

Report for PA of Statistical Inference

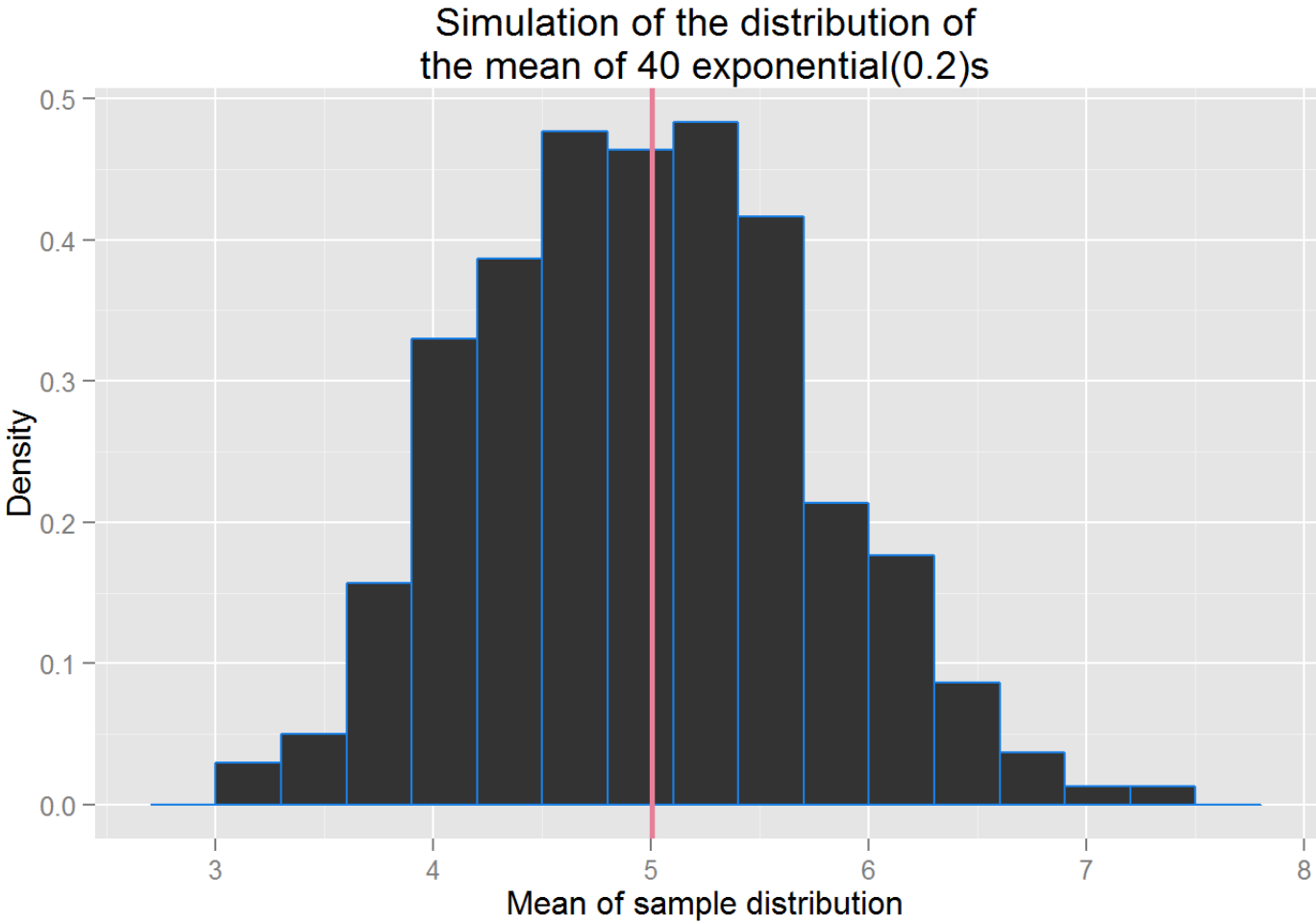
Thuan Bui

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Part 1: Simulate the exponential distribution

1. How sample mean differ from theoretical mean

The simulation mean is 4.9723191 different from theoretical mean is 5



As you can see in the plot above, the distribution of the mean of 40 exponential(0.2)s centered at theoretical center (pink line)

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

The simulation standard deviation is

```
sd(meanOfExpDist)

## [1] 0.7602225
```

while theoretical standard deviation is

```
1/(lamda * sqrt(sampleSize))

## [1] 0.7905694
```

