APSC-172

$V = V_0 + t\vec{a}$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} x_0 \\ y_0 \\ z_0 \end{bmatrix} + t \begin{bmatrix} a \\ b \\ c \end{bmatrix} \quad \text{or} \quad \begin{aligned} x &= x_0 + ta \\ y &= y_0 + tb \\ z &= z_0 + tc \end{aligned}$$

example 1.1

$$\vec{r}(t) = \begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix} + \begin{bmatrix} -1 \\ 1 \\ 3 \end{bmatrix} \cdot t$$

$$\vec{r}'(t) = \frac{d}{dt}\left(\begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix} + \begin{bmatrix} -1 \\ 1 \\ 3 \end{bmatrix} t \right) = \begin{bmatrix} -1 \\ 1 \\ 3 \end{bmatrix} = \vec{\omega}$$

$\vec{\omega} = [a, b, c]$

$\|\vec{\omega}\| = \sqrt{a^2 + b^2 + c^2}$ = Speed

(1, 2, 3)

$\vec{\omega} = [a\ b\ c]$

run ↑ rise

$$\text{slope} = \frac{c}{\sqrt{a^2 + b^2}} = \frac{\text{rise}}{\text{run}} = \frac{z \text{ dist}}{\text{xy plane dist}}$$

Hilroy