Homework 2 - BIOS 6643 - Analysis of Longitudinal Data

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Question 1 Let **B** be defined as follows:

$$\begin{bmatrix} 1 & 5 & 0 \\ 1 & 0 & 5 \\ 1 & 0 & 5 \end{bmatrix}$$

Part A Are the column vectors of **B** linearly dependent? Explain or show.

The column vectors can be separated from the matrix, and the following system of equations can be constructed. If each scalar, represented by a, b, and c are equal to 0, then the column vectors are considered independent.

$$a \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} + b \begin{bmatrix} 5 \\ 0 \\ 0 \end{bmatrix} + c \begin{bmatrix} 0 \\ 5 \\ 5 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

Expanding this out into a system of equations:

$$\begin{aligned} a + 5b &= 0 \\ a + 5c &= 0 \\ a + 5c &= 0 \end{aligned}$$