MATH 4780 (MSSC 5780) In-class Activity 4

October 22, 2023

Sylvester and Navid, please present your work on Oct 24. Remember to ask undergraduate students two Non-yes-no questions. You, as a teacher, try to get students understand your work.

Interpretation of coefficients (Sylvester)

Suppose we have models

- (1) $\log(y) = \beta_0 + \beta_1 \log(x) + \epsilon$
- (2) $\log(y) = \beta_0 + \beta_1 x + \epsilon$
- (3) $y = \beta_0 + \beta_1 \log(x) + \epsilon$

Here $\log()$ is the natural log with base e. What is the meaning of β_1 in each model? Please explain it mathematically or numerically.

Why we don't like hypothesis testing (Navid)

Generate simulated data from $y = 2 - 0.01x_1 + 0.01x_2 + 0.02x_3 + \epsilon$, where $\epsilon \sim N(0, \sigma^2)$. Set the values of xs and σ yourself.

Show that the marginal t test $H_0 : \beta_j = 0$ and overall significance F test always get rejected as long as n is large enough, even though β_js are tiny and practically zero.