Statistical Inference Course Project1

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Overview

Overview to be writting here...

Simulations

```
#number of simulations to run
simnum <- 10000

#number of distributions to generate
exp_n <- 40

#exponential distribution parameters
exp_lambda <- 0.2
expMean <- NULL
expVar <-NULL
for (a in 1:simnum) {
    expMean = c(expMean, mean(rexp(exp_n, exp_lambda)))
    expVar = c(expVar, var(rexp(exp_n, exp_lambda)))
}
```

Plots Comparing Simulation to Population

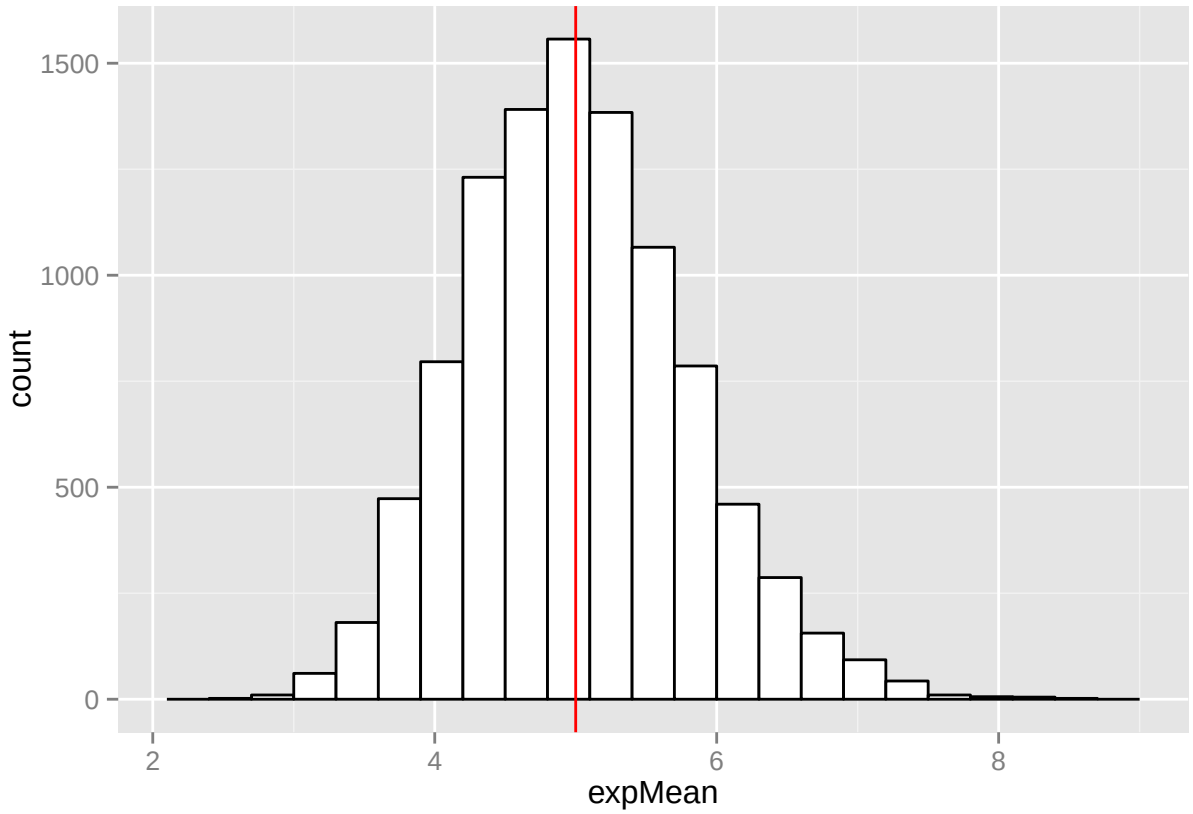
```
#load ggplot2
library(ggplot2)

#Compare Means
popMean <- 1 / exp_lambda
simMean <- mean(expMean)
popMean
```

```
## [1] 5
```

```
simMean
```

```
## [1] 5.004848
```

```
#Compare Means visually
plt <- ggplot() + aes(expMean) +
    geom_histogram(binwidth = 0.3, colour = "black", fill = "white") +
    geom_vline(xintercept = 1 / exp_lambda, colour = "red")
plt
```




```
#use Freedman-Diaconis rule for binwidth
bw <- round(diff(range(expVar) / (2 * IQR(expVar) / length(expVar)^(1/3))))

#Compare Variances
popVariance <- (1 / exp_lambda) ^ 2
simVariance <- mean(expVar)
popVariance
```

