

STAT 8004 Midterm Exam I Optional Makeup

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- 1 Suppose that we have observable random variables y_1, y_2, y_3 and y_4 satisfying $E(y_1) = 2\beta_1 - \beta_2 + \beta_3 - \beta_4$, $E(y_2) = 2\beta_1 + \beta_3$, $E(y_3) = \beta_2$, and $E(y_4) = 2\beta_1 + \beta_2 + \beta_3$. Let $\mathbf{Y} = (y_1, y_2, y_3, y_4)^T$, and $\beta = (\beta_1, \beta_2, \beta_3, \beta_4)^T$. Answer parts (a)-(e) in this scenario.

1.1 a

Find \mathbf{X} and ϵ such that a model for \mathbf{Y} can be expressed in the form of $\mathbf{Y} = \mathbf{X}\beta + \epsilon$.