Subspaces

This section focusses on important sets of vectors in $\Re^n$ called subspaces. Often subspaces arise in connection with some matrix A and they provide useful information about the equation $A\mathbf{x} = \mathbf{b}$.

A **subspace** of $\Re^n$ is any set Φ in $\Re^n$ that has three properties:

a. The zero vector is in Φ.

b. For each $\mathbf{u}$ and $\mathbf{v}$ in Φ, the sum $\mathbf{u} + \mathbf{v}$ is in Φ (closed under vector addition).

c. For each $\mathbf{u}$ in Φ and each scalar α, the vector $\alpha\mathbf{u}$ is in Φ (closed under scalar multiplication).