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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Regression analysis (course)

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Unit 11 - Week 9

Assignment 9

The due date for submitting this assignment has passed. **Due on 2019-10-02, 23:59 IST.**

Assignment submitted on 2019-10-01, 17:14 IST

1) In an enzyme kinetics study, the velocity of a reaction (Y) is expected to be related to the concentration (X) as follows: ***1 point***

$$Y_i = \frac{\gamma_0 X_i}{\gamma_1 + X_i}$$

Can the model be linearized?

- Yes
- No (selected)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Yes

2) The yield (Y) of a chemical process depends on the temperature (X_1) and pressure (X_2). The following nonlinear model is expected to be applicable: ***1 point***

$$Y_i = \gamma_0 X_{i1}^{\gamma 1} X_{i2}^{\gamma 2}$$

Can the model be linearized?

- Yes
- No (selected)

(Part B) (unit?unit=53&lesson=54)

Transformation and Weighting to correct model inadequacies (Part C) (unit?unit=53&lesson=55)

WEEK 9 - FEEDBACK - Regression analysis (unit?unit=53&lesson=56)

Assignment 9 Solution (unit?unit=53&lesson=57)

Quiz : Assignment 9 (assessment?name=92)

Week 10

Week 11

Week 12

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No, the answer is incorrect.
Score: 0

Accepted Answers:
Yes

3) We wish to fit the simple linear regression model $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$ subject to the restriction that $\beta_2 = 1$. Can we just fit $Y - X_2 = \beta_0 + \beta_1 X_1 + \epsilon$ by least squares to get what we want? ***1 point***

- Yes
- No

No, the answer is incorrect.
Score: 0

Accepted Answers:
Yes

4) When $V(Y) = \sigma_Y^2$ is proportional to $E(Y)$, which of the following is a useful variance stabilising transformation: ***1 point***

- Y^2
- $\sqrt{Y}$
- $\log Y$
- Y^{-1}

Yes, the answer is correct.
Score: 1

Accepted Answers:
$\sqrt{Y}$

5) If we know σ_Y is proportional to the kth power of $E(Y)$, then which of the following is a useful variance stabilising transformation: ***1 point***

- $Y^{1-\frac{k}{2}}$
- $\sqrt{Y}$
- Y^{1-k}
- Y^k

No, the answer is incorrect.
Score: 0

Accepted Answers:
Y^{1-k}

6) Suppose that we want to fit the no-intercept model $Y_i = \beta X_i + \epsilon_i$ using weighted least squares. Assume that the observations are uncorrelated but have unequal variance.Let $w_i = \frac{1}{V(Y_i)}$. A general formula for weighted least squares estimator of β is: ***1 point***

$\hat{\beta} = \frac{\sum w_i X_i Y_i}{\sum w_i X_i^2}$

- [ ] $\hat{\beta} = \frac{\sum w_i (X_i - \bar{X})(Y_i - \bar{Y})}{\sum w_i (X_i - \bar{X})^2}$

- [ ] $\hat{\beta} = \frac{\sum_{i=1}^{n} w_i X_i Y_i}{\sum_{i=1}^{n} w_i X_i}$

- [ ] $\hat{\beta} = \bar{Y}$

Yes, the answer is correct.
Score: 1

Accepted Answers:
$\hat{\beta} = \frac{\sum w_i X_i Y_i}{\sum w_i X_i^2}$

7) Suppose that we want to fit the no-intercept model $Y_i = \beta X_i + \epsilon_i$ using weighted least squares. Assume that the observations are independent but $\sigma_i^2 = V(Y_i) = cX_i$ (c is a constant), that is, the variance of Y_i is proportional to the corresponding X_i .The least squares estimate of β is **1 point**

- [ ] $\hat{\beta} = \frac{\sum X_i Y_i}{\sum X_i^2}$
- [x] $\hat{\beta} = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{\sum (X_i - \bar{X})^2}$
- [ ] $\hat{\beta} = \frac{\sum Y_i}{\sum X_i}$
- [ ] $\hat{\beta} = \bar{Y}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\hat{\beta} = \frac{\sum Y_i}{\sum X_i}$

8) The variance of $\hat{\beta}$ is **1 point**

- [ ] $\frac{c}{\sum X_i}$
- [x] $\frac{c}{n}$
- [ ] $\frac{c}{\sum X_i^2}$
- [ ]

$$\frac{c}{\sum(X_i - \bar{X})^2}$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\frac{c}{\sum X_i}$$