Coursera Statistical Inference Class

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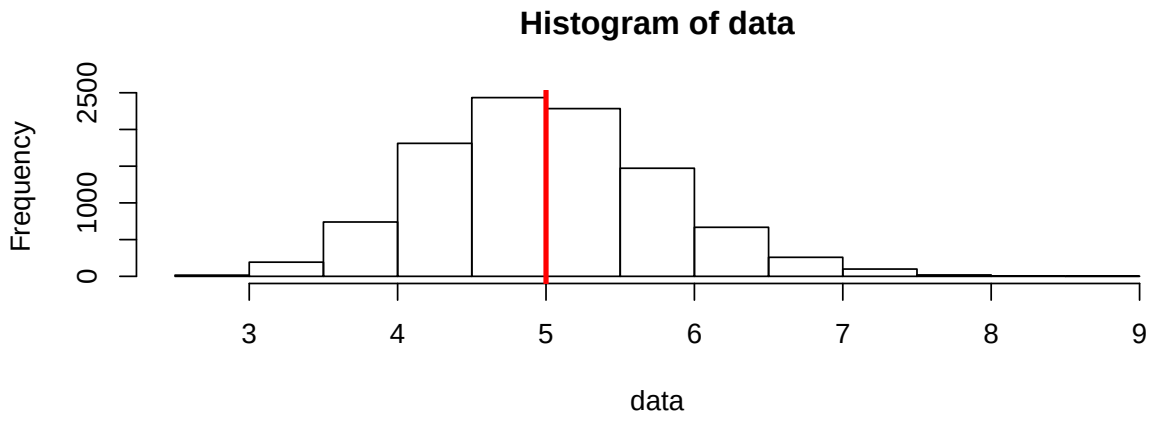
Generate a exponential distributed numbers (with parametr lambda equals to `lambda`. We will generate a `total.num` rows, each consist of `num.is.each` numbers. Then we calculate their means (by row), and do our analysis.

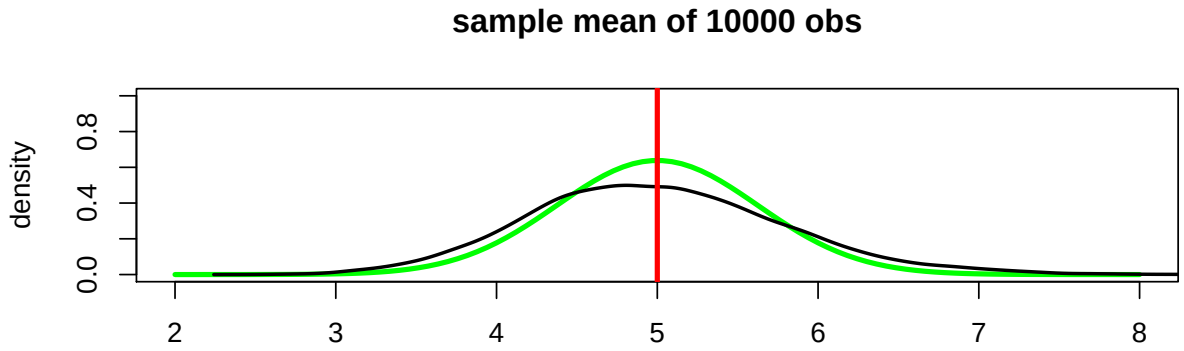
```
data <- matrix(rexp(total.num * num.in.each, lambda), nrow = total.num,
               byrow = TRUE)
means <- rowMeans(data)

make_plots <- function (data){
    par(mfrow = c(2, 1))
    hist(data)
    abline(v = 1 / lambda, lwd = 3, col = "red")
    dty <- density(data)
    plot(dty$x, dty$y, xlab = "",
         ylab = "density",
         xlim = c(2, 8),
         ylim = c(0, 1),
         type = "n")
    title(paste("sample mean of", total.num, "obs"))
    lines(seq(2, 8, length = 100),
          dnorm(seq(2, 8, length = 100), mean =  1 / lambda,
                sd = 1 / lambda / lambda / num.in.each),
          col = "green", lwd = 3)
  lines(dty$x, dty$y, lwd = 2)
  abline(v = 1 / lambda, lwd = 3, col = "red")
}
```

A variance of this data is 0.6307, but the theory says, that the variance should be 0.625

There is a histogrm of means and dencity plot:

```
   make_plots(means)
```





Red lines show a theoretical center and a green curve is normal distribution curve for a mean is equal to 5 and a standart deviation is equal to 0.625

Estimate a coverage interval:

```
    mean(means) + c(-1, 1) * qnorm(0.975) * sd(means)/sqrt(length(means))
```

```
## [1] 4.984 5.015
```

You can find a Rmd file here