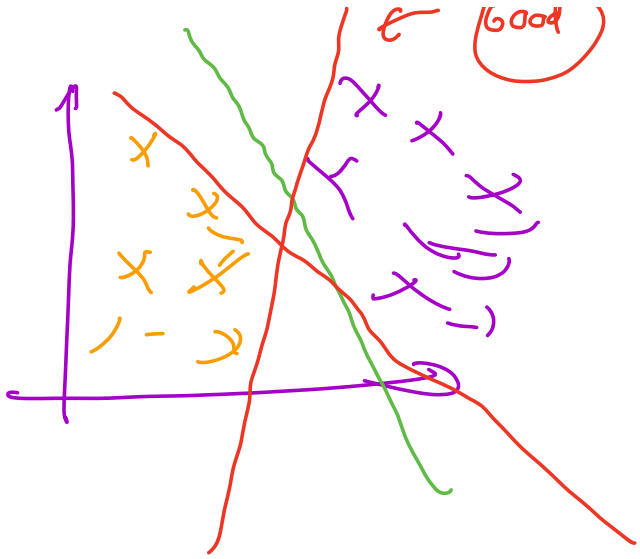
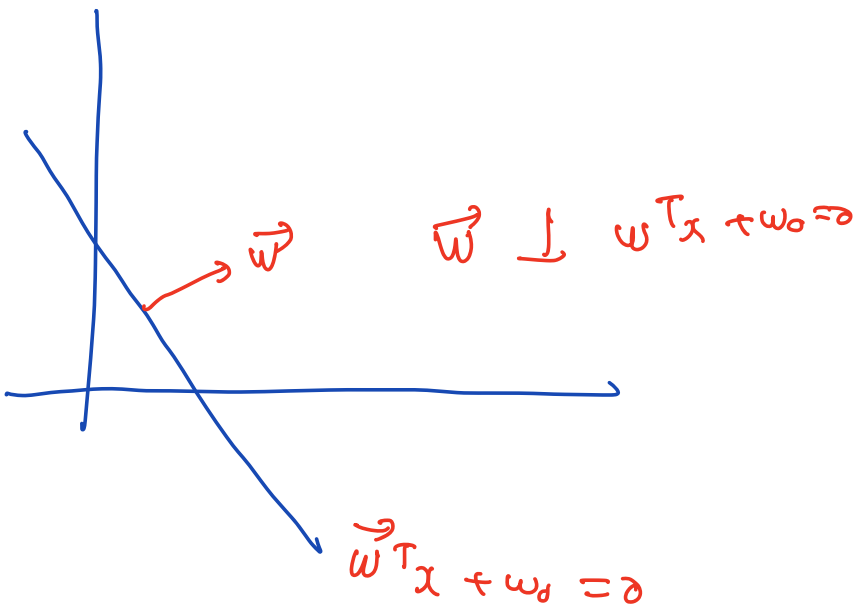
ML ⇒



