

$$\{x : x \in \mathbb{R}^n, w^T x + b = 0\}$$

$w \in \mathbb{R}^n$ and b is real scalar.

$$\min_x \|x_0 - x\|_2 \quad \text{s.t. } w^T x + b = 0$$

a) analytic sol'n for distance between

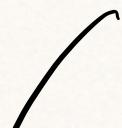
$$w^T x_0 + b = 0$$

$$\text{dist}(x_0, w^T x + b = 0) =$$

$$\boxed{\frac{|w^T x_0 + b|}{\|w\|_2}}$$

b) dist. btwn $w^T x + b_1 = 0 \leftarrow H_1$
 and $w^T x + b_2 = 0 \leftarrow H_2$
 parallel planes.

$$w^T x_1 = -b_1$$



$$\text{dist}(x_1, \theta_2) = \frac{|w^T x_1 + b_2|}{\|w\|_2}$$

plug in

$$\text{dist}(\theta_1, \theta_2) = \frac{|-b_1 + b_2|}{\|w\|_2}$$