XOR is Linear OR Not.

Truth Table

X_1	X_2	Y	
0	0	0	$\sum_{i=0}^{2} x_i w_i < 0$
1	0	1	$\sum_{i=0}^{2} x_i w_i \geq 0$
0	1	1	$\sum_{i=0}^{2} x_i w_i \geq 0$
1	1	0	$\sum_{i=0}^{2} x_i w_i < 0$

Here $Y = X_1 \oplus X_2$

Now

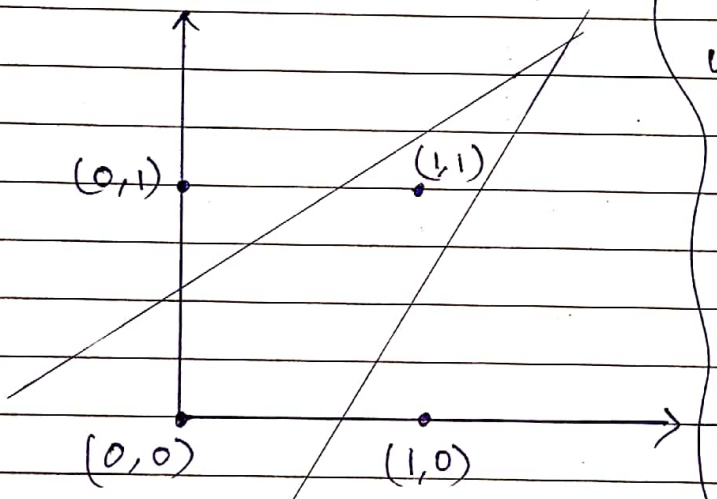
Output = $w_1 X_1 + w_2 X_2 + w_0$

↑ Bias

Threshold = $\theta = 1$

Bias = $w_0 = -\theta = -1$

Now plotting the graph



$w_0 + w_1 \cdot 0 + w_2 \cdot 0 < 0$
$\Rightarrow w_0 < 0$.

$w_0 + w_1 \cdot 0 + w_2 \geq 0$
$\Rightarrow w_1 \geq w_0$

$w_0 + w_1 \cdot 0 + w_2 \geq 0$
$\Rightarrow w_2 \geq -w$

$w_0 + w_1 \cdot 0 + w_2 \cdot 0 < 0$
$\Rightarrow w_0 < 0$

Linear Separable is if there exist a one line or plane such that all inputs which produce a 1 lie on one side of the line or plane and all input which produce a 0 lie on other side of the line or plane.

But in Case of XOR we need a two line to separate a plane in such way that it divide a 1 on one side and 0's on other side.

Hence XOR is not linear.