

$$x=0$$

$m = \text{Slope}$

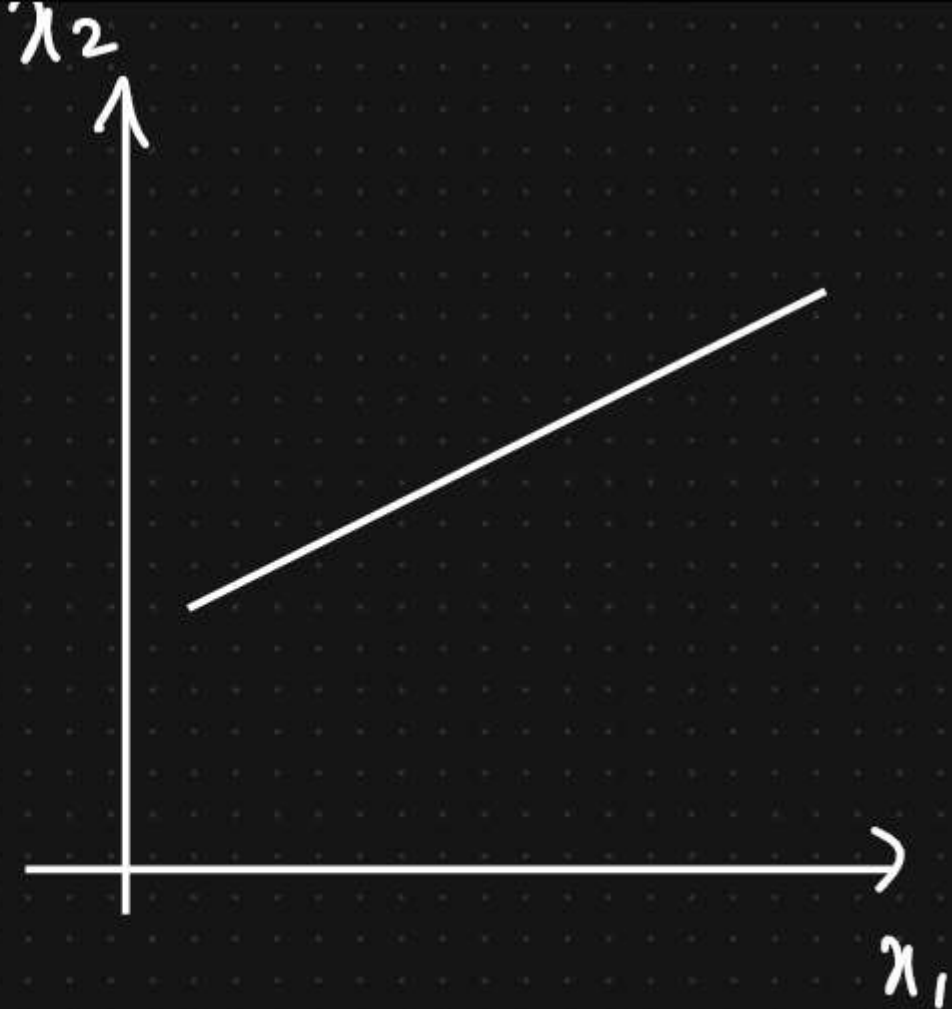
$C = \text{Intercept}$

$$y = mx + C$$

$$y = \beta_0 + \beta_1 x$$

$$ax + by + c = 0$$

$$by + c = -ax$$



$$w_1 x_1 + w_2 x_2 + b = 0$$

$$y = mx + c$$

$\Leftarrow$

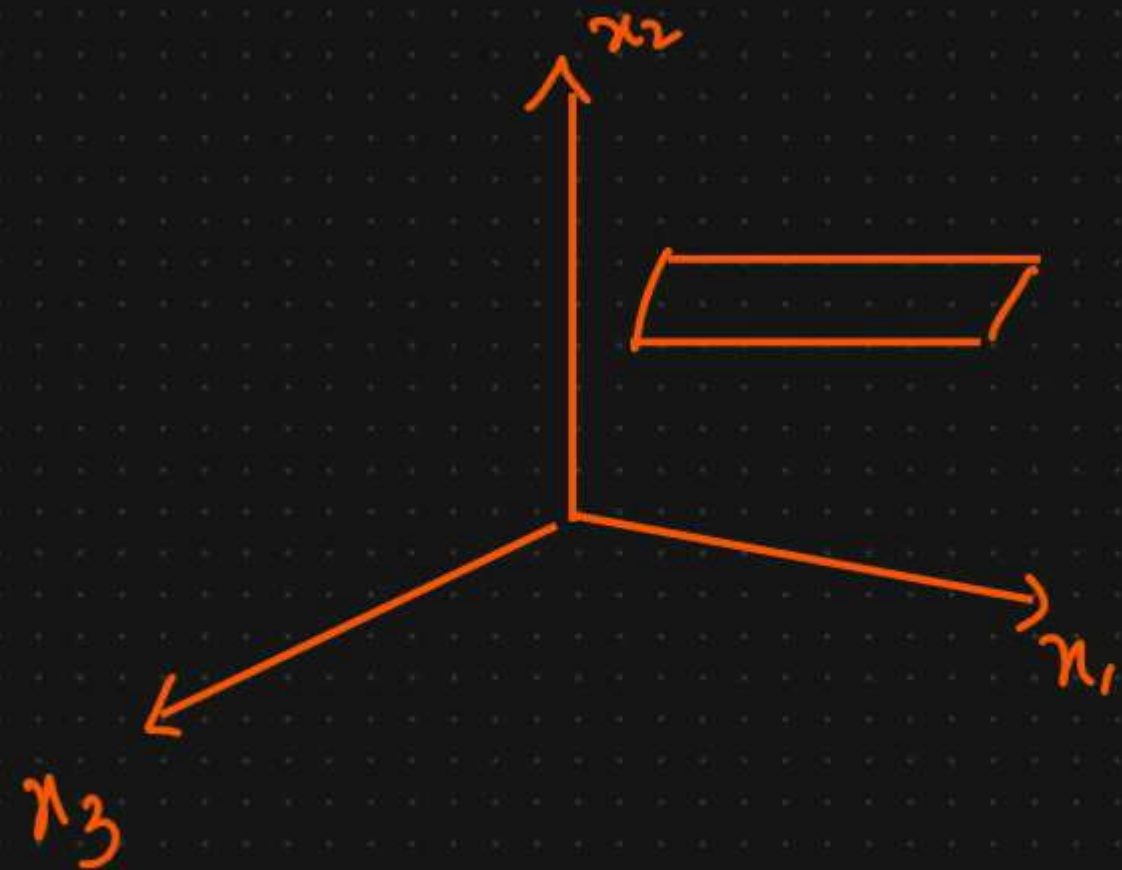
$$y = \underbrace{\begin{bmatrix} -a \\ b \end{bmatrix}}_m x - \underbrace{\begin{bmatrix} c \\ b \end{bmatrix}}_{\rightarrow c}$$

$$by = -ax - c$$

$$\boxed{w^T x + b = 0}$$

$\Downarrow$

Eq of a straight  
line



$$w_1 x_1 + w_2 x_2 + w_3 x_3 + b = 0$$

n-Dimension plane

$$w_1 x_1 + w_2 x_2 + w_3 x_3 + \dots + w_n x_n + b = 0$$

$$\boxed{w^T x + b = 0}$$

$x_2$

A 2D coordinate system with axes labeled  $x_1$  and  $x_2$ . A diagonal line representing a plane is drawn in the first quadrant.

$$w_1 x_1 + w_2 x_2 + b = 0$$

$$w_1 x_1 + w_2 x_2 = 0$$

$$\boxed{w^T x + b = 0}$$

$$w = \begin{bmatrix} w_1 \\ w_2 \\ w_3 \end{bmatrix} \cdot x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$



$$\boxed{w^T x = 0}$$

Equation of a straight  
passing through an  
origin



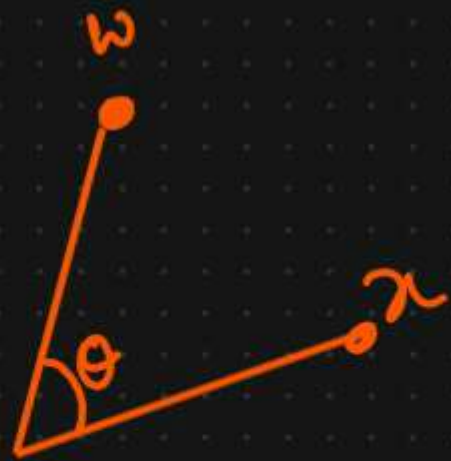
$$w = \begin{bmatrix} w_1 \\ w_2 \\ w_3 \end{bmatrix} \cdot x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Equation of a straight  
passing through an  
origin

$$\boxed{w^T x = 0}$$

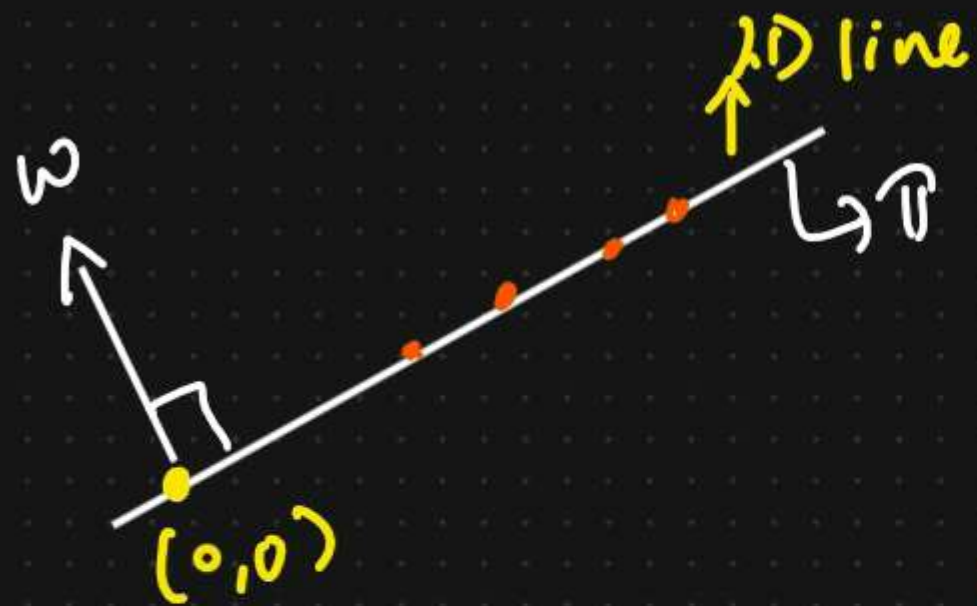
$$\text{Equation of a plane} = \hat{\Pi}_n : w^T x = 0$$

$$\begin{bmatrix} w_1 \\ w_2 \\ w_3 \\ \vdots \\ w_n \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ \vdots \\ x_n \end{bmatrix}$$



$$w^T x = 0$$

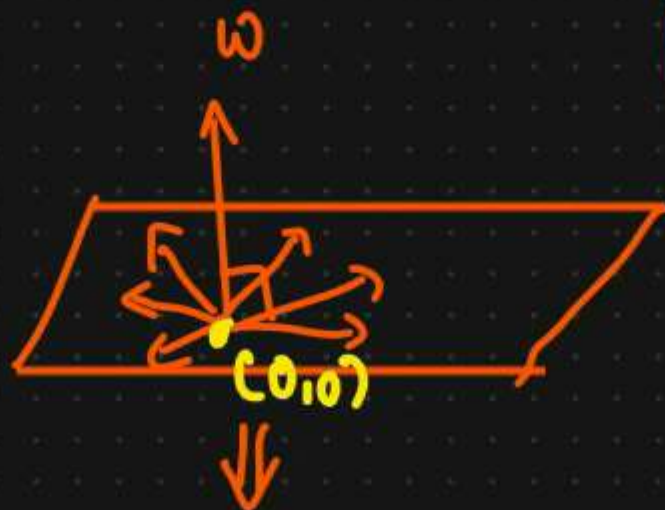
$$w \cdot x = w^T x = \|w\| \|x\| \cos \theta = 0$$



$$\theta = 90$$

$$\cos \theta = 0$$

$$\text{intercept} = 0$$



$$w \perp \pi$$

$$w^T x = 0$$