SVM ⇒

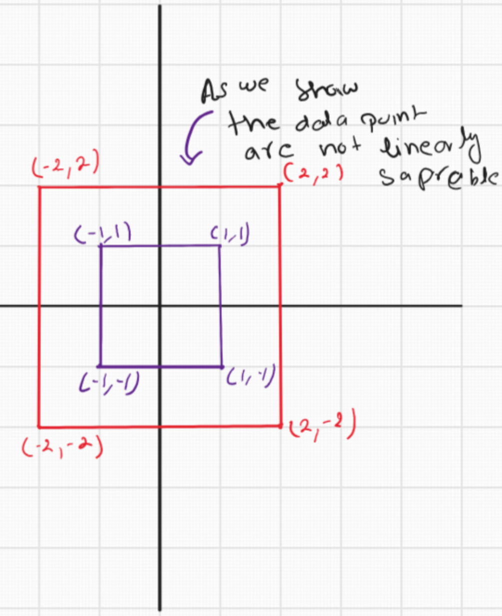
$10, 6 \quad 6, 6 \quad 6, 10$

$+ve \; \{\underline{(2,2)}, (2,-2), (-2,-2), (-2,2)\}$

$-ve \; \{(1,1), (1,-1), (-1,-1), (-1,1)\}$

↳ Converting data point

$$\phi = \begin{cases} \begin{matrix} 4-x_2+|x_1-x_2| \\ 4-x_1+|x_1-x_2| \end{matrix}, & \text{if } \sqrt{x_1^2+x_2^2} > 2 \\ \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}, & \text{otherwise} \end{cases}$$



Non-Linear Data Points ⇒

Updating +ve data point

$$= \sqrt{2^2+2^2} = \sqrt{8} > 2 \begin{bmatrix} 4-2+|2-2| = 2 \\ 4-2+|2-2| = 2 \end{bmatrix}$$

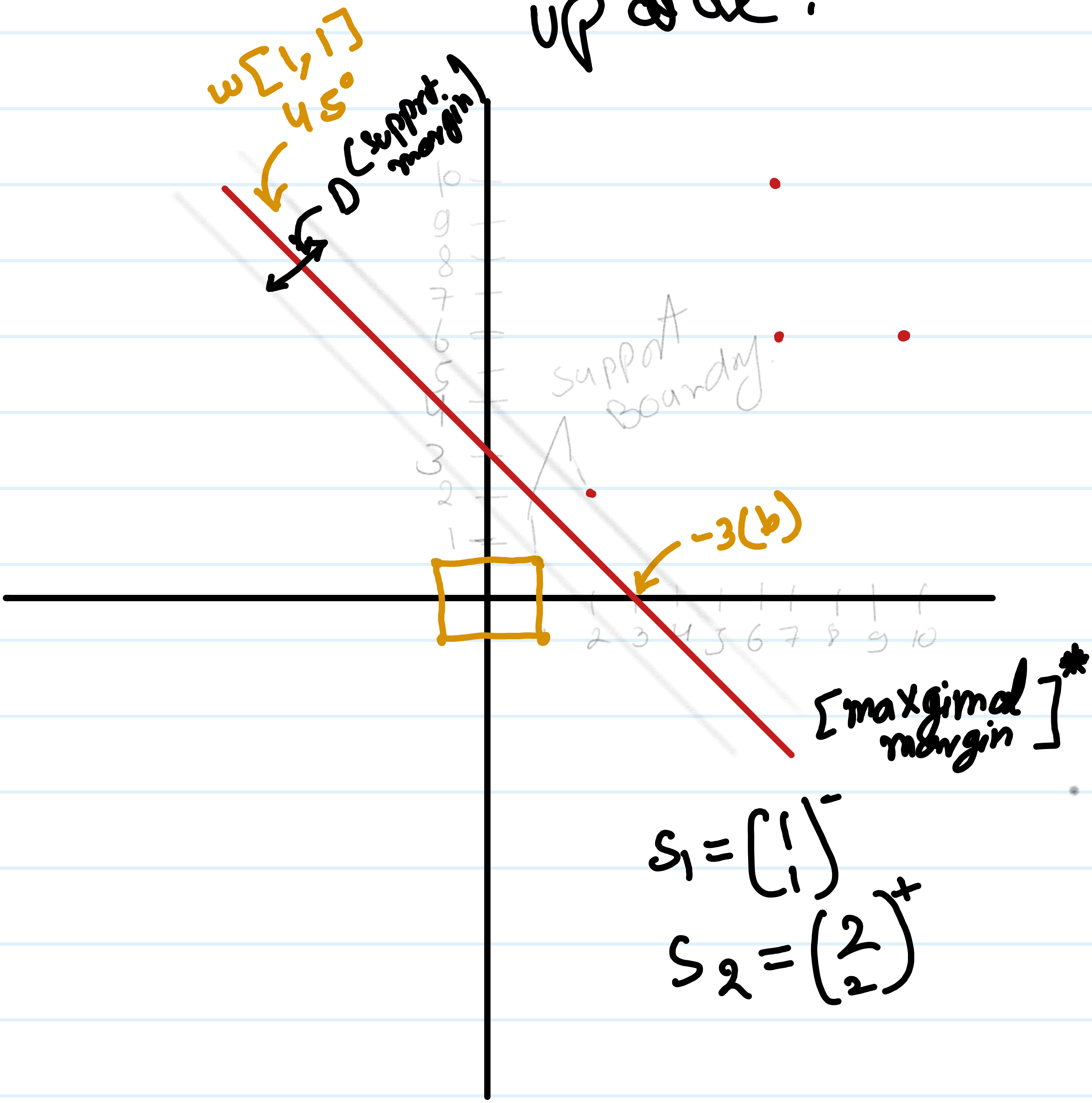
$$= \sqrt{2^2-(-2))^2} = \sqrt{8} > 2 \begin{bmatrix} 4+2+|2+2| = 10 \\ 4-2|2+2| = 6 \end{bmatrix}$$

