

Unit 12 - Week 10

Course outline

How does an NPTEL online course work?

Practice Assignment

Week 1

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Week 3

Week 4

Week 5

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Week 10

● Lecture 81: Regression Analysis - I

● Lecture 82: Regression Analysis - II

○ Lecture 83: Regression Analysis - III

● Lecture 84: Regression Analysis - IV

○ Lecture 85: Analysis of Variance-I

● Lecture 86: Analysis of Variance-II

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○ **Quiz : Assignment 10**

○ Assignment 10 solution

Week 11

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Text Transcripts

Assignment 10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-04-08, 23:59 IST.

1) The determination of the percentage of an organic content in the mixture of organic and inorganic of material is measured by an infrared spectroscopy (IR). The reading of an infrared spectroscopy of a some material as follows: **0 points**

Percentage	0	20	40	60	80	100
Reading	0.834	0.785	1.050	1.191	1.314	1.432

The least square estimates of the given data which is fitted using the simple linear regression model ($Y = \alpha + \beta x$) are:

- $\alpha = -98.24$ and $\beta = 64.18$
- $\alpha = -106.24$ and $\beta = 49.18$
- $\alpha = -104.24$ and $\beta = 47.18$
- $\alpha = -109.24$ and $\beta = 75.18$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\alpha = -104.24$ and $\beta = 47.18$

2) Using the data given in the question 1, estimate the percentage of an organic content for the infrared spectroscopy reading of 1.19 **1 point**

- 47.97
- 67.89
- 62.46
- 71.18

No, the answer is incorrect.
Score: 0

Accepted Answers:
62.46

3) The simple linear regression model is defined as $Y = \alpha + \beta x + \epsilon$ where α and β are constant, and ϵ is a random error. The random error follows a normal distribution with mean value equal to zero and variance equal to σ^2 ($\epsilon \sim N(0, \sigma^2)$). The sum of squares of residuals (SS_R) divided by the unknown error variance ($\frac{SS_R}{\sigma^2}$) is distributed as _____ distribution with a degree of freedom _____. **1 point**

- t - distribution, n-1
- t - distribution, n-2
- Chi square distribution, n-4
- Chi square distribution, n-2

No, the answer is incorrect.
Score: 0

Accepted Answers:
Chi square distribution, n-2

4) The diameter and shear strength of the spot weld is given in the file [weldvsshear.csv](#) and the given dataset follows a simple linear regression model. The least squares estimates of the linear regression equation ($Y = \alpha + \beta x$) are: **1 point**

- $\alpha = 74.28, \beta = 1.49$
- $\alpha = 1.49, \beta = 74.28$
- $\alpha = 14.28, \beta = 14.9$
- $\alpha = 14.9, \beta = 14.28$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\alpha = 74.28, \beta = 1.49$

5) Using the dataset given in question 4, calculate the 95% confidence interval of the slope of the regression line: **1 point**

- (12.1, 17.7)
- (1.21, 1.77)
- (1.41, 1.37)
- (1.49, 1.97)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(1.21, 1.77)

6) Using the dataset given in question 4, determine a 95 percent confidence interval for the average strength of a spot weld when the weld diameter is 10 mm. **1 point**

- (84.23, 86.14)
- (81.67, 82.94)
- (83.23, 84.94)
- (88.48, 89.97)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(88.48, 89.97)

7) Calculate the coefficient of determination (R^2) for the dataset given in the question 4: **1 point**

- 1
- 0
- 0.877
- 0.996

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.877

8) Fit a quadratic regression equation of the form $Y = \beta_0 + \beta_1 x + \beta_2 x^2 + e$ to the data given in the file [question8.csv](#). The estimated quadratic regression equation is: **1 point**

- $Y = 12.59 + 6.33x + 2.12x^2$
- $Y = 14.64 + 2.12x + 6.33x^2$
- $Y = 6.24 + 14.64x + 2.12x^2$
- $Y = 14.64 + 6.29x + 2.12x^2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $Y = 14.64 + 6.29x + 2.12x^2$