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reviewer1@nptel.iitm.ac.in ▼

Courses » Design and Analysis of Experiments

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Unit 5 - Week 4

Course outline

How to access the portal

Week 1

Week 2

Week 3

Week 4

- Lecture 20: Introduction to Multiple Linear Regression (MLR)
- Lecture 21: Sampling Distribution of Regression Coefficients
- Lecture 22: Multiple Linear Regression: Hypothesis Testing and Model Adequacy Test
- Lecture 23: Multiple Linear Regression: Model Diagnostics and Testing for Lack of Fit
- Lecture 24: Regression Approach to ANOVA
- Feedback for Week 4
- Quiz : week4_assignment4

Week 5

Week 6

week4_assignment4

The due date for submitting this assignment has passed. **Due on 2018-02-21, 23:59 IST.**

Submitted assignment

Questions 1- 4 are based on the following case:

The tensile strength of a paper product is related to the amount of hardwood in the pulp. Ten samples are produced in the pilot plant, and the data obtained are shown in the following table.

Strength	Percent Hardwood	Strength	Percent Hardwood
160	10	181	20
171	15	188	25
175	15	193	25
182	20	195	28
184	20	200	30

1) The regression equation is

2 points

- (i) Strength = 144 + 1.88 Hardwood
- (ii) Strength = -144 + 1.88 Hardwood
- (iii) Strength = 144 - 1.88 Hardwood
- (iv) None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:

(i) $Strength = 144 + 1.88 \text{ Hardwood}$

2) The value of R^2 is

2 points

- (i) 0.97
- (ii) 0.95
- (iii) 0.98
- (iv) None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
(i) 0.97

3) The value of R^2 (adj) is

2 points

- (i) 0.95
- (ii) 0.966
- (iii) 0.98
- (iv) None of these

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

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No, the answer is incorrect.
Score: 0

Accepted Answers:
(ii) 0.966

4) 95 percent confidence interval on the parameter β_1 is

2 points

- (i) $1.60 < \beta_1 < 2.15$
- (ii) $1.69 < \beta_1 < 2.05$
- (iii) $1.59 < \beta_1 < 2.05$
- (iv) $1.69 < \beta_1 < 2.15$

No, the answer is incorrect.
Score: 0

Accepted Answers:
(i) $1.60 < \beta_1 < 2.15$

Questions 5- 7 are based on the following case:

A study was performed on wear of a bearing y and its relationship to x_1 = oil viscosity and x_2 =load. The following data were obtained.

y	x_1	x_2
193	1.6	851
230	15.5	816
172	22.0	1058
91	43.0	1201
113	33.0	1357
125	40.0	1115

5) The regression equation is

2 points

- (i) $Y = 351 - 1.27 x_1 - 0.154 x_2$
- (ii) $Y = 351 + 1.27 x_1 + 0.154 x_2$
- (iii) $Y = 351 - 1.27 x_1 + 0.154 x_2$
- (iv) None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
(i) $Y = 351 - 1.27 x_1 - 0.154 x_2$

6) The value of R^2 is

2 points

- (i) 0.862
- (ii) 0.906
- (iii) 0.98
- (iv) None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
(i) 0.862

7) The value of R^2 (adj) is

2 points

- (i) 0.67
- (ii) 0.77
- (iii) 0.84
- (iv) None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:

(ii) 0.77

8) Hat matrix is

2 points

- (i) $H = X^T(X^T X)^{-1} X$
- (ii) $H = X(X^T X)^{-1} X^T$
- (iii) $H = X(X^T X)^T X^T$
- (iv) $H = X(X^{-1} X)^T X^T$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(ii) $H = X(X^T X)^{-1} X^T$

9) Adjusted R^2 statistics can be defined as

2 points

- (i) $R^2(adj) = 1 - \frac{(n-1)SS_E}{(n-p)SS_T}$
- (ii) $R^2(adj) = 1 - \frac{(n-p)SS_E}{(n-1)SS_T}$
- (iii) $R^2(adj) = 1 - \frac{(n-1)SS_T}{(n-p)SS_E}$
- (iv) $R^2(adj) = 1 - \frac{(n-1)SS_R}{(n-p)SS_T}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(i) $R^2(adj) = 1 - \frac{(n-1)SS_E}{(n-p)SS_T}$

10) If, $SS_E=0.16$ and $SS_T=0.52$, then what is the value of R^2

2 points

- (i) $R^2=0.308$
- (ii) $R^2=0.692$
- (iii) $R^2=0.444$
- (iv) $R^2= 3.25$

No, the answer is incorrect.
Score: 0

Accepted Answers:

(ii) $R^2=0.692$

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