1. Vector

$\vec{u}.\vec{v} = u_1 * v_1 + u_2 * v_2 = |\vec{u}||\vec{v}|cos(\theta)$

$|\vec{u}|^2 = \vec{u}.\vec{u}$

Linear combination

$a_1\overrightarrow{v_1}+\ldots+a_m\overrightarrow{v_m}$

Span

$span(v_1,\ldots,v_m) = \{a_1\overrightarrow{v_1}+\ldots+a_m\overrightarrow{v_m}|a_1,\ldots,a_m \in \mathbb{R}\}$

Linear independent

A list $(v_1,..,v_m)$ is linear independent if the only choice of $a_1,\ldots,a_m \in \mathbb{R}$ that makes $a_1\overrightarrow{v_1}+\ldots+a_m\overrightarrow{v_m} = 0$ is $a_1 =\ldots= a_m = 0$

Basic of V:

a list of vectors in V that

- linear independent
- span V

every $\vec{v} \in V$ can be written **uniquely** in form of a linear combination of the basic

Dim = len(basic)