⇒

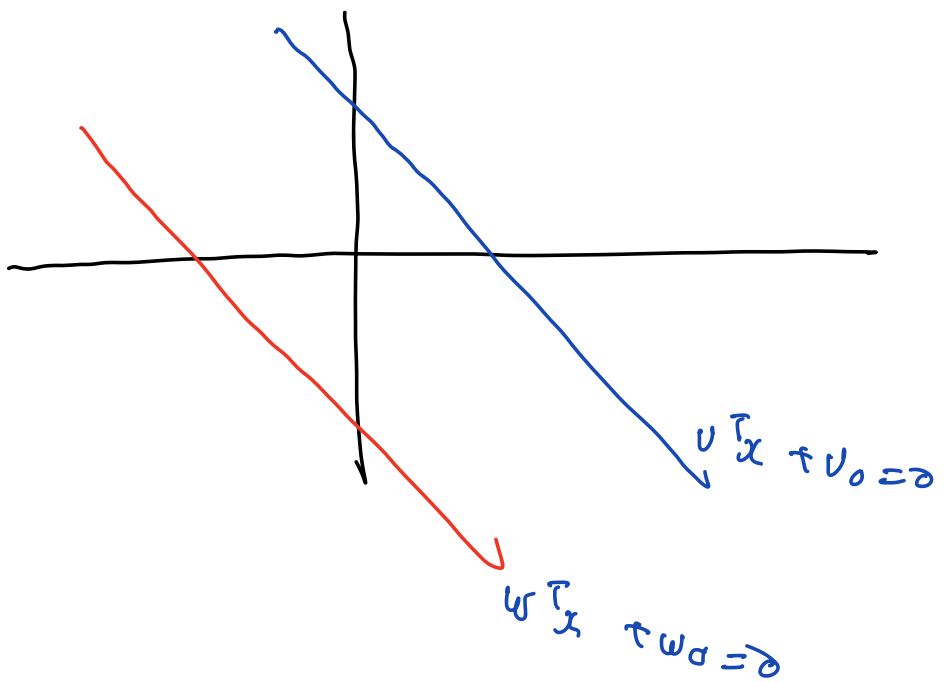


⇒ Distance of a pt from a h-plane

$$d = \frac{\vec{w}^T x_i + w_0}{\|\vec{w}\|}$$

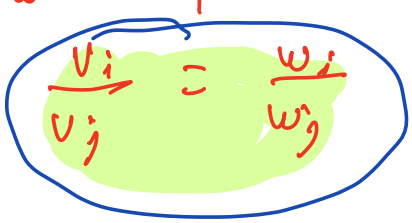
⇒ Half space : if d +ve ⇒ +ve half s)
-ve ⇒ -ve ⟶

Distance b/w parallel lines



Q ⇒ Line is parallel is $w = v$?

