

STA 313F04 Quiz 6

1. (2 Points) Consider the model

$$\begin{aligned}y_2 &= b_1 y_1 + e_1 \\y_1 &= b_2 y_2 + e_2,\end{aligned}$$

where $e_1 \sim N(0, \sigma_1^2)$ and $e_2 \sim N(0, \sigma_2^2)$ are independent. Is the model identified? Answer Yes or No and justify your answer.

2. (4 Points) Consider the model

$$\begin{aligned}y_1 &= b_1 x + e_1 \\y_2 &= b_2 y_1 + e_2,\end{aligned}$$

where $e_1 \sim N(0, \sigma_1^2)$, $e_2 \sim N(0, \sigma_2^2)$, $Cov(e_1, e_2) = \kappa$, and $x \sim N(0, \sigma_x^2)$ is independent of both e_1 and e_2 . Is the model identified? Answer Yes or No and justify your answer.

3. (4 Points) Consider the model

$$\begin{aligned}y_1 &= b_1 x + e_1 + e_2 \\y_2 &= b_2 x + e_1 + e_2,\end{aligned}$$

where $x \sim N(0, \sigma_x^2)$, $e_1 \sim N(0, \sigma_1^2)$ and $e_2 \sim N(0, \sigma_2^2)$ are all independent. Is the model identified? Answer Yes or No and justify your answer.