L2F Lab 6: Point Estimation

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Outline

- Where to find my slides

(https://thisisyichenzhang.github.io/files/STAT200-2019/lab6slides.pdf)

- TA evaluation

(https://learn.stat.ubc.ca/eval/182200RQL)

- Midterm return & Grade appeal information
- Lab instrutions & Sample code

TA Evaluation (https://learn.stat.ubc.ca/eval/182200RQL)

- We will spend the first 5 minutes to complete the mid-term TA evaluation.
- Please use the link "https://learn.stat.ubc.ca/eval/182200RQL" to complete the evaluation for me (Yichen).
- Your answers are recorded anonymously and will NOT be provided to the TA. You can access the link through PC/phone/laptop.

Midterm return & Grade appeal instructions

- You can pick up your midterm after you finishing today's lab.
- Grade appeal: you can talk to me/instructor/any other TAs to request a grade appeal.
- For the grade appeal: Please attach a short note to indicate the question you want to be regraded and a brief justification. For example: "The solution says XXXX. My answer says XXXX. I have all the relevant information included in my answer."

Lab instructions

In previous labs, we learnt how to estimate the mean parameter. Today, we will learn how to estimate the variance parameter.

How we did in previous labs:

1. Simulate 1000 sample from a distribution (Normal/Uniform/...)
   ie. Sample 1, sample2, ... , sample 1000.
2. For each sample we compute the sample mean
   ie. Sample mean 1, sample mean 2, ... , sample mean 1000.
3. We compute the mean of those sample means, draw histgrams for those sample means.

Lab instructions

In previous labs, we learnt how to estimate the mean parameter. Today, we will learn how to estimate the variance parameter.

How we will do today:

1. Simulate 1000 sample from a distribution (Normal).
   ie. Sample 1, sample2, ... , sample 1000.
2. For each sample, we compute the sample variance
   ie. Sample variance 1, sample variance 2, ... , sample variance 1000.
3. We compute the mean of those sample variances, draw histgrams for those sample variances.

Question 1

```r
# Simulate a sample of size 50 from Normal ditribution
# with mean = 15 and sd = 3
onesample = rnorm(50,15,3)
# Compute S1
S1 = sd(onesample)
# Compute S1 square
S1_square = S1^2
S1_square
# Compute S0 square
S0_square = S1_square * (50-1) / 50
S0_square
# Compute S2 square
S2_square = S1_square * (50-1) / (50-2)
S2_square
```

Question 2

```r
# Simulate 1000 samples of size 50 from the same distribution
samples = replicate(1000,rnorm(50,15,3))
# Compute S1 for each sample
# Remember here you have 1000 samples,
# so you will have 1000 values of 'S1'
S1 = apply(samples, 2, sd)
# Compute S1 square
S1_square = S1^2
# Compute S0 square
S0_square = S1_square * (50-1) / 50
# Compute S2 square
S2_square = S1_square * (50-1) / (50-2)
```

Question 3 & Question 5

```
## Question 3
# Compute the mean of your 1000 S1 squares
mean(S1_square)
# Compute the mean of your 1000 S0 squares
mean(S0_square)
# Compute the mean of your 1000 S2 squares
mean(S2_square)
```

```
## Question 5: Draw histgrams
hist(S1_square)
hist(S0_square)
hist(S2_square)
```