Additional Lecture and Reading Notes

Lecture 1f

(from lecture presention)
Definition: Suppose that $\mathbb{V}$ is a vector space. Then $\mathbb{U}$ is a subspace of $\mathbb{V}$ if is satisfies the following three properties:
S0. $\mathbb{U}$ is a non-empty subset of $\mathbb{V}$
S1. $\mathbf{x} + \mathbf{y} \in \mathbb{U}$ for all $\mathbf{x}, \mathbf{y} \in \mathbb{U}$ ($\mathbb{U}$ is closed under addition)
S2. $t\mathbf{x} \in \mathbb{U}$ for all $\mathbf{x} \in \mathbb{U}$ and $t \in \mathbb{R}$ ($\mathbb{U}$ is closed under scalar multiplication)

Note that I have modified the statement of this definition slightly from the one in the text to emphasize the need to verify that $\mathbb{U}$ is not the empty set, as well as emphasizing the need to show that $\mathbb{U}$ is actually a subset of $\mathbb{V}$.