Stochastic data processing and simulation

A1 assignment

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Exercise 1:

Using the formula ”by hand” , we obtain that the beta0 is -17.57909 and beta1 is 3.932409 , therefore is the same with compute with “lm”

Exercise 2:

By formula , the s we compute “by hand ” we obtain is 15.38 , is verify that s= 15.38

Exercise 3:

1.Using the formula, the result we obtain is same with given by “confint”

2. The 80% confident interval for beta1 means , giving 100 times of drawing example and calculating for beta1_hat, around 80 will be inside and 20 be will outside the 80% of confident interval , meaning that 80% of beta1_hat we calculating will be inside the confident interval . However , beta1 is a actual number , it can only be inside or outside confident interval. Hence, we cannot say beta1 is 80% inside confident interval , we can only said that " with 80% of "confident" beta1 is inside confident interval"

Exercise 4:

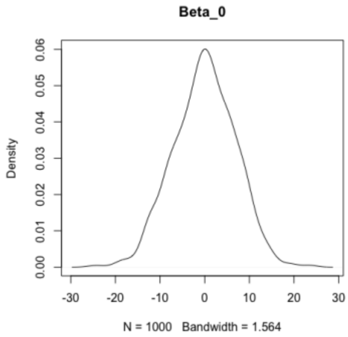
First , we assume real beta 0 and beta1

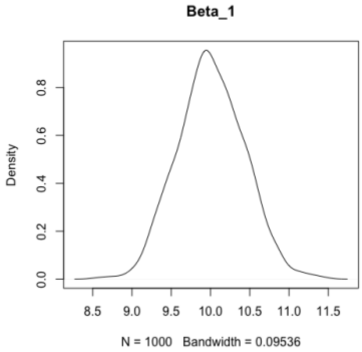
With formula”beta0 + beta1 * speed + error” , we create 1000 sets of new distant. By those data we can obtain beta0, beta1 and confident interval of each set. Creating another matrix within each confident interval to check whether real beta0 and beta1 is inside the interval.

After calculation we obtain the percent beta0 is 0.959 and beta1 is 0.954 , those are close to 0.95 , which is the alpha value we set.

Exercise 5:

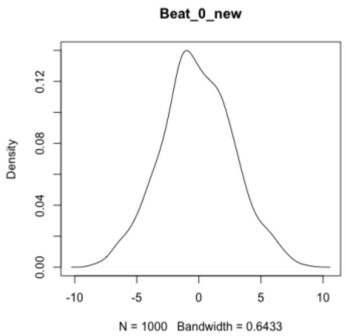
1.

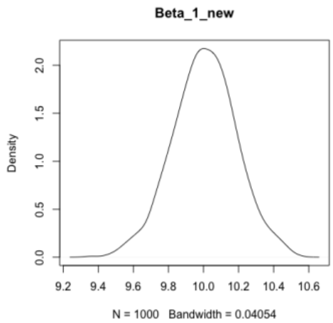




Plot for beta0 with 50 observations Plot for beta1 with 50 observations

2.After similar approach in exercise 4 , we obtain





Plot for beta0 with 200 observations Plot for beta1 with 200 observations

By comparing the plot between 50 and 200 observations, we find that the beta0 and beta1 estimator we calculate with 200 observations is more close to real beta0(0) and beta1(0) than the value we obtain with 50 bs