

STATISTICS 3340, Assignment 6, Due Dec 10, 11:59 PM

(3) 1. A regression of Y on three predictors X_1 , X_2 , and X_3 was carried out. There were 100 observations. The total sum of squares was 32.5, and the R-squared value was $R^2 = .7$ What is the value of R^2_{adj} ?

(3) 2. In a regression problem, the estimated variance when the i th case is deleted was $s_{(i)}^2 = 2.25$. If the raw residual for that case is $e_i = 3.75$ and $h_{ii} = .3$, what is the value of the externally studentized residual for case i ?

3. Suppose that you wish to test that β_1 , β_2 and β_3 are all equal, and that $\beta_0 = 1$, using a null hypothesis of the form $H_0 : \mathbf{T}\boldsymbol{\beta} = \mathbf{c}$.

(3) (a) What is \mathbf{T} ? Note that T is not unique. There are several equivalent choices.

(2) (b) For the \mathbf{T} indicated, what is the appropriate value of \mathbf{c} ?

4. Suppose that Y is a Bernoulli random variable with parameter p , for which the mean of Y is p and the variance of Y is $p(1 - p)$. If $h(Y) = \arcsin(\sqrt{Y})$,

(2) (a) What is the approximate mean of $h(Y)$?

(4) (b) What is the approximate variance of $h(Y)$?

(5) 5. Suppose that x and y have a nonlinear relationship of the form

$$y = \left(\frac{\beta_0 x}{\beta_1 + \beta_2 x} \right)^{\frac{1}{3}}$$

Find transformations of y and/or x such that the relationship between the transformed variables is linear.