2019/12/02

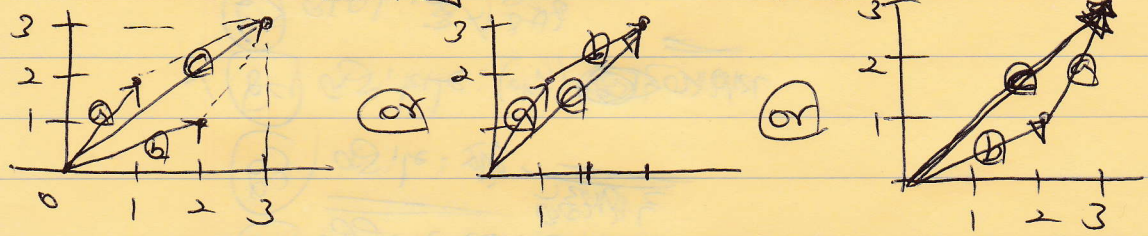
Unit Vector

→ vector that has length "1".

example) $a=\begin{bmatrix}1\\0\end{bmatrix}$, $b=\begin{bmatrix}0\\1\end{bmatrix}$, $c=\begin{bmatrix}\frac{1}{\sqrt{2}}\\ \frac{-1}{\sqrt{2}}\end{bmatrix}$

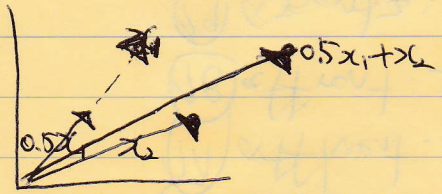
Sum of Vector

$a=\begin{bmatrix}1\\2\end{bmatrix}$, $b=\begin{bmatrix}2\\1\end{bmatrix}$ → $c=a+b=\begin{bmatrix}3\\3\end{bmatrix}$



Linear Combination of Vector

$c_1x_1+c_2x_2+\cdots+c_Nx_N$



example) Find c_1, c_2

$x_1=\begin{bmatrix}1\\2\end{bmatrix}$, $x_2=\begin{bmatrix}2\\1\end{bmatrix}$

(1) $c_1x_1+c_2x_2=\begin{bmatrix}3\\1\end{bmatrix}$

$$c_1\begin{bmatrix}1\\2\end{bmatrix}+c_2\begin{bmatrix}2\\1\end{bmatrix}=\begin{bmatrix}3\\1\end{bmatrix}$$

$$\begin{aligned}c_1+2c_2&=3\\2c_1+c_2&=1\end{aligned} \Rightarrow \begin{aligned}2c_1+4c_2&=6\\2c_1+c_2&=1\end{aligned} \Rightarrow \boxed{c_2=\frac{5}{3}\Rightarrow c_1=-\frac{1}{3}}$$

(2) $c_1x_1+c_2x_2=\begin{bmatrix}-1\\-1\end{bmatrix}$

$$\begin{aligned}c_1+2c_2&=-1\\2c_1+c_2&=-1\end{aligned} \Rightarrow \begin{aligned}2c_1+4c_2&=-2\\2c_1+c_2&=-1\end{aligned} \Rightarrow 3c_2=-1 \Rightarrow \boxed{c_2=-\frac{1}{3}} \Rightarrow \boxed{c_1=\frac{1}{3}}$$