Basis of a Vector Space

Recall: A set of vectors is linearly independent if the vector equation:

$$c_1\mathbf{v}_1 + c_2\mathbf{v}_2 + ... + c_p\mathbf{v}_p = 0,$$

only has the trivial solution where $c_1 = c_2 = ... = c_p = 0$. Or, if the vectors make up the columns of a matrix A and the matrix equation $A\mathbf{x} = \mathbf{0}$ has only the trivial solution: $\mathbf{x}$. Note that this is two different ways of saying the exact same thing.

Example 17.1 – Polynomial and Function linear dependence

Definition of Basis:

Examples of Bases:

<u>Example 17.2</u>:

<u>Theorem 5 (yes, we skipped Thm 4)</u>:

1.

2.

<u>Proof of Theorem 5</u>:

Finding Bases for Nul A and Col A

Example 17.3:

Theorem 6: