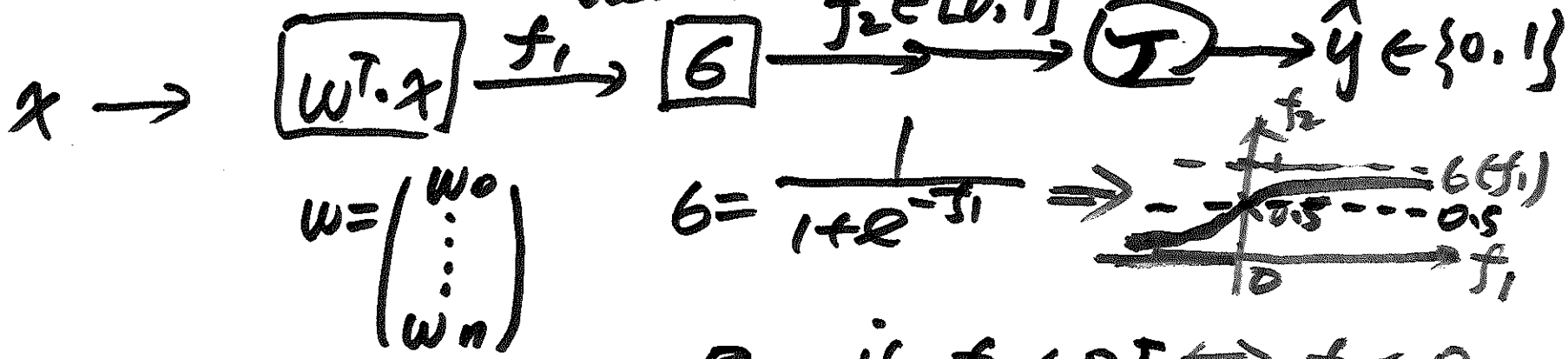
Lecture 13. ANNs

1. Quick Review of Logistic Regression

training pairs (x, y)

x: feature vector

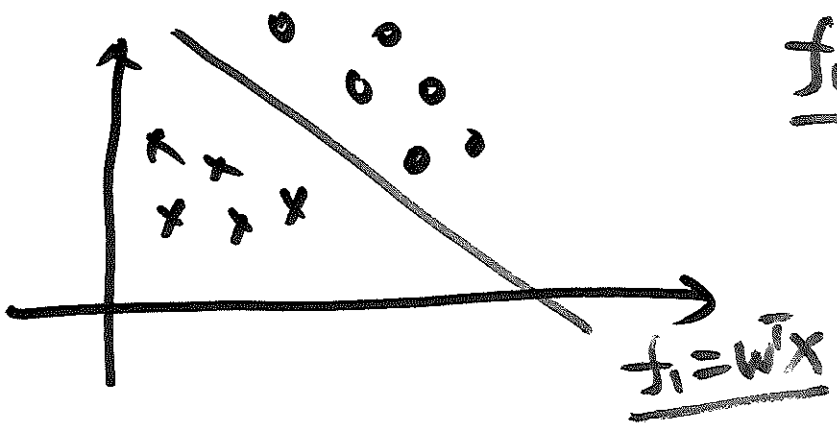
y: class label $\in \{0, 1\}$

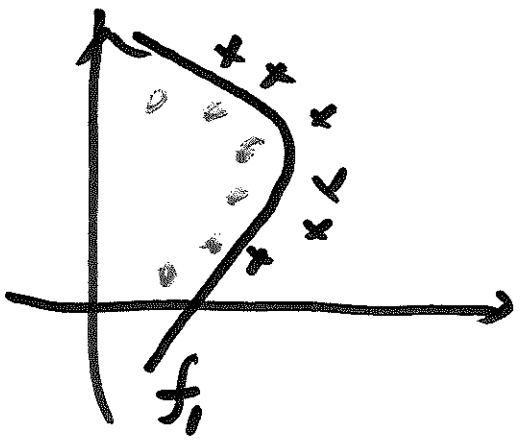


$$\hat{y} = T(f_2) = \begin{cases} 0 & \text{if } f_2 < 0.5 \iff f_1 < 0 \\ 1 & \text{if } f_2 \geq 0.5 \iff f_1 \geq 0 \end{cases}$$

$$\Downarrow$$

$$\hat{y} = \begin{cases} 0 & \text{if } f_1 = w^T x < 0 \\ 1 & \text{if } f_1 = w^T x \geq 0 \end{cases}$$





Pros

1). easy to implement and interpret. efficient to train.

2). no assumption about the data distribution.

3) performs well if the data is linearly seperable.

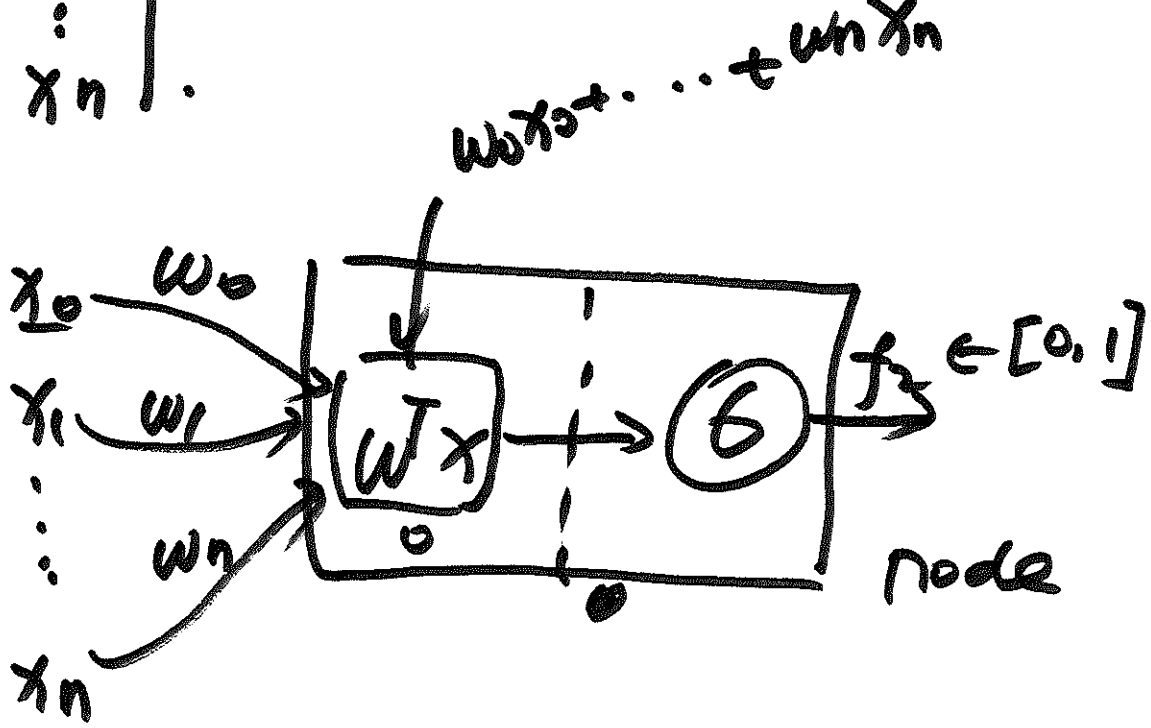
Cons

1). Constructs a linear boundary. and can't solve non-linear problems.

2) linearity between features.

3). Difficult to model complex relationships using logistic regression.

$\underline{x}$ = input $\begin{pmatrix} x_0 \\ x_1 \\ \vdots \\ x_n \end{pmatrix}$.



It is also an <u>one-node</u> artificial neural network.