

# Vectores

{ Magnitud ←  
Dirección ←  
Sentido ←  
+ Vec. ←

$$\vec{A} = |A| \hat{a}$$

↑ vector  
unitario.

Sistemas de coordenadas.

→ Rectangulares.  $(x, y, z)$

⇒ Polares,  $(r, \theta)$

→ Esféricas

→ Cilíndricas.

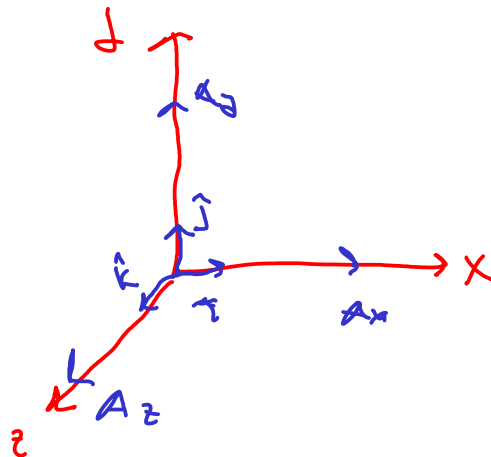
Notación con V.U.

$$(A_x, A_y, A_z) \rightarrow A_x \hat{i} + A_y \hat{j} + A_z \hat{k}$$

$$\hat{i} \rightarrow x$$

$$\hat{j} \rightarrow y$$

$$\hat{k} \rightarrow z$$

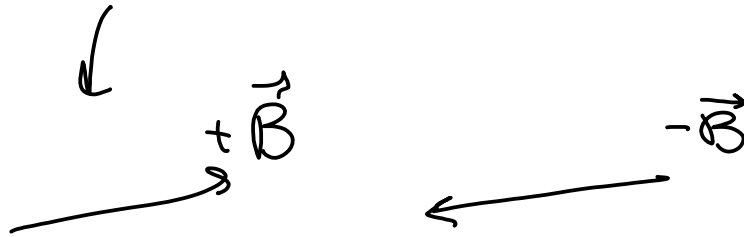


## Suma y Resta:

$$\vec{A} = (A_x, A_y) \longrightarrow \vec{A} + \vec{B} = (A_x + B_x, A_y + B_y)$$

$$\vec{B} = (B_x, B_y)$$

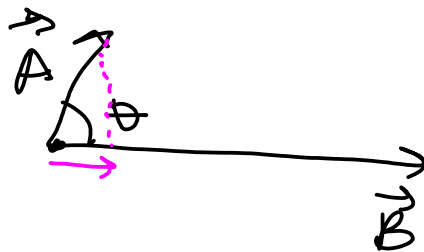
$$\vec{A} + (-\vec{B}) \longrightarrow (A_x - B_x, A_y - B_y)$$



## Producto Punto (Escalar):

$$\vec{A} \cdot \vec{B} \longmapsto c \in \mathbb{R}$$

$$\rightarrow \vec{A} \cdot \vec{B}$$



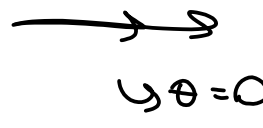
$$\vec{A} \cdot \vec{B} = |\vec{B}| |\vec{A}| \cos \theta$$


$$0 \leq \theta \leq \pi$$

$$0 \leq \theta \leq 180^\circ$$

$$\vec{A} \cdot \vec{B} = (A_x B_x) + (A_y B_y) + (A_z B_z)$$

Def:

→ Vec. Paralelos:  $\vec{A} \cdot \vec{B} = |\vec{A}| |\vec{B}|$  

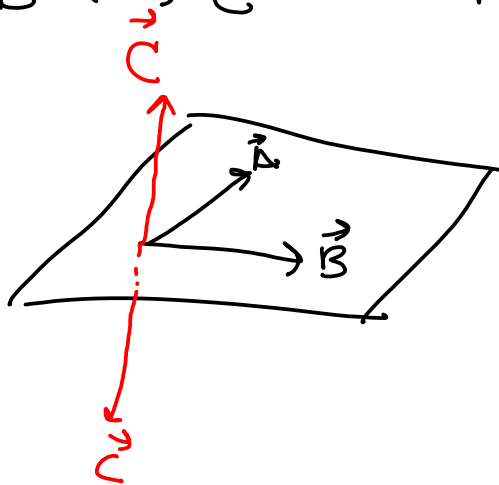
→ Vec. Antiparalelos:  $\vec{A} \cdot \vec{B} = -|\vec{A}| |\vec{B}|$  

→ Vec. Perpendiculares:  $\vec{A} \cdot \vec{B} = 0$

Producto Cruz (Vectorial):

$\vec{A} \times \vec{B} \rightarrow \vec{C} \rightarrow$  Perpendicular a  $\vec{A}$  y  $\vec{B}$ .

