6.8 Linear Combinations and Spanning Sets

Given the non collinear vectors $\vec{u}$ and $\vec{v}$, and the scalars *a* and *b*, we can construct a third vector $\vec{w} = a\vec{u} + b\vec{v}$ (we call $\vec{w}$ a **linear combination** of vectors $\vec{u}$ and $\vec{v}$) .

Picture:

Since $\vec{w}$ is a **linear combination** of $\vec{u}$ and $\vec{v}$ we say that the set of vectors $\{\vec{w}, \vec{u}, \vec{v}\}$ form a **linear dependent set**. Now, because $\vec{u}$ and $\vec{v}$ are **not collinear**, we call the set $\{\vec{u}, \vec{v}\}$ a **linearly independent set.**

Note:

Example 6.8.1

Show that $\vec{w} = (2, -1)$ can be written as a linear combination of $\vec{u} = (3, 3)$ and $\vec{v} = (1, 2)$.

Example 6.8.2

Show that $\vec{w}=(2,-1)$ cannot be written as a linear combination of $\vec{x}=(1,3)$ and $\vec{y}=(-2,-6)$.

Class/Homework for Section 6.8 (pt. 1)

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