$$= \sqrt{8} > 2 \begin{bmatrix} 4+2+|-2+2| = 6 \\ 4+2+|-2+2| = 6 \end{bmatrix}$$

$$= \begin{bmatrix} 4-2+|-2-2| = 6 \\ 4+2+|-2-2| = 10 \end{bmatrix}$$

Updating the weight ⇒

$\sqrt{1^2+1^2} = \sqrt{2} \cancel{\times} 2$ So for the Point no weight are need to be update.



$s_1 = \begin{pmatrix}1\\1\end{pmatrix}^-$

$s_2 = \begin{pmatrix}2\\2\end{pmatrix}^+$

$$\hat{S}_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \quad \hat{S}_2 = \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix}$$

Make eq^n.

$$\alpha_1 \hat{S}_1 \hat{S}_1 + \alpha_2 \hat{S}_1 \hat{S}_2 = -1$$
$$\alpha_1 \hat{S}_2 \hat{S}_1 + \alpha_2 \hat{S}_2 \hat{S}_2 = 1$$

$$\alpha_1 \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} + \alpha_2 \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} = -1$$

$$\alpha_2 \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} + \alpha_2 \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} = 1$$

$$\left.\begin{aligned} 3\alpha_1 + 5\alpha_2 &= -1 \\ 5\alpha_1 + 9\alpha_2 &= 1 \end{aligned}\right| \quad \begin{aligned} \alpha_1 &= -7 \\ \alpha_2 &= 4 \end{aligned}$$

$$\alpha_1 \hat{S}_1 + \alpha_2 \hat{S}_2 = \hat{w}$$

$$\hat{w} = -7\begin{bmatrix}1\\1\\1\end{bmatrix} + 4\begin{bmatrix}2\\2\\1\end{bmatrix}$$

$$= \begin{bmatrix}-7\\-7\\-7\end{bmatrix} + \begin{bmatrix}8\\8\\4\end{bmatrix} = \begin{bmatrix}1\\1\\-3\end{bmatrix}$$

$$w = \begin{bmatrix}1\\1\end{bmatrix}, \quad b = -3$$

★ 1,1 — 45°

1,0 — = y

0,1 — = x

b (position)

— v [I]

$$y = wx + b$$

$$\boxed{y = \begin{bmatrix}1\\1\end{bmatrix}x - 3}$$