True False

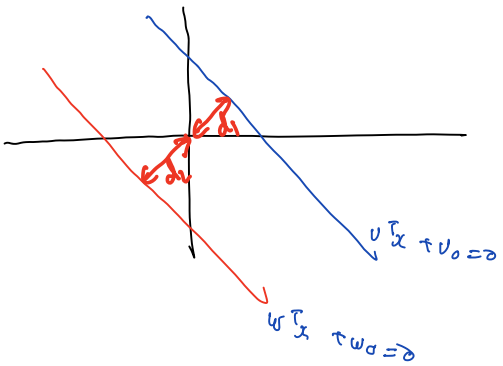


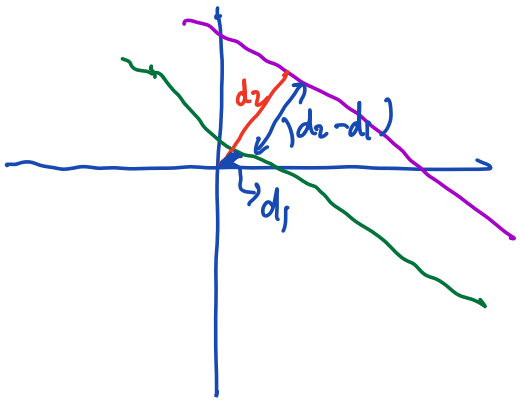
$3x + 2y + 7 = 0$

→ $12x + 8y + 7 = 0$

$3x + 2y + 2 = 0$

$\frac{3}{2} \Rightarrow \frac{r_2}{r_1} = \frac{3}{2}$



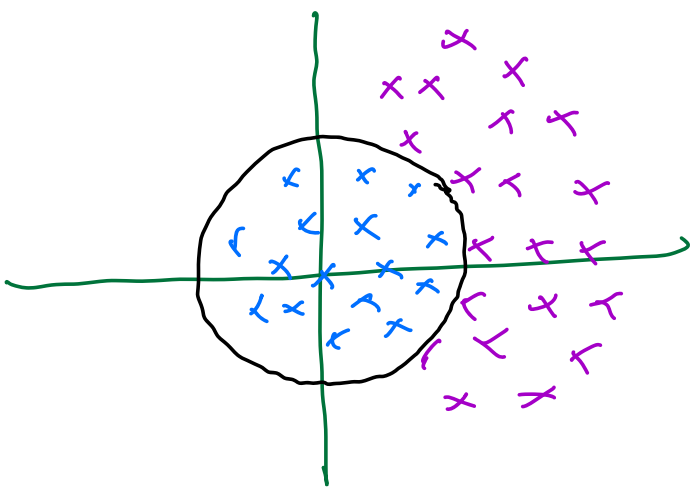


$|d_1 + d_2|$

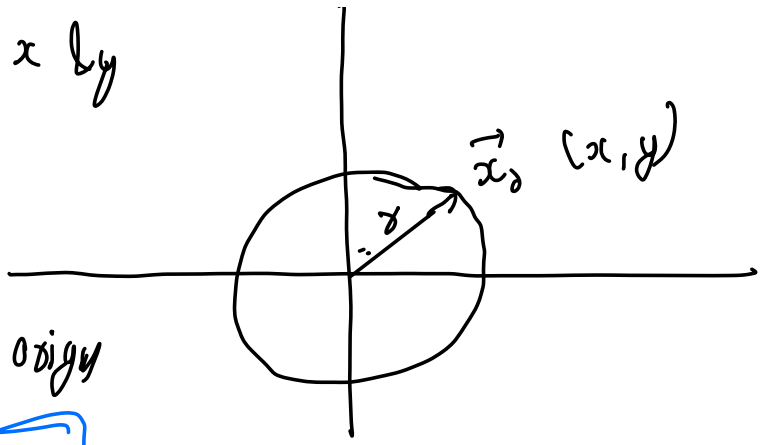
$|d_2| - |d_1|$

$$\frac{|w_0 - v_0|}{|\vec{w}|}$$

Circle



Rel between x by in a circle?

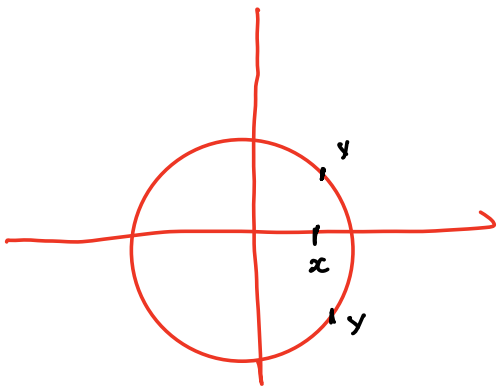


Distance from origin

$$x^2 + y^2 = r^2$$

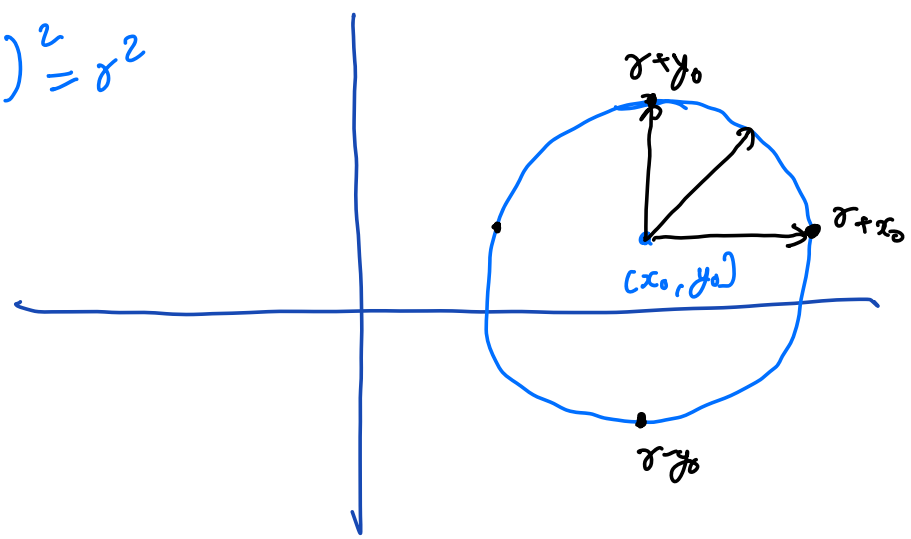
$$y^2 = r^2 - x^2$$

$$y = \pm\sqrt{r^2 - x^2}$$



Q ⇒ What if circle is not in origin?

$$(x - x_0)^2 + (y - y_0)^2 = r^2$$



n-d Hyper sphere

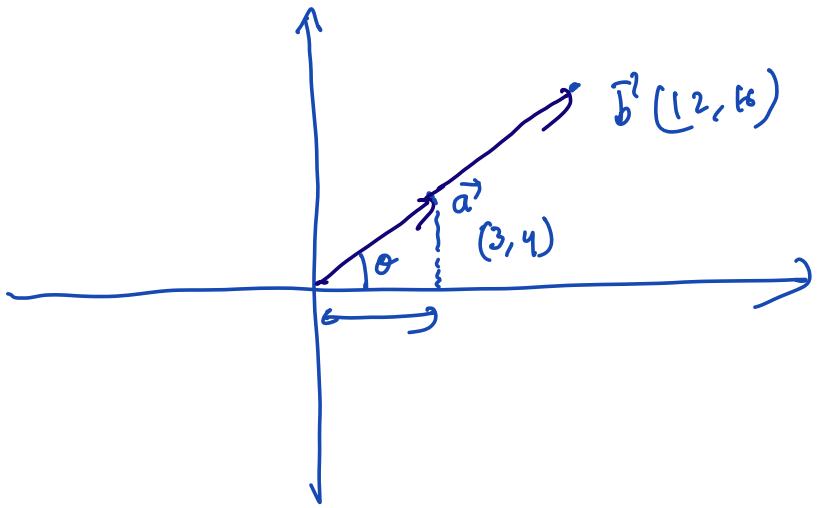
$$(x-x_1)^2+(x-x_2)^2+\cdots-(x_n-x_n)^2 = r^2$$

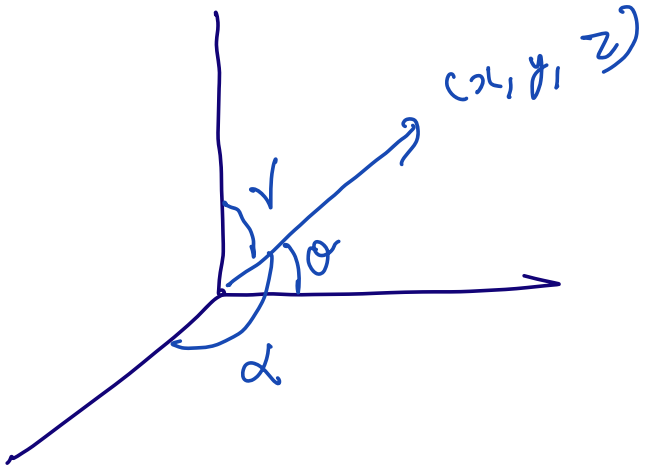
Q) Is $(4,4)$ in the circle $x^2+y^2=25$ $= r^2$

$$r=5$$

$$4^2+4^2 \Rightarrow 32$$

Unit Vectors



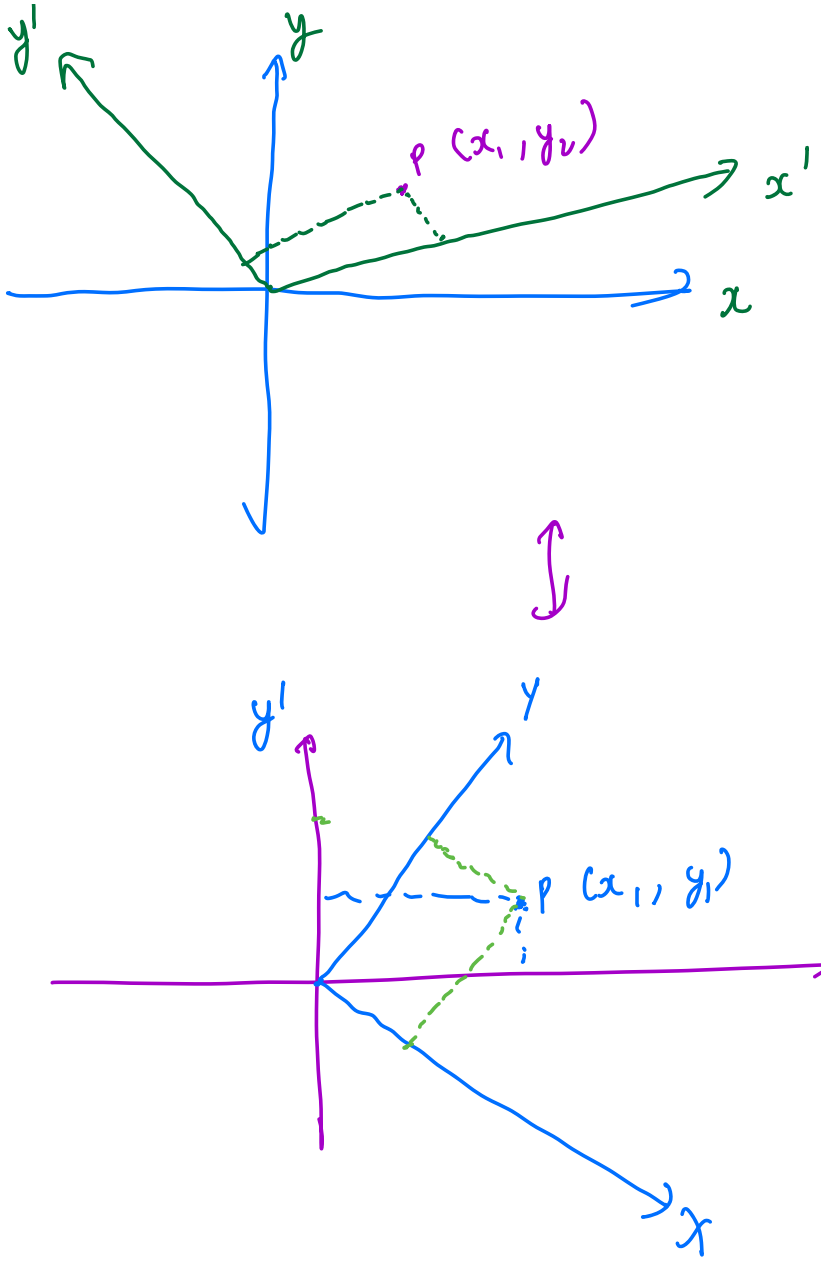


$$\cos\theta = \frac{\text{base}}{\text{hypo}} = \frac{3}{\sqrt{3^2+y^2}} = \frac{3}{5}$$

$$= \frac{12}{\sqrt{12^2+16^2}} = \frac{12}{20} = \frac{3}{5}$$

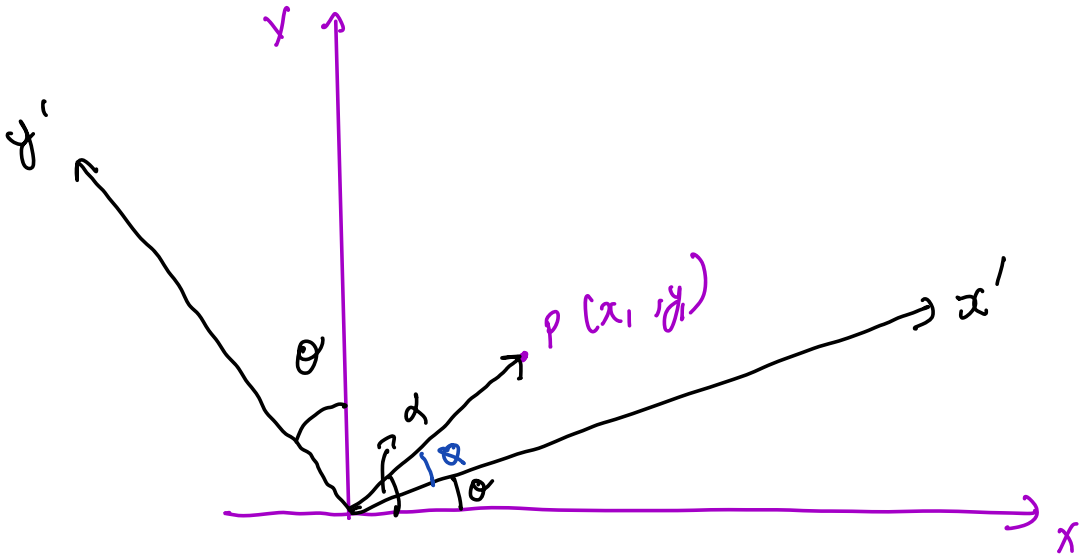
$$\hat{v} = \frac{\vec{v}}{\|v\|}$$

Projection



old → x, y

new → x', y'



$x_1' = \|P\| \cdot \cos\phi$ $\quad \phi = \alpha - \theta$

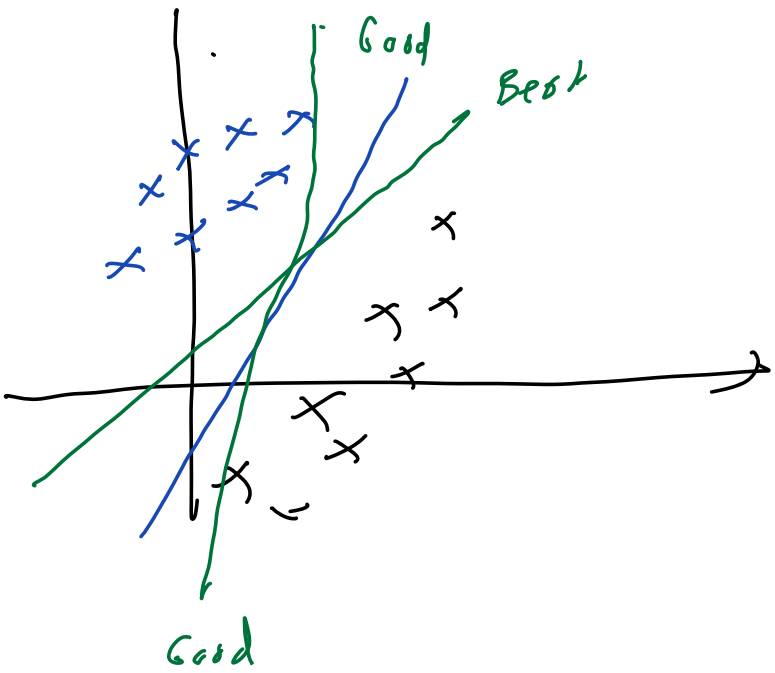
$y_1' = \|P\| \cdot \sin\phi$

General form

$x_1' = x\cos\theta + y\sin\theta$

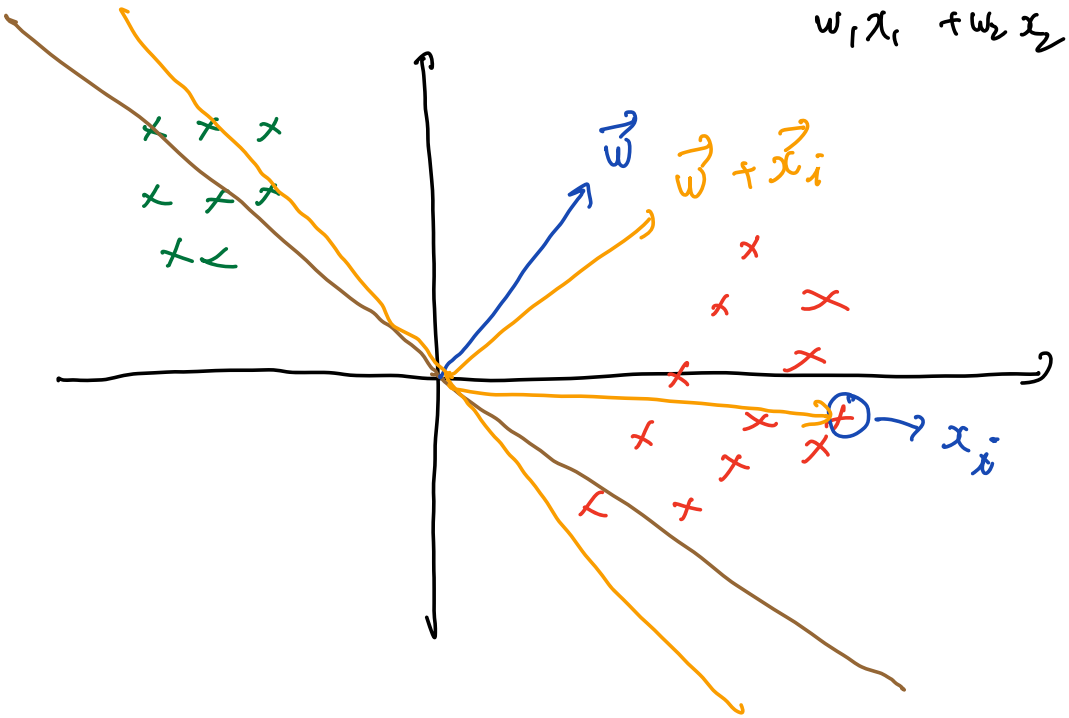
$y_1' = -x\sin\theta + y\cos\theta$

Break : 8:40



age	Income	Credit score	Loan

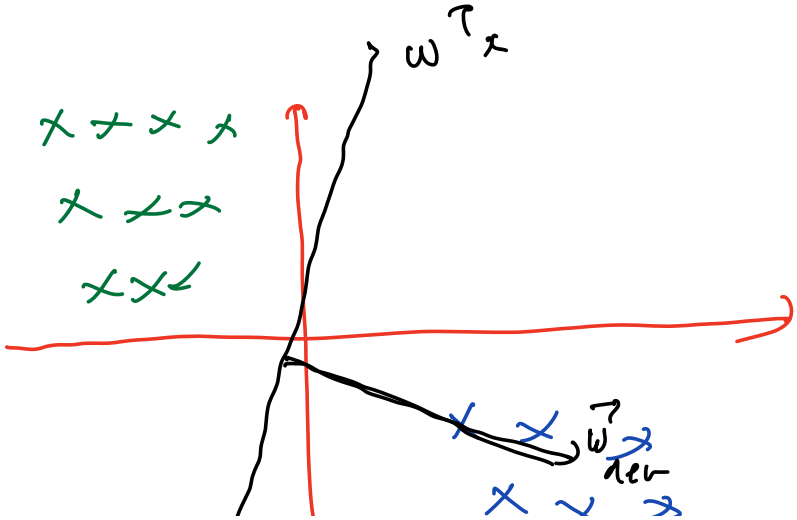
$w_1 x_1 + w_2 x_2 + w_0 = 0$

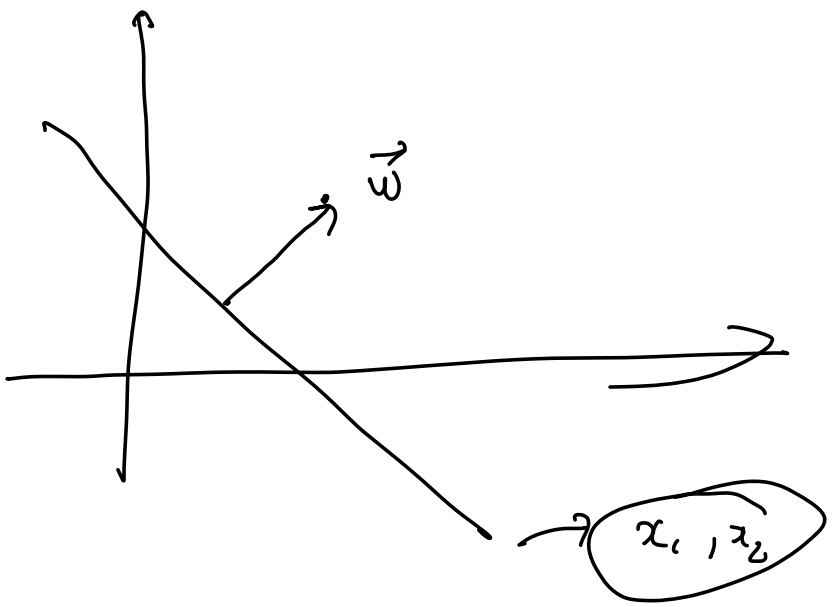


Perceptron Learning Algo

Initialise w_0, $\vec{w}$ randomly

$\vec{w}_{new} = \vec{w}_{old} + x_i$





$w_1 x_1 + w_2 x_2 + w_0 = 0$