The simulation variance is

```
var(meanOfExpDist)

## [1] 0.5779383
```

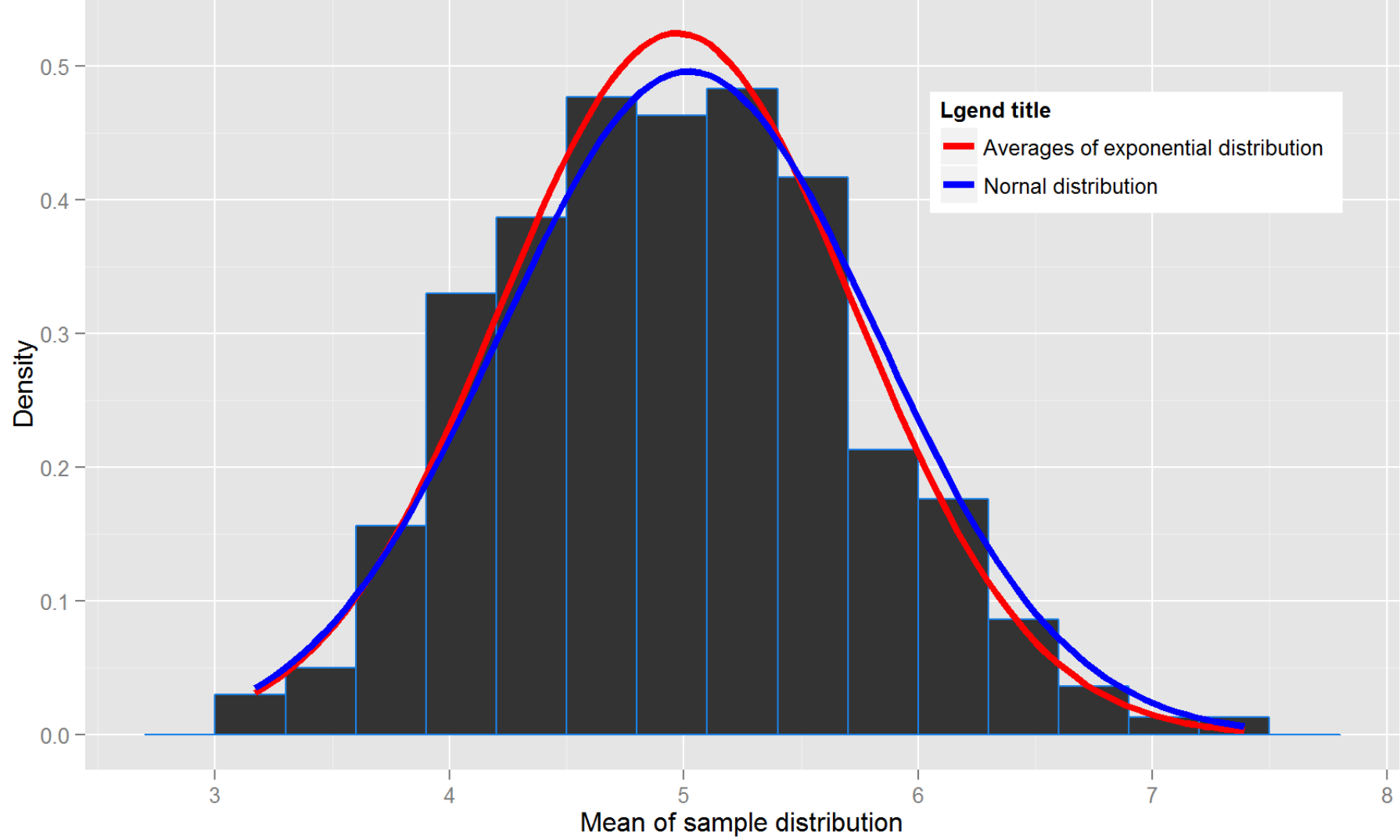
while theoretical variance is

```
(1/lamda^2) / sampleSize

## [1] 0.625
```

3. The distribution of averages of exponential distribution is approximately normal

Simulation of the distribution of the mean of 40 exponential(0.2)s



As you can see in the plot above, the curve of averages of exponential distribution very close to with normal distribution. It means the averages of exponential distribution is approximately normal. For more info, you can take a look to QQ plot below, the values of averages of exponential distribution approaches from left and right to center value at quantile 0.

Normal Q-Q Plot

