2021_01_18_Problema 1

Muestra no linealmente separable

i	1	2	3	4	5	6	7	8
x_{i1}	1	3	4	4	3	1	3	2
x_{i2}	4	2	1	3	1	2	3	3
Clase	+1	+1	−1	−1	−1	+1	+1	−1
α_i^*	0.0	**10.0**	0.0	**6.0**	**6.4**	**2.4**	**10.0**	**10.0**
		$>0, <C$		$>0, <C$	$>0, <C$	$>0, <C$	>0	>0

FDL:

$$\theta^* = C_2\alpha_2^* X_2 + C_4\alpha_4^* X_4 + C_5\alpha_5^* X_5 + C_6\alpha_6^* X_6 + C_7\alpha_7^* X_7 + C_8\alpha_8^* X_8$$

$$\theta^* = \Big((1\cdot 10\cdot 3 + -1\cdot 6\cdot 4 + -1\cdot 6{,}4\cdot 3 + 1\cdot 2{,}4\cdot 1 + 1\cdot 10\cdot 3 + -1\cdot 10\cdot 2),$$
$$(1\cdot 10\cdot 2 + -1\cdot 6\cdot 3 + -1\cdot 6{,}4\cdot 1 + 1\cdot 2{,}4\cdot 2 + 1\cdot 10\cdot 3 + -1\cdot 10\cdot 3)\Big)$$

$$\theta^* = (-0{,}8,\ 0{,}4)$$

x_4, primera muestra que verifica $\alpha_4^* > 0$ y $\alpha_4^* < C$

Umbral:

$$\theta_0^* = c_4 - \theta^{*T} x_4 = -1 - (-0{,}8\cdot 4 + 0{,}4\cdot 3) = 1$$

Margen $\Rightarrow$ $\dfrac{1}{\|\theta\|} + \dfrac{1}{\|\theta\|} = \dfrac{2}{\|\theta\|} = 2{,}23$

$$= 2/\sqrt{0{,}8^2 + 0{,}4^2} = 2{,}23606$$

Frontera de separación (hiperplano separador):

$y \Rightarrow -0{,}8x_1 + 0{,}4x_2 + 1 = 0$ — clase +1 + clase −1

Vectores Soporte: $v = (3,2)^t, (4,3)^t, (3,1)^t, (1,2)^t, (3,3)^t, (2,3)^t$

Tolerancia:

$\zeta_1 = 0$

no cumple α

$\zeta_2 = 1 - C_2\left(\theta^{*t} x_2 + \theta_0^*\right) = 1 - 1\cdot(-0{,}8\cdot 3 + 0{,}4\cdot 2 + 1) = 1{,}6$

$\zeta_3 = 0$

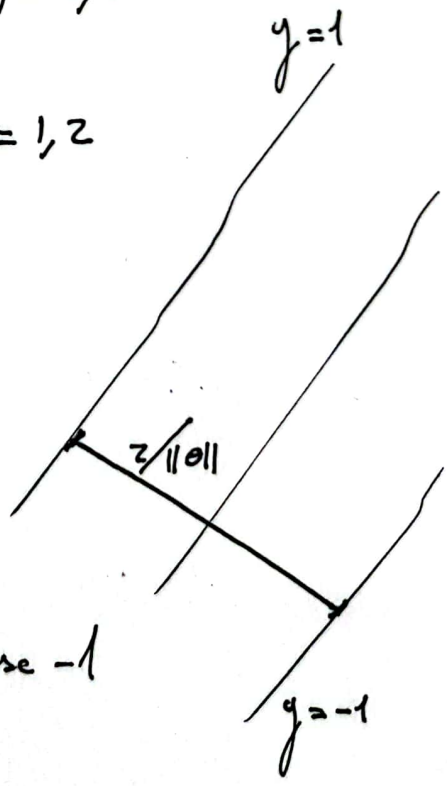
$\zeta_8 = 1 - -1(-0{,}8\cdot 2 + 0{,}4\cdot 3 + 1) = 1{,}6$

$\zeta_4 = 0$

$\zeta_7 = 1 - 1(-0{,}8\cdot 3 + 0{,}4\cdot 3 + 1) = 1{,}2$

$\zeta_5 = 0$

$\zeta_6 = 0$



Clasificación de $(4,4)^t$:

$(-0{,}8\cdot 4 + 0{,}4\cdot 4) + 1 = -0{,}6 \longrightarrow$ clase −1