

the span

example

the linear span

the span

- Given some vectors we now ask: what is the set of all vectors that you can get from a linear combination of these specific vectors?
- The answer is "*the span of these vectors*". Because of the rules of vector addition, any such linear combination will be in the vector space.

The set of all linear combinations of vectors $\vec{v}_1, \vec{v}_2, \dots, \vec{v}_n$ is denoted by $\text{span}(\vec{v}_1, \vec{v}_2, \dots, \vec{v}_n)$ and called **the linear span** of these vectors.

example

What is the span of the vectors $\vec{v}_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$?

We can actually get to any other vector in the plane, by taking a linear combination of \vec{v}_1 and \vec{v}_2 . In other words, the span of \vec{v}_1 and \vec{v}_2 is \mathbb{R}^2 , i.e. the whole plane.

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