

Problem 1 - 7 Points

Determine if $\begin{bmatrix} 3 \\ -5 \\ 8 \end{bmatrix}$ is in the span of $\begin{bmatrix} 1 \\ 3 \\ -2 \end{bmatrix}$ and $\begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$. If so write it as a linear combination of the two vectors.

Problem 2 - 7 Points

Let the following vectors be given

$$\mathbf{v}_1 = \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}, \mathbf{v}_2 = \begin{bmatrix} 3 \\ 4 \\ -1 \end{bmatrix}, \mathbf{v}_3 = \begin{bmatrix} -4 \\ h \\ 3 \end{bmatrix}$$

Find all values of h such that $\{\mathbf{v}_1, \mathbf{v}_2, \mathbf{v}_3\}$ do not span \mathbb{R}^3 .

Problem 3 - 6 Points

Determine whether the following statements are True/False. If True explain why, if False provide a counterexample.

1. A homogeneous system is always consistent.
2. If S is a linearly dependent set of vectors, then each vector in S is a linear combination of the other vectors in S .
3. Columns of a 3×2 matrix can never span \mathbb{R}^3 .