Least Squares Examples Quiz

6/6 points (100%)

Quiz, 6 questions

✓ Congratulations! You passed!

Next Item



1/1 points

1.

Consider two design matrices, let J_{2n} be an $2n \times 1$ vector of ones, X_1 be a vector with the first n entries are 1 and the latter n are 0, and X_2 be a vector with the first n entries as 0 and the latter n as 1. Consider three design matrices $X = \begin{bmatrix} J_{2n} \ X_1 \end{bmatrix}$, $W = \begin{bmatrix} J_{2n} \ X_2 \end{bmatrix}$ and $Z = \begin{bmatrix} X_1 \ X_2 \end{bmatrix}$. Let Y be an outcome vector. What can be said about the least squares fitted values (\hat{Y}) with design matrices X, W and Z?



All three will be equal.

Correct

The column space of the three matrices is the same.

- All three will be different.
- Whether or not they are equal can't be determined from the information given.
- At least two will be unequal.



1/1 points

2.

Consider the setting of the previous two problems. What would the coefficient estimates be when the design matrix is Z?

 $igcup ar{Y}_1$ and $ar{Y}_2 - ar{Y}_1$

$$igcup ar{Y}_1 - ar{Y}_2$$
 and $ar{Y}_2 - ar{Y}_1$

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Correct

The fitted values for all three models will be \bar{Y}_1 for the first n entries and \bar{Y}_2 for the latter n entries. You can use this to compare the coefficient values for the different models.

$$igcup ar{Y}_1 - ar{Y}_2$$
 and $ar{Y}_2$



1/1 points

3.

Consider the setting of the previous three problems. What would the coefficient estimates be when the design matrix is X?

$$igcap ar{Y}_1 - ar{Y}_2$$
 and $ar{Y}_2 - ar{Y}_1$

$$igcup ar{Y}_1$$
 and $ar{Y}_2$

$$igcup ar{Y}_1$$
 and $ar{Y}_2 - ar{Y}_1$

$$igcirc$$
 $ar{Y_1} - ar{Y_2}$ and $ar{Y_2}$

Correct

The fitted values for all three models will be \bar{Y}_1 for the first n entries and \bar{Y}_2 for the latter n entries. You can use this to compare the coefficient values for the different models.



1/1 points

4.

Consider the setting of the previous four problems. What would the coefficient estimates be when the design matrix is W?



 $ar{Y}_1$ and $ar{Y}_2 - ar{Y}_1$

Correct

Least Squares Text in piles Quil three models will be $ar{Y}_1$ for the first n entries and \overline{Y}_2 for the latter n entries. You can use this to compare the coefficient values for the different models.

6/6 points (100%)

Quiz, 6 questions

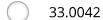
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- $ar{Y}_1 ar{Y_2}$ and $ar{Y_2}$
- $ar{Y_1}$ and $ar{Y_2}$



1/1 points

Consider the mtcars dataset. Fit a model that includes a group effect for vs and wt as predictors and mpg as the outcome. The vs variable is 1 for V type engines and 0 for straight. What is the estimate for the change in intercept for the mpg versus wt line going from vs = 1 minus vs = 0? Fit the model without using Im.





Correct



1/1 points

6.

Refer to the previous question. What is the estimated expected *decrease* in mpg per 1,000 pound increase in weight? (Fit the model without using lm.)

- 4,442 miles per gallon
- 3.154 miles per gallon

→ 33.0042 miles per gallon

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6/6 points (100%)

Quiz, 6 questions

Correct

-/3



