

09/07/2025

VECTORES

①

PRODUTO "PONTO" ENTRE DOS VECTORES

$$\vec{a} = (a_1, a_2, a_3) ; \vec{b} = (b_1, b_2, b_3)$$

$$\vec{a} \cdot \vec{b} = a_1 b_1 + a_2 b_2 + a_3 b_3$$

OBSERVAÇÕES 1) $\vec{a} \cdot \vec{a} = a_1^2 + a_2^2 + a_3^2 = |\vec{a}|^2$

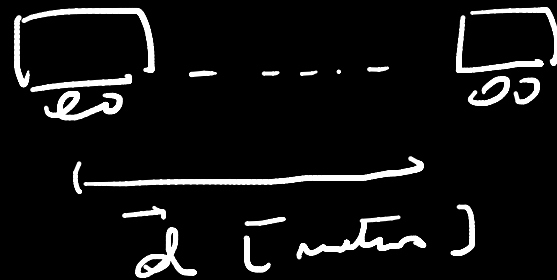
pois que $|\vec{a}| = \sqrt{a_1^2 + a_2^2 + a_3^2}$

2) 

$$\vec{a} \cdot \vec{b} = |\vec{a}| |\vec{b}| \cos \theta$$

$$\cos \theta = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}| |\vec{b}|}$$

Aplicación 3) $\vec{F}$ [Newton]

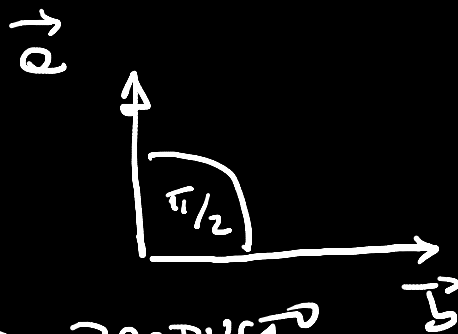


$$\vec{F} \cdot \vec{d} = W \text{ (trabajo)}$$

$$\vec{F} = k_g \frac{m}{s^2}$$

$$[W] = [\vec{F}] \cdot [m] = \frac{kg \cdot m^2}{s^2} = \text{Joule}$$

Aplicación 4)

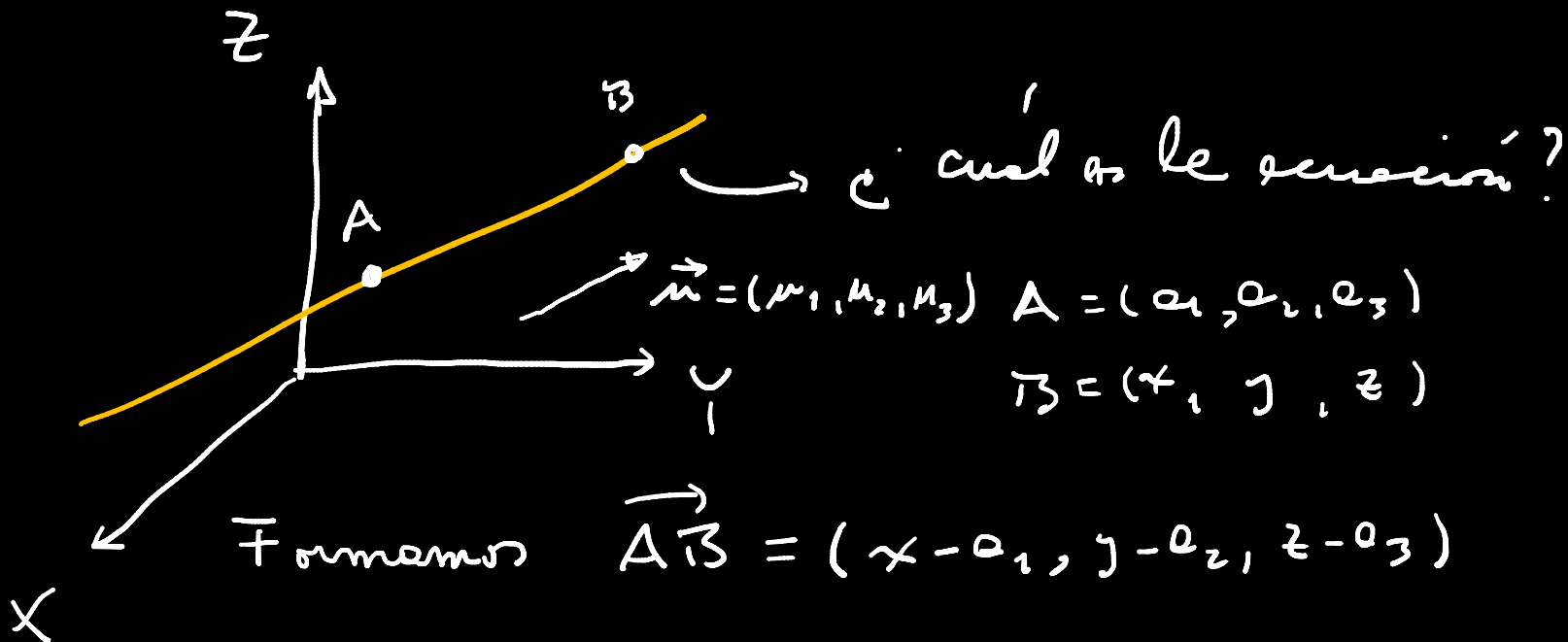


$$\vec{a} \cdot \vec{b} = |\vec{a}| |\vec{b}| \cos \frac{\pi}{2}$$

$$\vec{a} \cdot \vec{b} = 0$$

Dos vectores
perpendiculares su producto
punto es cero.

