projectSI

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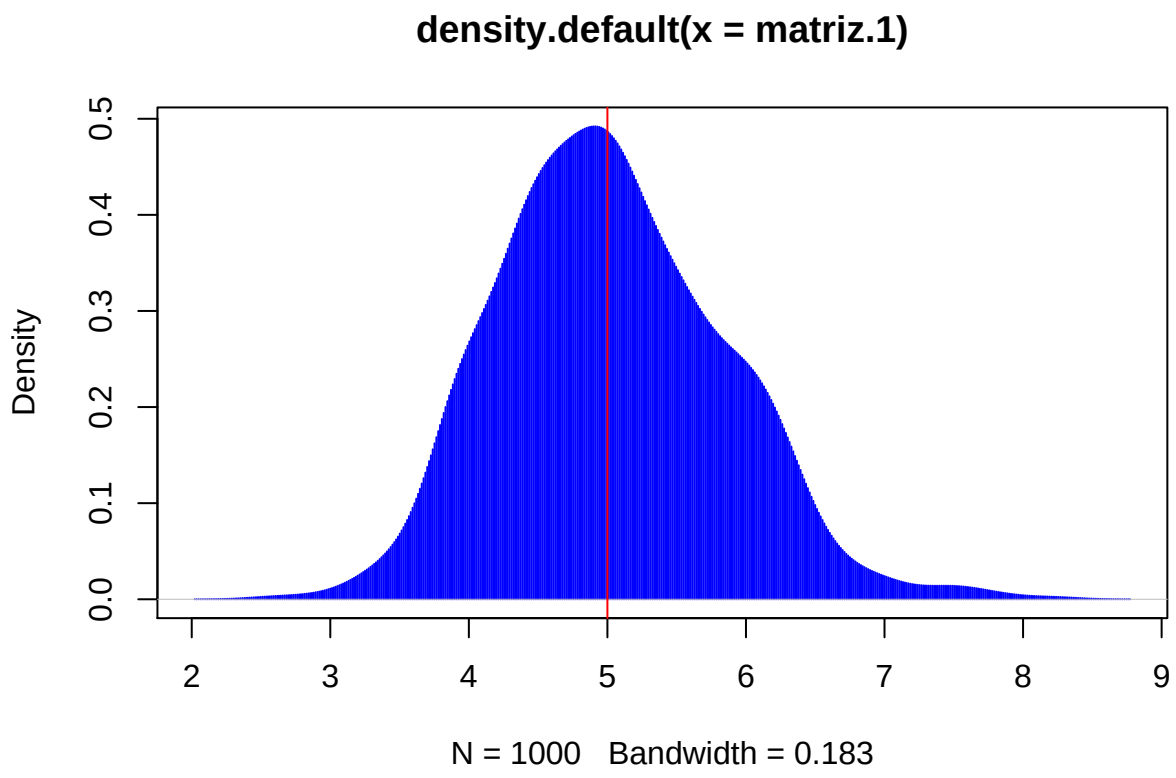
Wednesday, September 17, 2014

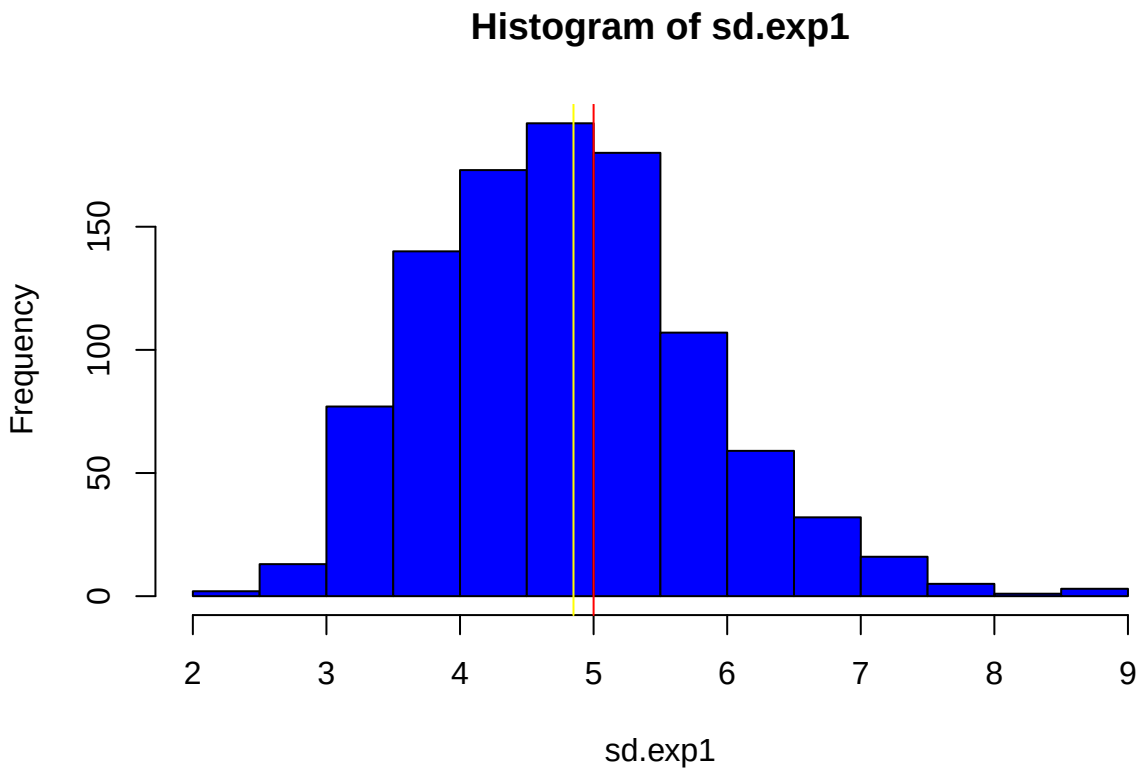
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

