Theoretical Questions

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1.

2.

3.

4.

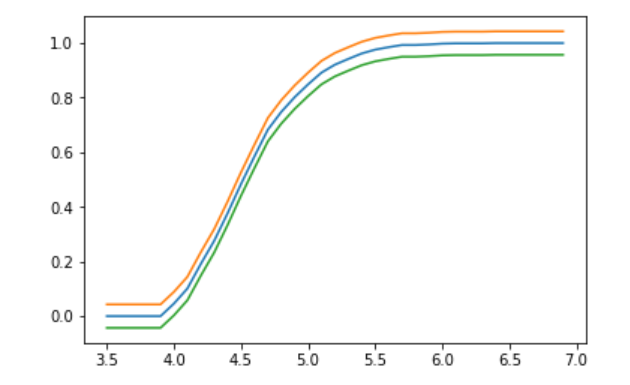
Confidence interval will be

5.

**Codes Report**

Question 1

A and b



Blue line is estimated CDF and orange and green lines are 95 percent confidence envelope for *F*.

C.

Point estimated would be

And standard error is

The interval is

95%

-0.584178140300015 , 1.636178140300015

93%

-0.5044730430477062 , 1.5564730430477063

Question 2

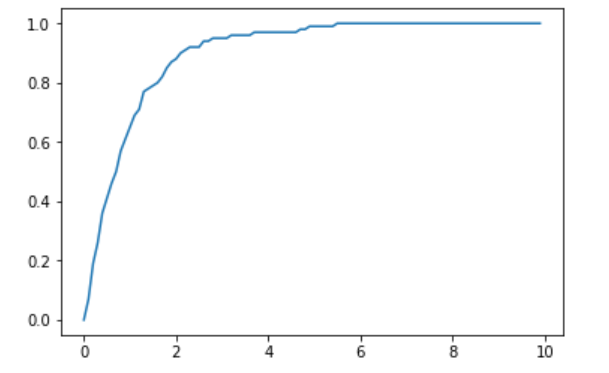
Estimated Lambda 1.006595871904141

97% confidence interval ( 0.9349665290299697 , 1.0782252147783125 )

the interval contains the param 0.975 % of times

Question 3

Estimated lambda 1.0212193328795964



Empirical Distribution Function

Plugin Estimators

Mean: 0.989556249796454

Sigma: 1.0241083502783939

the other way (defined in course book): 1.029267618952513

skewness: 2.1584672388251156

Question 4

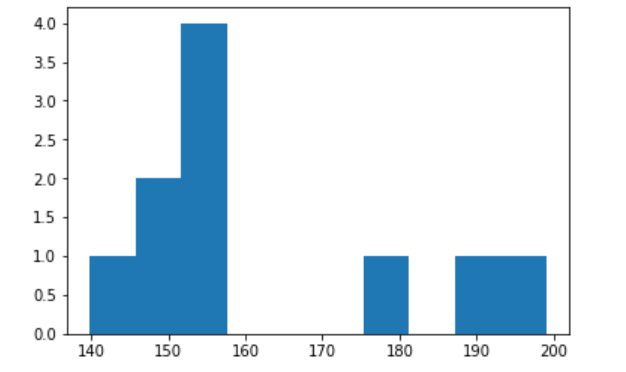
A and B

vboot 179.73283867041596

se 13.406447652917455

95% confidence interval( 103.36720117089159 , 155.92047597032803 )

C



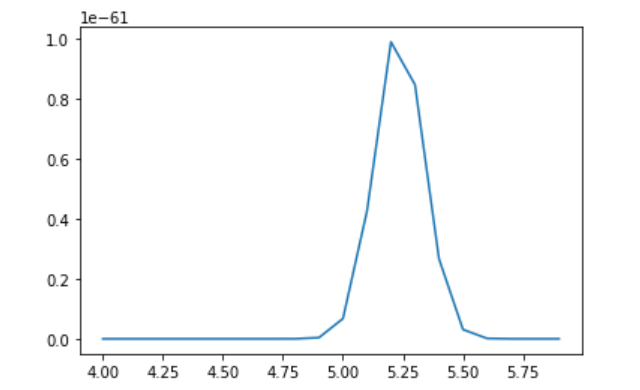
Histogram of Bootstrap Replications

And the True sampling distribution of is N(~148,se) which quite looks like the histogram

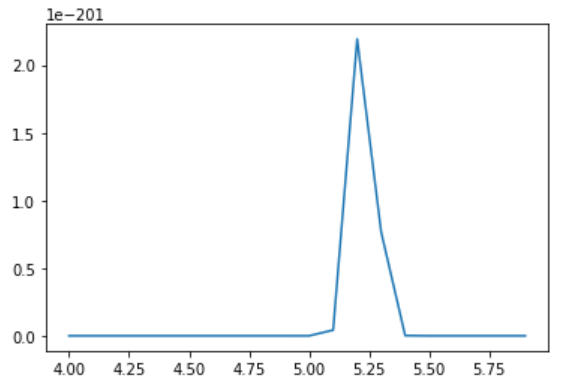
Question 5

A and B

Plot of Posterior



Plot of simualted posterior

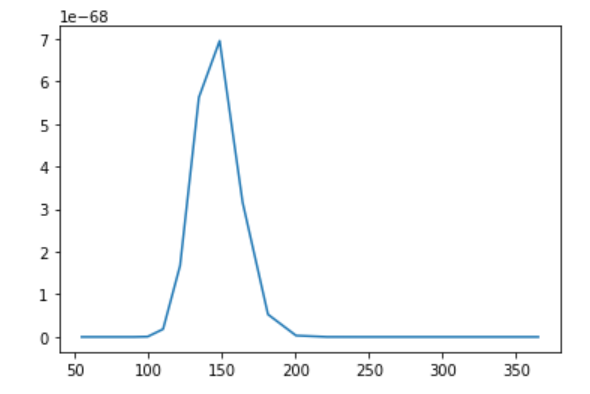


D

Analytically

By simulation

Using the guide on page 212 of course book we have:



E

97% confidence interval ( -61.88483753233056 , 76.84934247091029 )

93% confidence interval ( -50.37453361005844 , 65.33903854863817 )

Question 6

In 0.0637 of times we reject the null, which is the error rate for type-1 error and is close to 0.05

Question 7

A

Delta 0.022175

97% confidence interval ( -0.013458074389523171 , 0.05780807438952317 )

P-Value 0.17686214169208325

Since both negative and positive values are in confidence interval, we can not judge to which author it belongs to.

B

Based on permutation test, P-value is 0.00062

So, the two distributions are the same.

Question 8

test accuracy 0.72

test confusion matrix

[[31. 14. 0.]

[ 9. 30. 3.]

[10. 6. 47.]]

train accuracy 0.78

train confusion matrix

[[33. 6. 1.]

[10. 38. 3.]

[ 7. 6. 46.]]

Question 9

theta\_hat -0.07130609590256017

se: 0.10018298605515501

95% confidence interval ( -0.2716720680128702 , 0.12905987620774984 )