

Practice Questions Lecture # 7 and 8

Question # 1

Determine whether the following system has a trivial solution or non-trivial solution:

$$\begin{aligned}x_1 - 2x_2 + x_3 &= 0 \\3x_2 - 3x_3 &= 0 \\x_1 - 3x_2 &= 0\end{aligned}$$

Question # 2

Solve the following system using the reduced echelon form:

$$\begin{aligned}x_1 + 4x_2 + 6x_3 &= 0 \\-2x_1 - 5x_3 &= 0 \\3x_2 - 7x_3 &= 0\end{aligned}$$

Question # 3

Check whether $\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$ is linearly dependent or not?

$$\text{where } \vec{v}_1 = \begin{bmatrix} -2 \\ 1 \\ 3 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix} \text{ and } \vec{v}_3 = \begin{bmatrix} 2 \\ -2 \\ 1 \end{bmatrix}$$

Question # 4

Determine, without solving, whether the following set of vectors is linearly independent or dependent.

$$S = \left\{ \begin{bmatrix} 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \end{bmatrix}, \begin{bmatrix} 4 \\ 6 \end{bmatrix}, \begin{bmatrix} 7 \\ 3 \end{bmatrix} \right\}$$

Question # 5

Show that the columns of $A = \begin{bmatrix} 2 & 4 \\ 4 & -3 \end{bmatrix}$ are linearly independent.