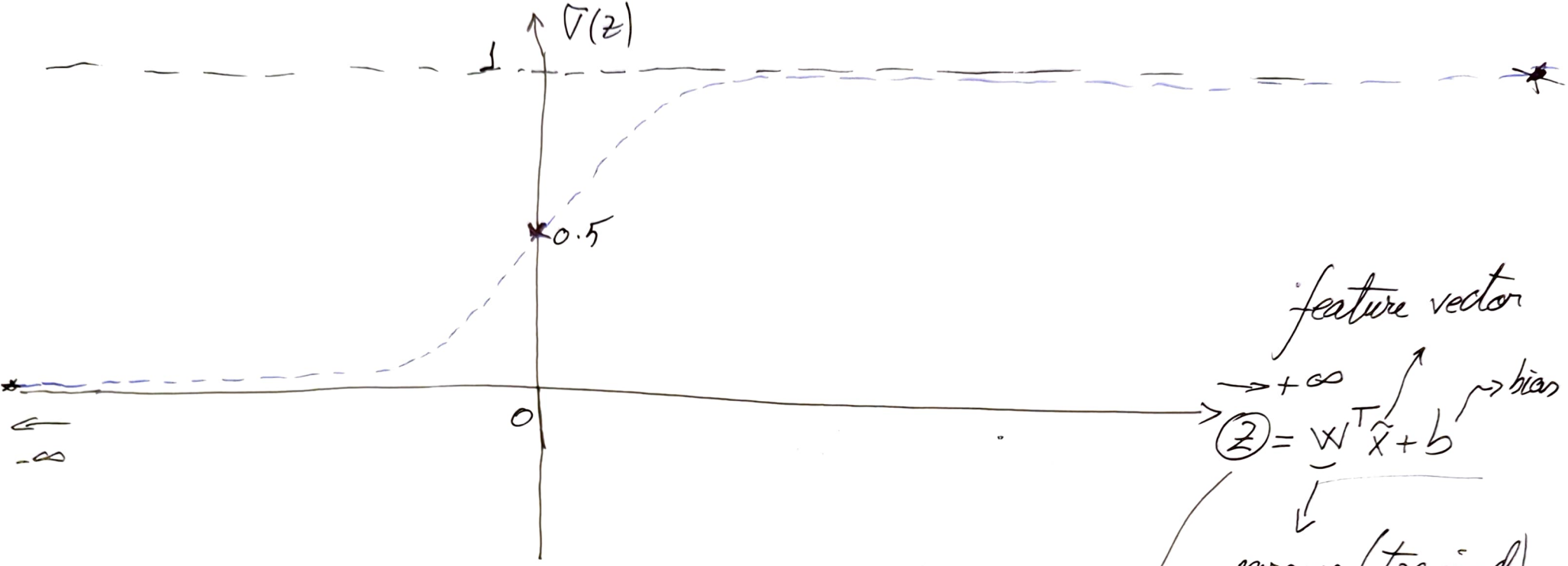

feature vector

bias

$z = w^T \tilde{x} + b$

params (trained)

$$p(y=1|x) = \sigma(z) = \frac{1}{1+e^{-z}} = \frac{1}{1+e^{-(w^T x+b)}}$$

the score for +ve class

$$p(y=0|x) = 1 - p(y=1|x)$$

e is Euler's number

→ 2.7181

$e^{\pi i} = -1$

$\sigma(0) = 1/2 = 0.5$

$\sigma(+\infty) = \frac{1}{1+0} = 1$

$\sigma(-\infty) = \frac{1}{1+\infty} = \frac{1}{\infty} = 0$

$e^{-\infty} = \frac{1}{e^{\infty}} = \frac{1}{+\infty} = 0$

$e^{--\infty} \Rightarrow e^{\infty} = \infty$

$p(y|x) \longrightarrow p(\text{class is } y|x)$

y → the true label $\in \{0,1\}$

$\hat{y} = p(y=1|x) = \sigma(w^T x + b)$ $\qquad$ $1-\hat{y} = p(y=0|x)$

w, b → the params. of the model.

Claim $\boxed{p(y|x) = \hat{y}^{y}(1-\hat{y})^{1-y}}$ ← RHS

Case $y=1 \Rightarrow \boxed{RHS = \hat{y} = p(y=1|x) = p(y|x)}$

Case $y=0 \Rightarrow \boxed{RHS = 1-\hat{y} = p(y=0|x) = p(y|x)}$