La ecuación de la recta en el espacio



$$\vec{AB} = \lambda \vec{\mu}$$

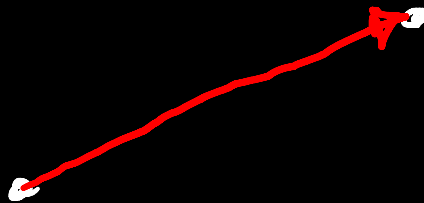
$$(x - a_1, y - a_2, z - a_3) = (\lambda \mu_1, \lambda \mu_2, \lambda \mu_3)$$

$$x - a_1 = \lambda \mu_1 ; y - a_2 = \lambda \mu_2 ; z - a_3 = \lambda \mu_3$$

$$x = a_1 + \lambda \mu_1 ; y = a_2 + \lambda \mu_2 ; z = a_3 + \lambda \mu_3$$

Antecedente

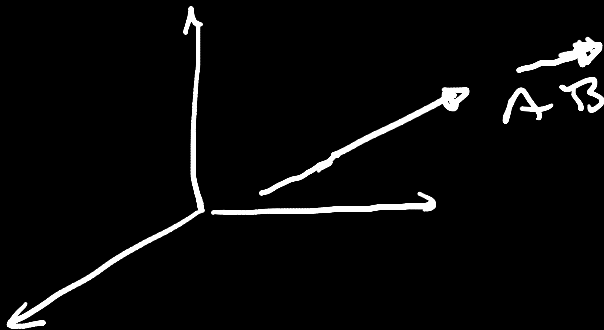
1ª)


$$\vec{B} = (-2, 3, 5)$$

$$A = (1, 2, 4)$$

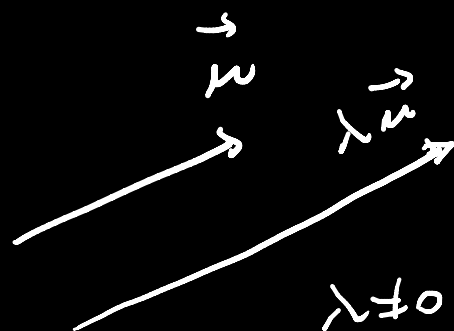
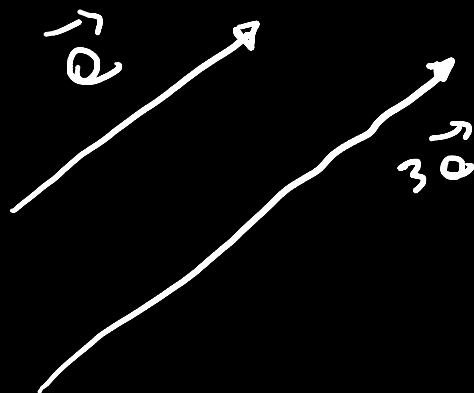
$$\begin{aligned}\vec{BA} &= A - B \\ &= (3, -1, -1)\end{aligned}$$

$$\vec{AB} = B - A = (-3, 1, 1)$$



2°)

$3\vec{a}$



E_{simple} $\vec{a} = (-4, 2, 1)$

$$\vec{b} = (-12, 6, 3)$$

$$\vec{c} = (2, -1, -0.5)$$

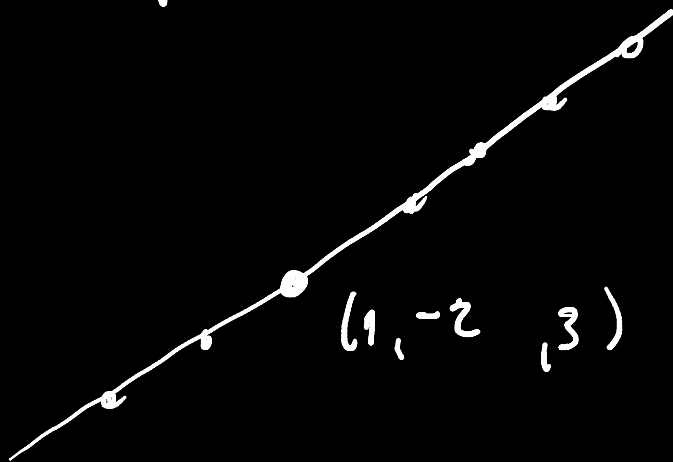
Ejemplo: Calcular las ecuaciones de la recta que pase por el punto $(1, -2, 3)$ y tiene la dirección $\vec{\mu} = (3, 2, 5)$

$$x = 1 + 3\lambda$$

$$y = -2 + 2\lambda$$

$$z = 3 + 5\lambda$$

para cualquier λ



Otro ejemplo. Encontrar la ecuación de la recta que pase por los puntos

$$\checkmark A = (-2, 1, 3) \quad ; \quad B = (0, 2, 1)$$

La dirección $\vec{\mu}$ estará dada por

$$\vec{\mu} = \vec{AB} = (2, 1, -2) \quad \checkmark \quad \mu = 0$$

$$\lambda = 1$$

$$x = -2 + 2 \cdot \lambda$$

$$y = 1 + \lambda$$

$$z = 3 - 2\lambda$$

para cualquier λ

$$x = 0 + 2 \cdot \mu$$

$$y = 2 + \mu$$

$$z = 1 - 2\mu$$

cualquier μ