CourseProject Part1

Govs

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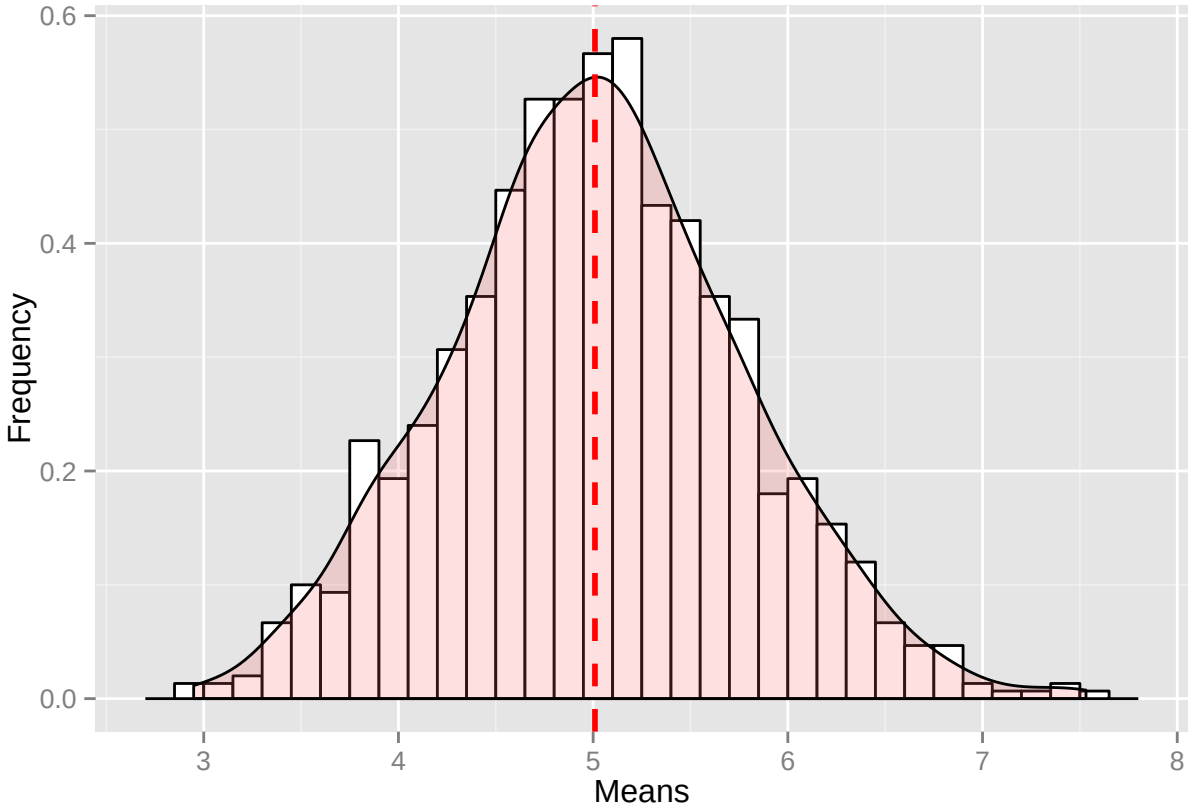
Coursera Statistical Inference December 2014

Exponential Distribution

We are simulating the exponential distribution,we take 40 observations and take the mean, this value is itself a random variable and it has a distribution,we are taking 1000 simulations of these means.

```
meane = NULL
lambda <- 0.2
for (i in 1 : 1000) meane= c(meane, mean(rexp(40,lambda)))
smean <- mean(meane)
svar <- var(meane)
emean <- 1/lambda
evar<- 1/(40*lambda^2)
dmean <- abs(smean-emean)
dvar <- abs(svar-evar)
```

Here is the plot of this distribution of means:



The red dashed line is the mean of the simulation distribution, which is where it is centered: 5.0092956 and the theoretical center of distribution is 5, as you can see they are very close to each other, the difference between them is just: 0.0092956.

About the variance, the distribution actually has a variance of: 0.5745596 and the expected variance was; 0.625, as you can see they only differ in about 0.0504404.

The graph show us that the distribution is somewhat normal, cause you can see it resembles the famous bell shape curve of a normal distribution, to know how well it aproximates to a normal distribution we could make a qqplot or a normality test like the shapiro one, here is the shapiro normality test:

```
test <- shapiro.test(meane)
pvalue <- test$p
alpha <- 0.05
test
```

```
##
##  Shapiro-Wilk normality test
##
## data:  meane
## W = 0.9979, p-value = 0.2613
```

According to this test the p-value is 0.2612583 which is greater than 0.05 (a chosen alpha for this test) so according to this test the means we're discussing are likely to form a normal distribution.

Also a qqplot show us that the values of the means we simulated, are very close to that of a normal distribution.