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5.R.R1

1/1 point (graded)

Download the file 5.R.RData and load it into R using load("5.R.RData"). Consider the linear regression model of y on X1 and X2. What is the standard error for β_1?

0.02593

Answer: 0.02593

0.02593

Explanation

Use summary(lm(y~.,data=Xy))

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5.R.R2

0/1 point (graded)

Next, plot the data using matplot(Xy,type="l"). Which of the following do you think is most likely given what you see?

- Our estimate of $s.e.(\hat{\beta}_1)$ is too high.
- Our estimate of $s.e.(\hat{\beta}_1)$ is too low. ✔
- (selected) Our estimate of $s.e.(\hat{\beta}_1)$ is about right. ✘

Explanation

There is very strong autocorrelation between consecutive rows of the data matrix. Roughly speaking, we have about 10-20 repeats of every data point, so the sample size is in effect much smaller than the number of rows (1000 in this case).

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5.R.R3

1/1 point (graded)

Now, use the (standard) bootstrap to estimate $s.e.(\hat{\beta}_1)$. To within 10%, what do you get?

0.02593295 ✔ **Answer:** 0.0274

0.02593295

Explanation

When we do the i.i.d. bootstrap, we are relying on the original sampling having been i.i.d. That is the same assumption that screwed us up when we used lm.

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5.R.R4

0/1 point (graded)

Finally, use the block bootstrap to estimate $s.e.(\hat{\beta}_1)$. Use blocks of 100 contiguous observations, and resample ten whole blocks with replacement then paste them together to construct each bootstrap time series. For example, one of your bootstrap resamples could be:

new.rows = c(101:200, 401:500, 101:200, 901:1000, 301:400, 1:100, 1:100, 801:900, 201:300, 701:800)

new.Xy = Xy[new.rows,]

To within 10%, what do you get?

0.02593295 ✖ **Answer:** 0.2

0.02593295

Explanation

The block bootstrap does a better job of mimicking the original sampling procedure, because it preserves the autocorrelation.

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