Homework 6 - Due Tuesday, August 8th at 10:00AM

Linear Independence, Basis, and Eigenvalues Practice

Make sure to justify your solution for each problem.

1. Determine if the columns of A form a linearly independent set.

$$A = \begin{bmatrix} -4 & -3 & 0 \\ 0 & -1 & 4 \\ 1 & 0 & 3 \\ 5 & 4 & 6 \end{bmatrix}$$

2. Find a basis for each of the following subspaces of $\mathbb{R}^n$.

   (a) All vectors whose components are equal in $\mathbb{R}^4$.

   (b) All vectors whose components add up to zero in $\mathbb{R}^4$.

3. Consider the matrix $A = \begin{bmatrix} 2 & 5 & -8 & 7 \\ -1 & 5 & 4 & 7 \\ 0 & 5 & 0 & 7 \end{bmatrix}$. Find a basis for $ColA$.

4. If A is an $n \times n$ matrix and λ is an eigenvalue of A, show that 2λ is an eigenvalue of 2A.