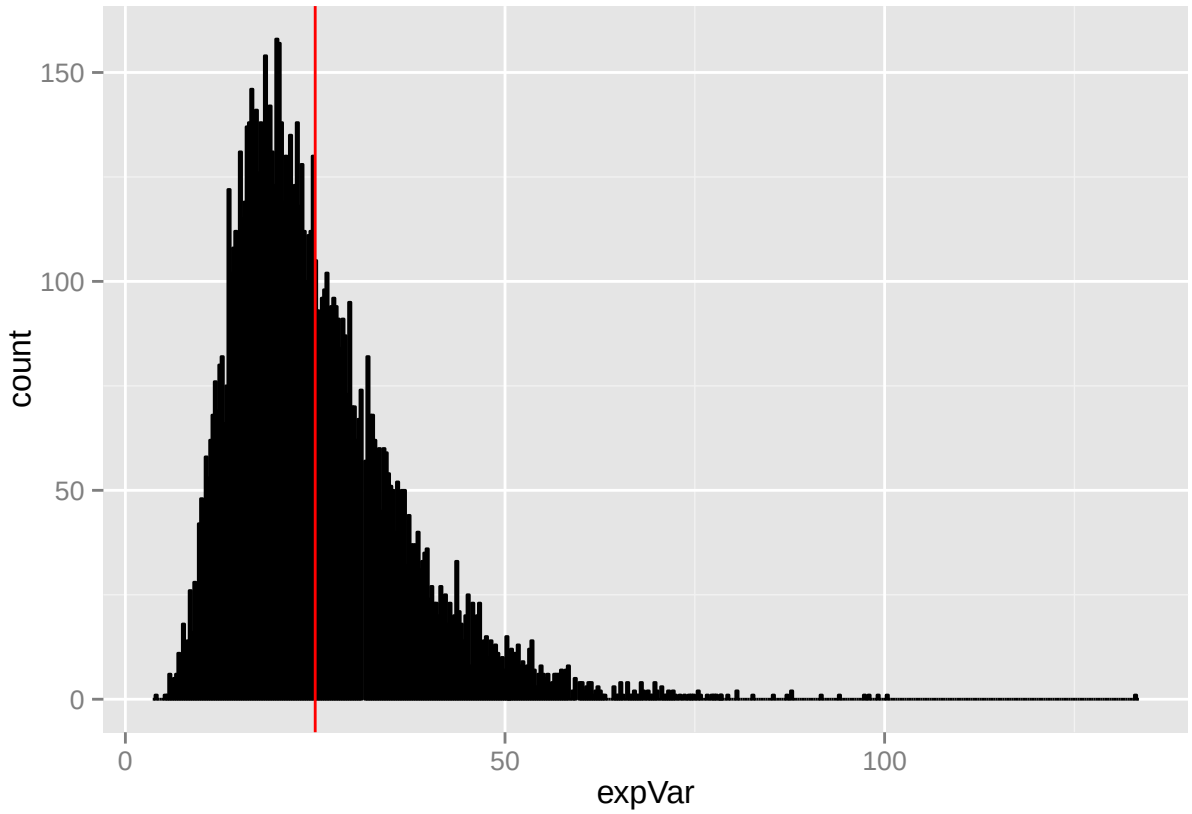
```
## [1] 25
```

```
simVariance
```

```
## [1] 25.10192
```

```
#compare Variances visually
plt.two <- ggplot() + aes(expVar) +
    geom_histogram(binwidth = 0.3, colour = "black", fill = "white") +
    geom_vline(binwidth = bw, xintercept = (1 / exp_lambda)^2, colour = "red")
plt.two
```

```
## Warning in loop_apply(n, do.ply): position_stack requires constant width:
## output may be incorrect
```


150
100
50
0
count
0
50
100
expVar