

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 $X = [J_{2n} \ X_1]$, $W = [J_{2n} \ X_2]$ and $Z = [X_1 \ X_2]$. 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 ?

 \bar{Y}_1 and $\bar{Y}_2 - \bar{Y}_1$

☐ $\bar{Y}_1 - \bar{Y}_2$ and $\bar{Y}_2 - \bar{Y}_1$

Least Squares Examples Quiz

6/6 points (100%)

Quiz, 6 questions

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.

☐ $\bar{Y}_1 - \bar{Y}_2$ and \bar{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 ?

☐ $\bar{Y}_1 - \bar{Y}_2$ and $\bar{Y}_2 - \bar{Y}_1$

☐ \bar{Y}_1 and \bar{Y}_2

☐ \bar{Y}_1 and $\bar{Y}_2 - \bar{Y}_1$

☒ $\bar{Y}_1 - \bar{Y}_2$ and \bar{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 ?

☒ \bar{Y}_1 and $\bar{Y}_2 - \bar{Y}_1$

Correct

Least Squares Examples Quiz

Quiz, 6 questions

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.

6/6 points (100%)

- ☐ $\bar{Y}_1 - \bar{Y}_2$ and $\bar{Y}_2 - \bar{Y}_1$
- ☐ $\bar{Y}_1 - \bar{Y}_2$ and \bar{Y}_2
- ☐ \bar{Y}_1 and \bar{Y}_2

1 / 1
points

5.

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 lm.

- ☐ 33.0042
- ☒ 3.154

**Correct**

- ☐ -4.4428

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

Least Squares Examples Quiz

6/6 points (100%)

Quiz, 6 questions



Correct

