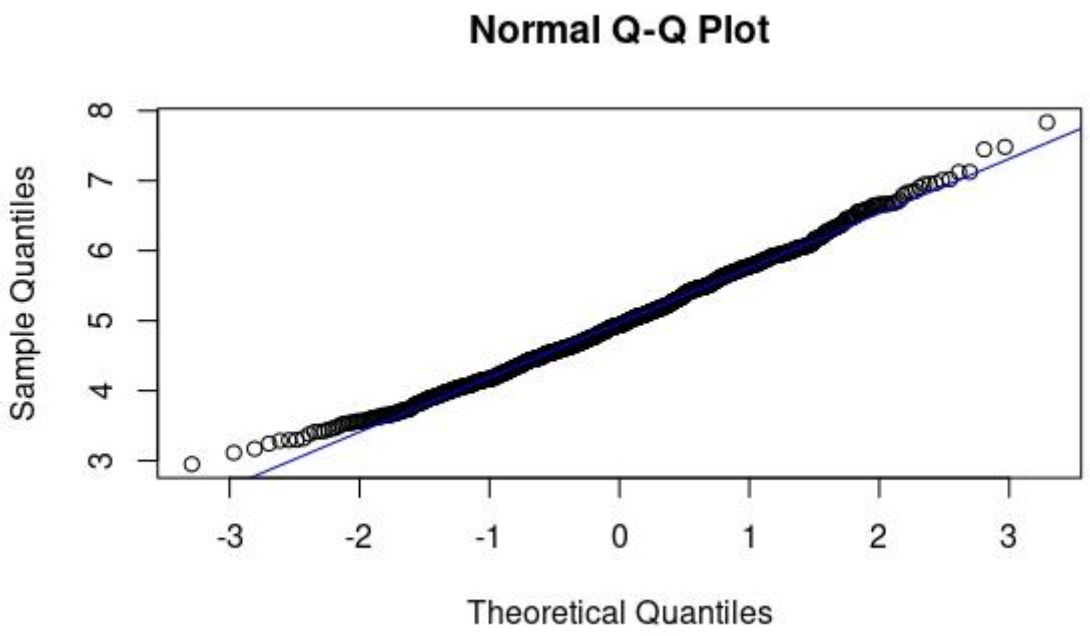
The theoretical standard deviation of the distribution is also 1/lambda, which, for a lambda of 0.2, equates to 5. The variance is the square of the standard deviation, which is 25 .

```
Variance <- var(SampleMean)
```

0.6 is close to the theoretical distribution.

Show that the distribution is approximately normal

```
qqnorm(SampleMean)
qqline(SampleMean, col = "blue")
```



The distribution average of 40 exponentials is very close to a normal distribution