X

Unit 12 - Week 10

Assignment 10

The due date for submitting this assignment has passed. Due on 2019-10-09, 23:59 IST.
As per our records you have not submitted this assignment.

1) You have two sets of data involving values of X and Y , but you are unsure whether to fit the data separately or together. You consider and fit the eight-parameter model ***1 point***

$$Y = \alpha_0 + \alpha_1 X + \alpha_2 X^2 + \alpha_3 X^3 + Z(\beta_0 + \beta_1 X + \beta_2 X^2 + \beta_3 X^3) + \epsilon$$

where Z is a dummy variable whose value is 0 for set A and 1 for set B. What hypothesis would you test to answer the question:“will a single quadratic model fit all the data?”

- $\beta_0 = \beta_1 = \beta_2 = \beta_3 = 0$
- $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \alpha_3 = 0$
- $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \alpha_2 = \alpha_3 = 0$
- none of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\beta_0 = \beta_1 = \beta_2 = \beta_3 = \alpha_3 = 0$

2) The distribution of the test statistic to test the hypothesis in Problem 1 is ***1 point***

- $F_{5,n-8}$

$F_{4,n-7}$

$F_{6,n-8}$

$F_{6,n-7}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$F_{5,n-8}$

3) If a data point in Set A and a data point in Set B had the same X value, would these two points be “repeat point” in the fit of the full model. ***1 point***

Yes

No

Cannot say

No, the answer is incorrect.
Score: 0

Accepted Answers:
No

4) Data on a response Y and k predictor variables $X_1, X_2, \ldots, X_k$ arise from two factories A and B. It is desirable to fit a model of the form ***1 point***

$$Y_Q = \beta_{0Q} + \beta_{1Q} X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + \epsilon.$$

where $Q = A$ or B denotes the factory in which the prediction will be made. In other words, the effects of $X_2, \ldots, X_k$ are the same in both factories, but the intercept, and the slope with respect to X_1 , are different for each factory. This problem can be handled by using one dummy variable Z, which takes the value 1 for A and 0 for B and then fit the model:

$Y = \beta_0 + \alpha_1 X_1 Z + \beta_1 X_1 + \ldots \beta_k X_k + \epsilon$

$Y = \beta_0 + \alpha_0 Z + \alpha_1 X_1 Z + \beta_1 X_1 + \ldots \beta_k X_k + \epsilon$

$Y = \beta_0 + \alpha_0 Z + \alpha_1 X_1 + \beta_1 X_1 + \ldots \beta_k X_k + \epsilon$

$Y = \beta_0 + \alpha_0 + \alpha_1 X_1 Z + \beta_1 X_1 + \ldots \beta_k X_k + \epsilon$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$Y = \beta_0 + \alpha_0 Z + \alpha_1 X_1 Z + \beta_1 X_1 + \ldots \beta_k X_k + \epsilon$

5) Look at the data below: Set A: ***1 point***

X	Y
8	5.3
0	0.9
12	7.1
2	2.4

Set B:

X	Y
9	5.1
7	4.4
8	5.2
6	3.8

Use one dummy variable Z to distinguish the two groups. With $Z = 0$ for set A and $Z = 1$ for set B, we can fit the model $Y = \beta_0 + \beta_1 X + \alpha_0 Z + \alpha_1 XZ + \epsilon$. LSE of β_0 is

- 0.054
- 5.552
- 1.142
- 0.433

No, the answer is incorrect.
Score: 0

Accepted Answers:
1.142

6) Consider the data in Problem 5. The LSE of β_1 is **1 point**

- 0.064
- 0.506
- 1.743
- 3.542

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.506

7) Consider the data in Problem 5. The LSE of α_0 is **1 point**

- 0.0418
- 0.506
- 1.342
- 3.542

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.0418

8) Consider the data in Problem 5. The LSE of α_1 is **1 point**

- 0.0418
- 0.506
- 1.342
- 0.036

No, the answer is incorrect.
Score: 0

Accepted Answers:

0.036

9) Consider the data in Problem 5. To see if a single straight line model fit all data, we test $H_0 : \alpha_1 = \alpha_0 = 0$ against $H_1 : H_0$ is not true. ***1 point***

The extra sum of squares F approximately equals

- 3.71
- 2.53
- 1.11
- 0.036

No, the answer is incorrect.
Score: 0

Accepted Answers:
1.11

10) Consider the data in Problem 5. To see if a single straight line model fit all data, we test $H_0 : \alpha_1 = \alpha_0 = 0$ against $H_1 : H_0$ is not true. ***1 point***

The decision is:

- H_0 rejected
- H_0 accepted
- cannot say

No, the answer is incorrect.
Score: 0

Accepted Answers:
H_0 accepted