625.661 Statistical Models and Regression

Module 3 Discussion Questions

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Please complete all problems.

A set of n subjects give data on a response variable y and two regressors, x_1 and x_2. The data are fitted to two different models

Model 1: $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \varepsilon$
Model 2: $y = \alpha_0 + \alpha_1 (x_1 - \bar{x}_1) + \alpha_2 (x_2 - \bar{x}_2) + \eta$

where $\bar{x}_k$ is the simple average of x_k values from this set of data, k = 1, 2; ε and η are random errors with mean zero.

Discuss with mathematical arguments whether the ordinary least-squares estimator of β_i under Model 1 is equal to the ordinary least-squares estimator of α_i under Model 2, for $i = 0, 1, 2$. State the assumptions in your discussion. Discuss whether or not the regressors are random or non-random change your discussion.