Inference Assignment 1

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mean is 1/lambda sd is 1/lambda var is 1/lambdaˆ2 sd_ is 1/(lambda * sqrt(n)) var_ is 1/(n * lambda)

Assignment:

The exponential distribution can be simulated in R with rexp(n, lambda) where lambda is the rate parameter. The mean of exponential distribution is 1/lambda and the standard deviation is also also 1/lambda. Set lambda = 0.2 for all of the simulations. In this simulation, you will investigate the distribution of averages of 40 exponential(0.2)s. Note that you will need to do a thousand or so simulated averages of 40 exponentials.

Illustrate via simulation and associated explanatory text the properties of the distribution of the mean of 40 exponential(0.2)s. You should

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

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

3. Show that the distribution is approximately normal.

Part 1

I will use set.seed(1) as seed for this and all following parts. According to the central limit theorem the distribution of sample means should be cenetered at the distribution mean, i.e. 5.

```
set.seed(1)
lambda <- 0.2
nm <- 40
reps <- 1000
means = NULL
for (i in 1:reps){
        means = c(means, mean(rexp(nm, lambda)))
}
hist(means)
```

Histogram of means