Statistical Inference Course project CLT

Sergei Keidzh

May 13 2018

Exponential distribution Compare with the Central Limit Theorem

```
setwd("/statistical inference")
library(ggplot2)
lambda <- 0.2
mu <- 1/lambda
stdDev <- 1/lambda
Expo<- 40
Sim <- 1:1000
```

To make it reproducible we set the variable

```
set.seed(909)
```

obtains the mean

```
sample1 <- function(v) {mean(rexp(Expo, lambda))}
```

distribution of 1000 averages of random uniforms

```
mns = NULL
for (i in 1 : 1000) mns = c(mns, mean(sample1()))
dat <- data.frame(x = mns)
mu
## [1] 5
mean(dat$x)
## [1] 4.960913
mu/sqrt(Expo)
## [1] 0.7905694
```

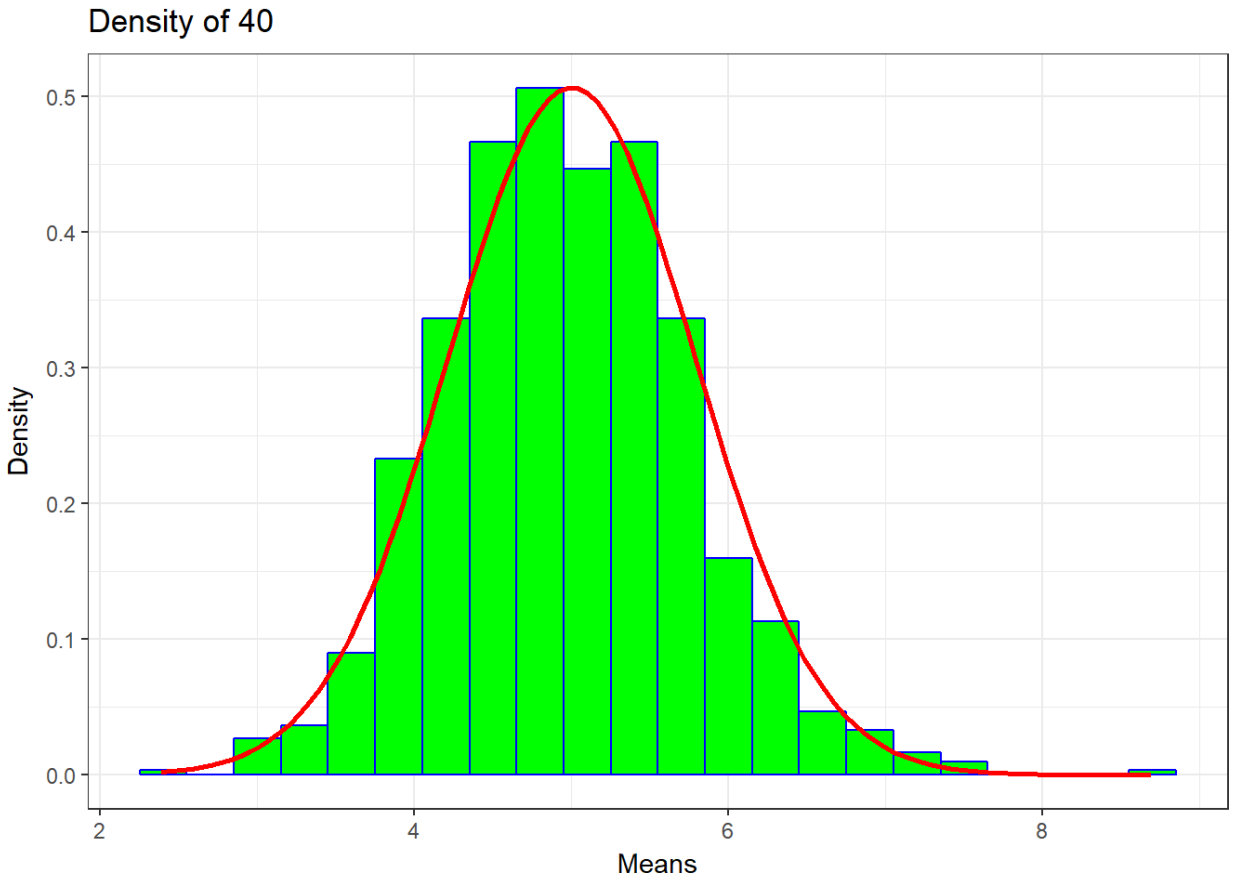
```
var(dat$x)
```

```
## [1] 0.619083
```

```
g <- ggplot(dat, aes(x = x))
g <- g + geom_histogram(binwidth=.3, colour = "blue", fill="green",
                        aes(y = ..density..))
g <- g + ggtitle("Density of 40")
g <- g + xlab("Means") + ylab("Density")

g <- g + stat_function(fun = dnorm, args=list( mean= mu, sd=sd(dat$x) ),
                       color="red", size=1)
g <- g + theme_bw()

g
```



#according to the ananlysis and figure we can see that the distribution with the mean values of 1000 is a normal distribution.