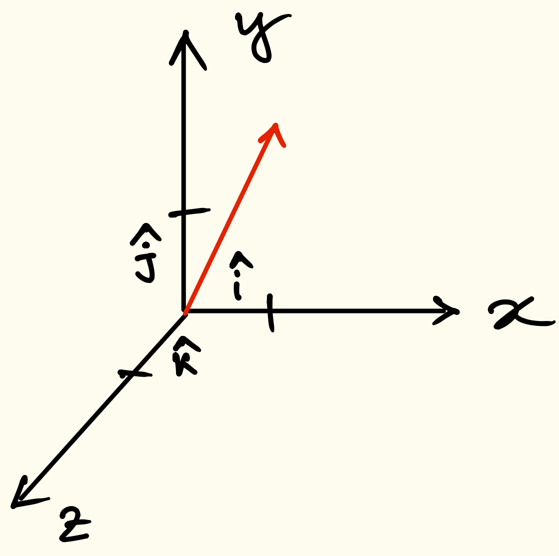
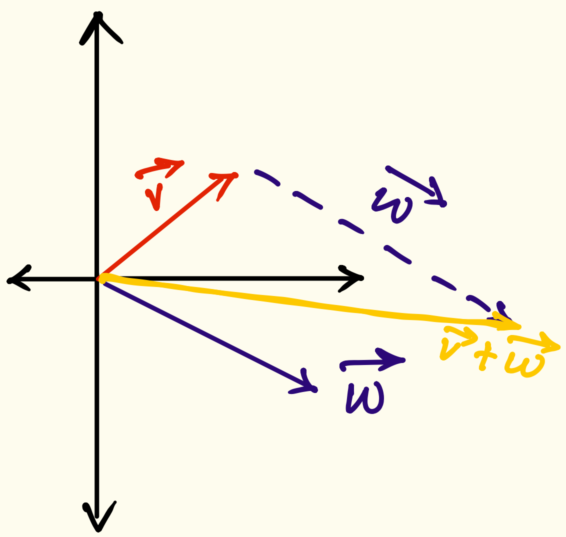
Vectors:



- unit vectors = i, j, z
- using these unit vectors we can represent any vectors in the space.
- $\begin{bmatrix} i \\ j \\ k \end{bmatrix}$ → basis vector

→ co-efficients of i, j, k tell us how far to move along x, y, z axes respectively.

Addition:



→ move towards $\vec{v}$ vector then from there $\vec{w}$ vector we will get $= \vec{v} + \vec{w}$

→ $\vec{v} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ $\vec{w} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$

$= \vec{u} = \vec{v} + \vec{w}$

$= \begin{bmatrix} 1 \\ 2 \end{bmatrix} + \begin{bmatrix} 3 \\ -1 \end{bmatrix} = \begin{bmatrix} 4 \\ 1 \end{bmatrix}$

$\vec{u} = \begin{bmatrix} 4 \\ 1 \end{bmatrix}$ from the origin in the direction of $\hat{i}$, $\hat{j}$.

$\vec{u} = \begin{bmatrix} x_1 + x_2 \\ y_1 + y_2 \end{bmatrix}$

Multiplication:

→ scaling
- stretch ⇒ $\vec{v} \rightarrow 2\vec{v}$
- squeez ⇒ $\vec{v} \rightarrow \frac{1}{3}\vec{v}$
- reversing ⇒ $\vec{v} \rightarrow -4\vec{v}$

→ so these numbers 2, ½, -4 are called scalars.

→ $2\vec{v} = \begin{bmatrix} 2x \\ 2y \end{bmatrix}$

→ Linear Algebra revolves around these 2 fundamental operations
- Addition
- Multiplication

→ we can conceptualize numbers in visual way and give patterns of the data.
also gives us global views what certain operations do.

Basis and Span: