

Coursera Statistical Inference Class

Pavel Gein

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

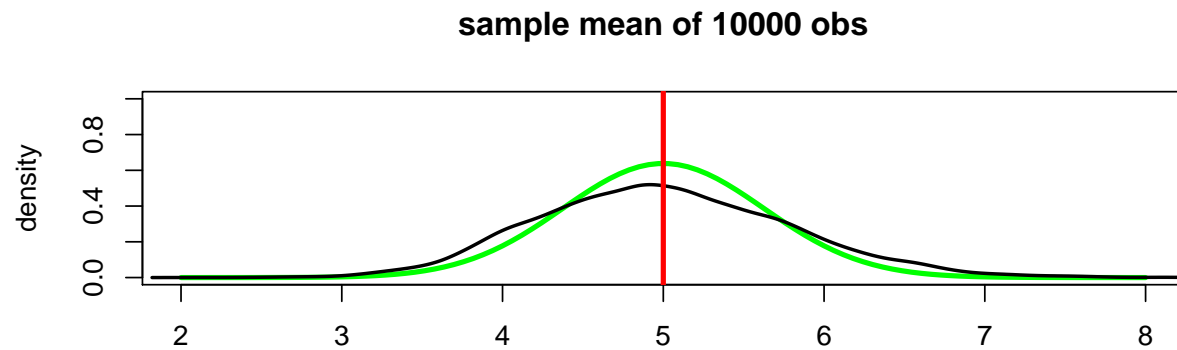
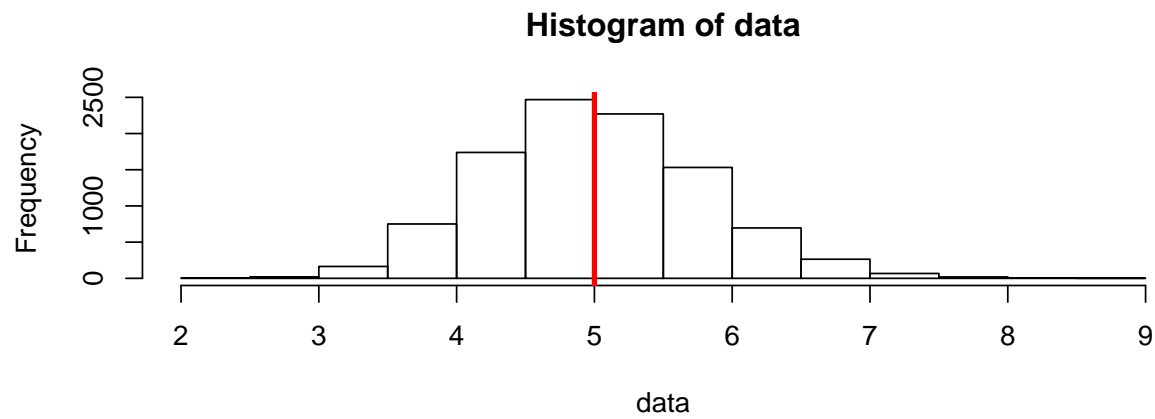
```
data <- matrix(rexp(total.num * num.in.each, lambda), nrow = total.num,
              byrow = TRUE)
means <- rowMeans(data)

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 0.6143, 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 standard deviation is equal to 0.625

Estimate a coverage interval:

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

```
## [1] 4.990 5.021
```

You can find a Rmd file [here](#)