Math 375
Worksheet 3 - Linear Independence
9/16/15

Linear Independence

For 1–4, determine whether the following sets are linearly dependent or linearly independent.

1. $$\left\{ \begin{pmatrix} 1 & -3 \\ -2 & 4 \end{pmatrix}, \begin{pmatrix} -2 & 6 \\ 4 & -8 \end{pmatrix} \right\} \text{ in } M_{22}(\mathbb{R})$$

2. $$\left\{ \begin{pmatrix} 1 & -2 \\ -1 & 4 \end{pmatrix}, \begin{pmatrix} -1 & 1 \\ 2 & -4 \end{pmatrix} \right\} \text{ in } M_{22}(\mathbb{R})$$

3. $\{(1,-1,2),(1,-2,1),(1,1,4)\}$ in $\mathbb{R}^3$.

4. $\{(1,-1,2),(2,0,1),(-1,2,-1)\}$ in $\mathbb{R}^3$.

5. Let $\mathbf{u}$ and $\mathbf{v}$ be distinct vectors in a vector space V. Prove that $\{\mathbf{u}, \mathbf{v}\}$ is linearly dependent if and only if $\mathbf{u}$ or $\mathbf{v}$ is a multiple of the other.

6. Prove that a set S of vectors in linearly independent if and only if each finite subset of S is linearly independent.