StatisticalInference-Project

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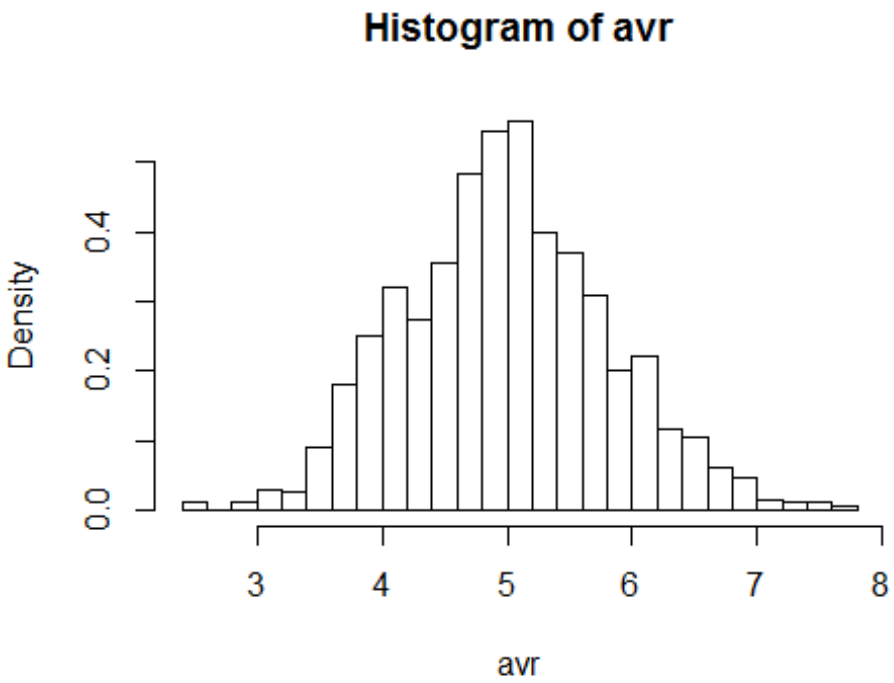
Project for Statistical Inference in Coursera

Part 1

First we simulate the 1000 means of 40 exponentials, and plot and histogram to observe the center:

```
avr<-replicate(1000,mean(rexp(40,0.2)))
hist(avr,30,freq=F)
```



Theoretically it should be 5 (1/lambda), the center of the distribution is actually:

```
mean(avr)

## [1] 4.988

## Then if we normalize by applying X-5/(5/sqrt(40))
avr_norm<-(avr-5)/(5/sqrt(40))
## We can see that the simulation mean is
mean(avr_norm)

## [1] -0.01532
```

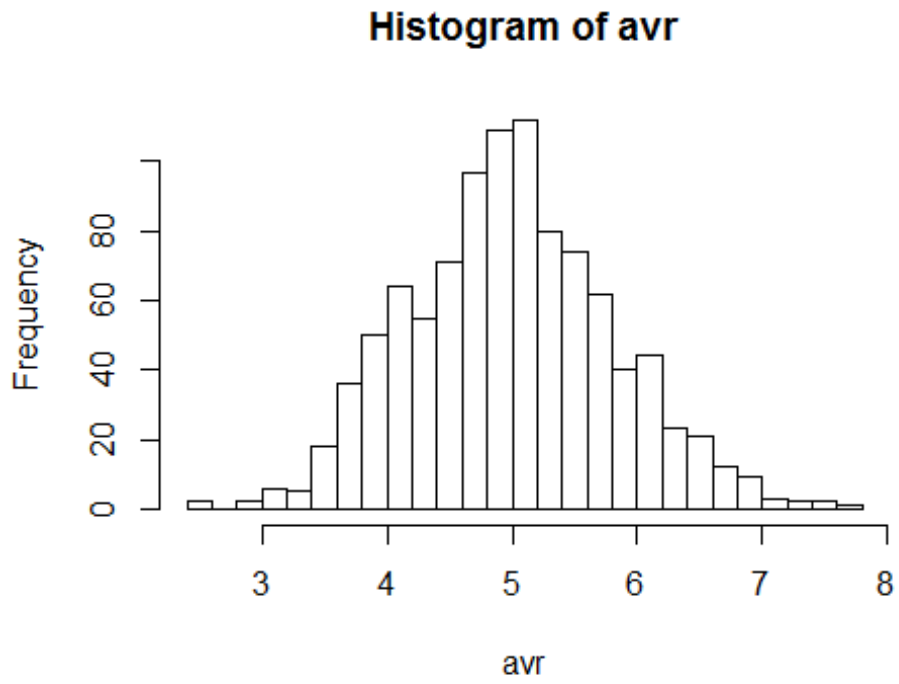
```
## Standard deviations less than the population mean
```

For the variance, theoretically it should be 0.625 (25/40) but the real value is presented now:

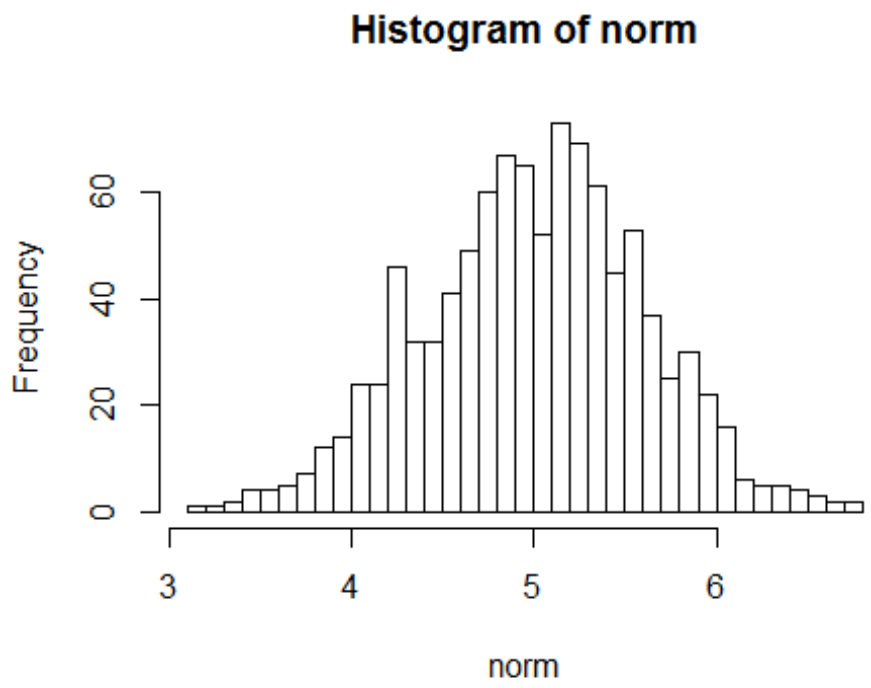
```
var(avr)

## [1] 0.6554
```

To show that is approximatly normal, we can plot the theortical normal N(5,0.625) and the histogram of the actual distribution:

```
norm<-rnorm(n = 1000,mean = 5,sd=0.625)
hist(avr,breaks=30)
```




```
hist(x=norm,breaks=30)
```




```
#They are fairly similar
```

The coverage of the confidence interval is:

```
## High end of the interval is:
mean(avr)+1.96*var(avr)/sqrt(40)

## [1] 5.191

## and the low end:
mean(avr)-1.96*var(avr)/sqrt(40)

## [1] 4.785

## With 95% confidence interval
```