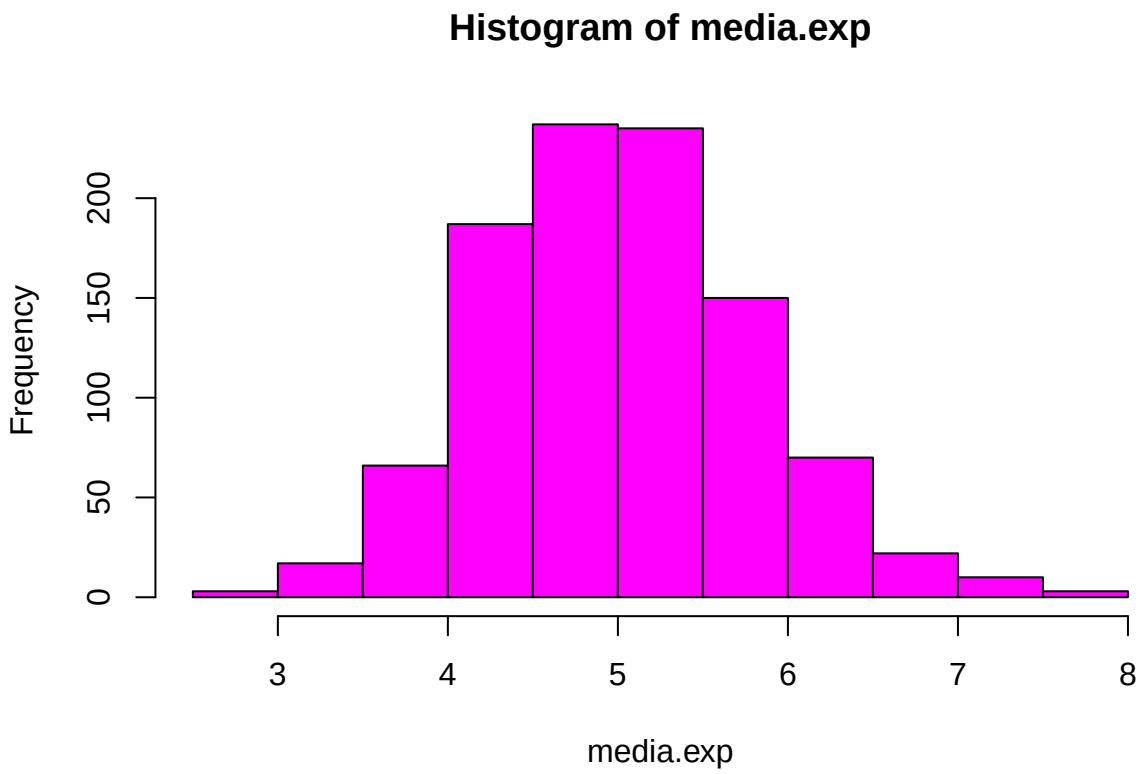
```
library(ggplot2)
lambda=0.2
n<-1000



## 1. Show where the distribution is centered at and compare it to the theoretical center of
## the distribution.


matriz.1<-replicate(n=1000, mean(rexp(40, rate=lambda)))

density.exp <- density(matriz.1)
plot(density.exp, type="h", col="blue")
abline(v=1/lambda, col="red")
```



```r
## When we plot the density, we can see that it is very different from
## the normal distribution


## 2. Show how variable it is and compare it to the theoretical variance of the distribution.

sd.exp<-matrix(nrow=n) ## create a matrix to save standard desviation
sd.exp<-mean(replicate(n=1000, sd(rexp(40, rate=lambda))))
sd.exp1<-replicate(n=1000, sd(rexp(40, rate=lambda)))
hist(sd.exp1, col="blue")
abline(v=1/lambda, col="red")
abline(v=sd.exp, col="yellow")
```




```r
## When we calculate the mean of the 1000 simulation of the standard desviation saved in sd.exp
## we can appreciate that the mean of them aproximates to 1/lambda=5




## 3. Show that the distribution is approximately normal.
media.exp<-matrix(nrow=n)
media.exp<-replicate(n=1000, mean(rexp(40, rate=lambda)))
hist(media.exp, col="magenta")
```




```
## 4. Evaluate the coverage of the confidence interval for 1/lambda: X¯±1.96Sn???.

sd.exp<-mean(replicate(n=1000, sd(rexp(40, rate=lambda))))
media.exp<-mean(replicate(n=1000, mean(rexp(40, rate=lambda))))

interval.confidence <- media.exp + c(-1,1)*(qnorm(.975) * sd.exp/sqrt(n))

interval.confidence
```

```
## [1] 4.698 5.304
```

You can also embed plots, for example: