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short

Math 584 Quiz 11 fall 2019 Name_____

1) Consider the multivariate linear regression model $\boldsymbol{Z} = \boldsymbol{X}\boldsymbol{B} + \boldsymbol{E}$.
a) What is the least squares estimator $\widehat{\boldsymbol{B}}$?

$(X^TX)^{-1}X^TZ$

b) What is $\widehat{\boldsymbol{E}}$.

$(I-P)Z$

c) There are three tests for testing $H_0 : \boldsymbol{L}\boldsymbol{B} = \boldsymbol{0}$. Name one of the tests.

Hotelling Lawley
or Wilks (Lambda)
or Pillai's (trace)

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2) Assuming the assumptions of the multivariate least squares central limit theorem hold, what is the limiting distribution of $\sqrt{n}\ vec(\hat{\boldsymbol{B}} - \boldsymbol{B})$?

$\sqrt{n}\ vec(\hat{\boldsymbol{B}} - \boldsymbol{B}) \xrightarrow{D}$ $N_{pm}(0, \Sigma_Z \otimes W)$

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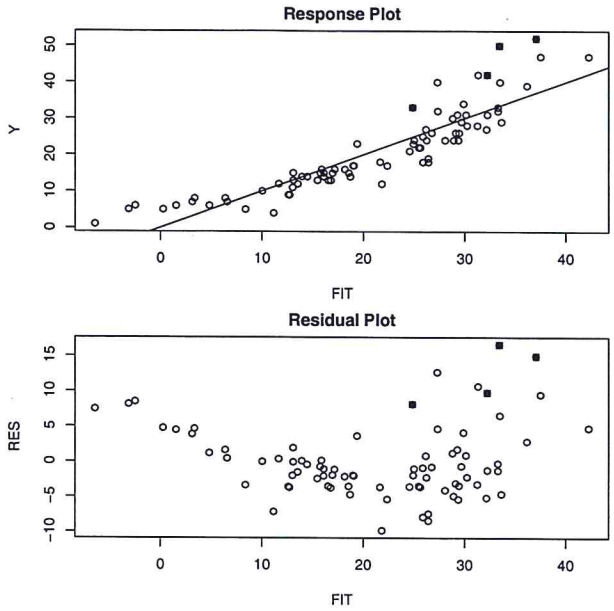

Figure 1: Plots for Mussels Data

3) Consider a data set on 82 mussels sampled off the coast of New Zealand. Let $Y_1 = \log(S)$ and $Y_2 = \log(M)$ where S is the shell mass and M is the muscle mass. The predictors are $X_2 = L$, $X_3 = \log(W)$, and $X_4 = H$: the shell length, log(width), and height.

The above plots occur when the mreg model is fit using Y_1, but $Y_2 = M$ was used instead of $Y_2 = \log(M)$. Do the plotted points scatter about the identity line and resid = 0 lines in roughly evenly populated bands?

NO there is curvature

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