Statistical Inference Course Project

S Sagara

This is 1 A simulation exercise.

```
#The 1000 exponential simulations are run 40 times and the average of the simulatons is calculated.
mns = NULL
for (i in 1 : 40) mns = c(mns, mean(rexp(1000,0.2)))
```

```
simulation.mean <- mean(mns)
theoretical.mean <- 1/0.2
```

Difference between simulation mean and theoretical mean The calculation shows that the simulation mean is very close to the theoretical mean.

```
simulation.mean - theoretical.mean
```

```
## [1] 0.001988697
```

Variance of simulation The 1000 exponential simulations are run 40 times and the variance of the simulatons is calculated.

```
vns = NULL
for (i in 1 : 40) vns = c(vns, var(rexp(1000,0.2)))
simulation.var <- mean(vns)
```

Variance of theoretical distribution

```
theoretical.std <- 1/0.2
theoretical.var <- theoretical.std^2
```

Difference between simulation variance and theoretical variance The calculations shows that the simulation variance is very close to the theoretical variance.

```
simulation.var - theoretical.var
```

```
## [1] 0.5236847
```

Distribution of sample mean is approximately normal as the peak of the histogram is aroung the mean and the shape of the graph is bell-shape.

```
hist(mns,xlab = "Exponential Mean")
```

Histogram of mns