Name: _____

Score: _____ / _____

Assignment_7

Part 1:

(0) Suppose we have randomly drawn n iid tuples of sample data (y, x1, x2, x3, x4)_1, (y, x1, x2, x3, x4)_2, ..., (y, x1, x2, x3, x4)_n, from the population space X and Y. Suppose assumption 1-5 hold. Use the following dataset to answer the following questions. No need to answer this question. This question sets up the parameter of the following questions and serves as a separator. (Round your answer in 3 decimal Places as always).

Attachments

A7.csv

(1) Which of the following estimator you would use to estimate the linear relationship between X and Y?

- A. Ordinary Least Square Estimator
- B. Mean Difference Estimator
- C. Variance Estimator
- D. Sample Mean Estimator

(2) What is the underlying theorem that guarantees the estimator you use is a consistent estimator?

- A. Spectral Theorem
- B. Gauss Markov Theorem
- C. Law of Large Number
- D. Central Limit Theorem

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). NOTE: For scientific notation, a period MUST be used as the decimal point marker.

(3) What is your estimation of for each of the linear coefficient?
beta0 = ____
*____
beta1 = ____
*____
beta2= ____
*____
beta3 = ____
*____
beta4 = ____
*____

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(4) Suppose the variance of the uncertainty u, Var[u|X] = \sigma^2 is unknown. How to estimate the \sigma^2? \sigma^2 = ____ ____

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(5) After you have the estimated \sigma^2 (hat), think about how to estimate the variance of each linear coefficients. Fill in your estimation result below for the standard deviation of each of the linear coefficients:
sd(beta0) = ____
*____
sd(beta1) = ____
*____
sd(beta2) = ____
*____
sd(beta3) = ____
*____
sd(beta4) = ____
*____

(6) Is your estimation for those \beta_hat and \sigma^2_hat still reliable in this case? (Close to the true parameter?)

- True
- False

(7) Suppose we want to test whether Beta_2 is greater than 2 Let us first formulate it in the language of Hypothesis Testing. We set up the null hypothesis as H_0: \beta_2 = 2, and the alternative H_1: \beta_2 >2. We want to know whether we could reject the null H_0 in favor of the alternative H_1 at 90% significant level. Which of the following test statistics do you want to use to test the above Null Hypothesis H_0?

- A. Wald-statistics
- B. z-statistics
- C. F-statistics
- D. t-statistics

(8) What is the associated distribution of the correct test statistics follows?

- A. t-distribution
- B. F distribution
- C. \chi ^2 distribution
- D. Standard Normal

(9) What is the underlying theorem that guarantees the statistics follow the desired distribution?

- A. Non of above
- B. Law of Large Number
- C. Gauss Markov Theorem
- D. Central Limit Theorem

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(10) What is the numerical value for the correct test statistics under H_0 and H_1 in question (7) =
*____

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(11) What is the critical value (Threshold value) for the underlying H_0 and H_1 at 90% significant level = ____

(12) Can you reject the Null H_0 in favor of the alternative H_1?

- True
- False

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(13) What is the P-Value under H_0 and H_1? ____

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(14) What is the 90% confidenceInterval for the \beta_2? 90%CI = (____ , ____)
*____
*____