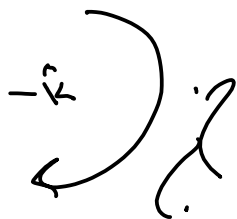
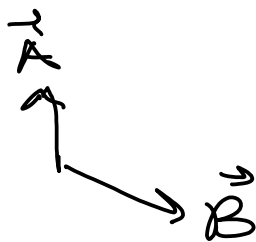
No  
Comuta



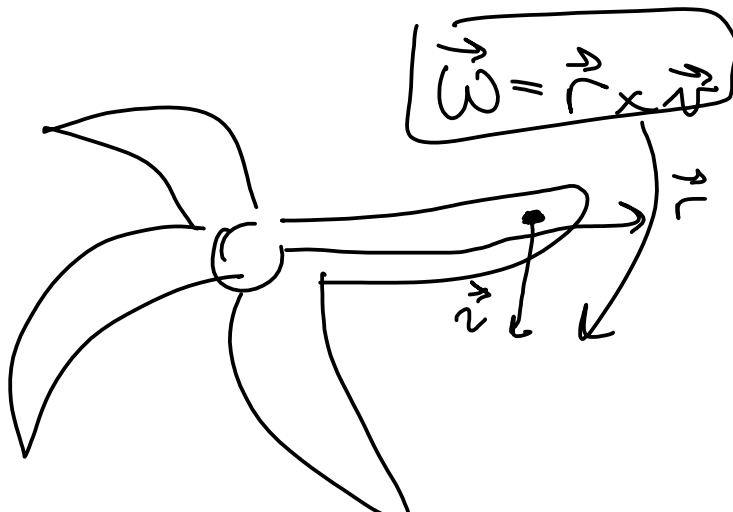
$$\vec{A} \times \vec{B} = -(\vec{B} \times \vec{A})$$

$$\vec{A} \times \vec{B} = -\hat{k}$$

$$\vec{B} \times \vec{A} = \hat{k}$$



Supuesto  
vector



$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ A_x & A_y & A_z \\ B_x & B_y & B_z \end{vmatrix} = (A_y B_z - A_z B_y) \hat{i} \leftarrow \\ - (A_x B_z - A_z B_x) \hat{j} \leftarrow \\ + (A_x B_y - A_y B_x) \hat{k} \rightarrow$$

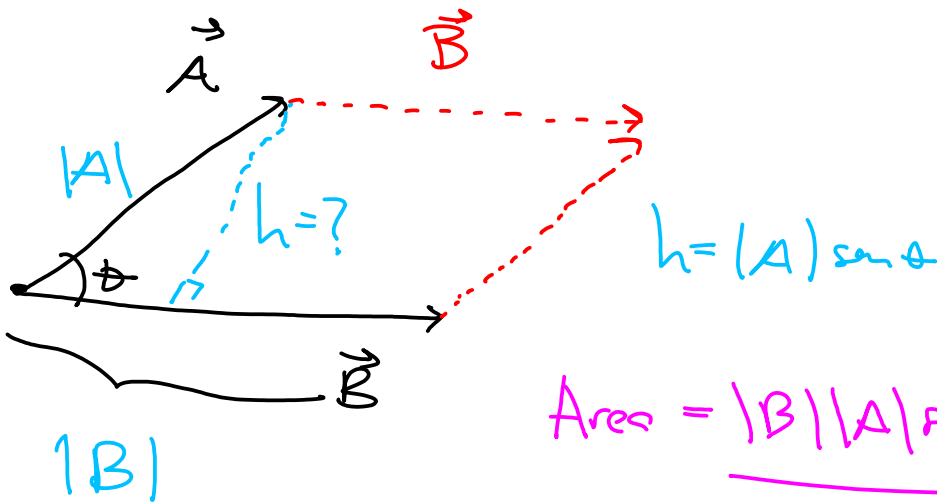
↘

Note: 3 blue 1 Brown

↳ Cross Product.

$$|\vec{A} \times \vec{B}| = |\vec{A}| |\vec{B}| \sin \theta \rightarrow \text{Area de}$$

$$0 \leq \theta \leq \pi$$


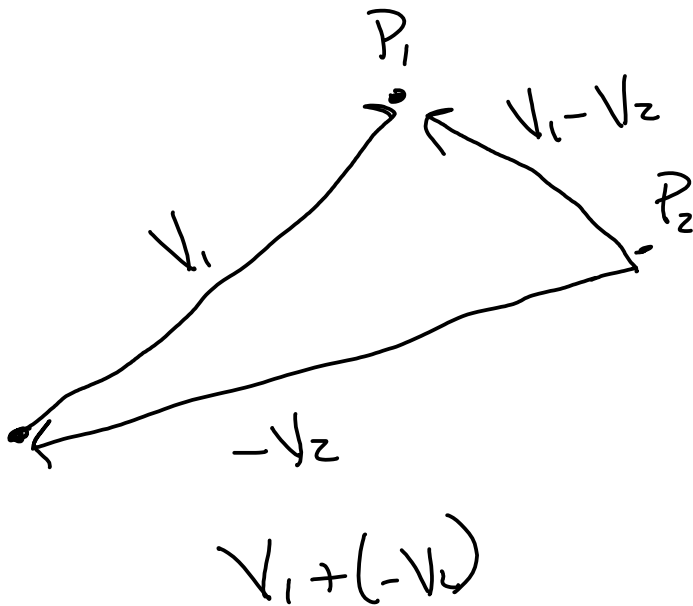


$$\text{Area} = |\vec{B}| |\vec{A}| \sin \theta$$

$$P_1 = (10, 2, 0)$$

$$P_2 = (7, 8, 9)$$

Vector entre  
2 puntos

$$P_1 - P_2 = (3, -6, -9)$$

$$P_2 - P_1 =$$