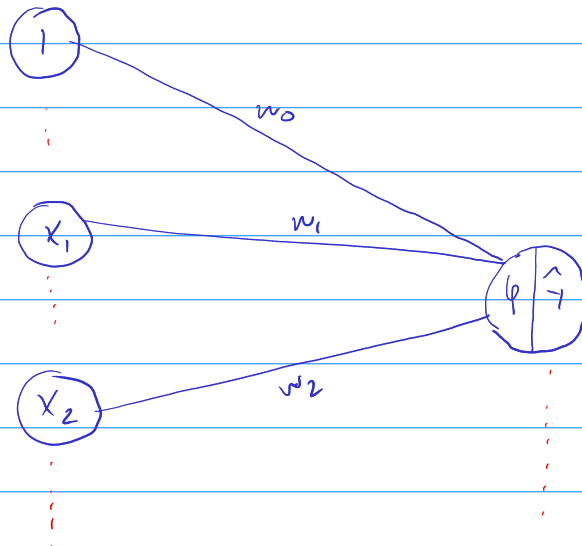


* Graphical presentation / neuron network Presentation of

Linear Regression

$$\hat{y} = w_0 + w_1 x_1 + w_2 x_2$$



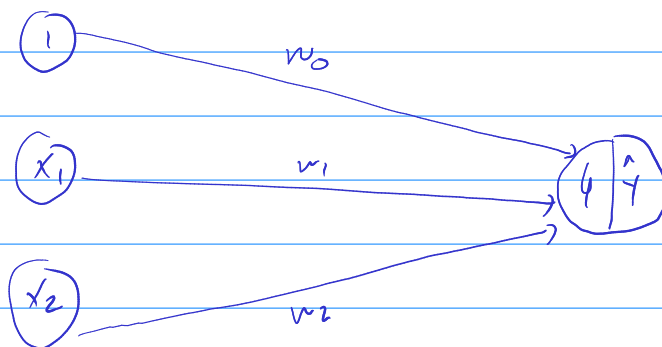
$$\phi(t) = t$$

input layer

output layer

* Logistic Regression

$$\hat{y} = \frac{1}{1 + e^{-(w_0 + w_1 x_1 + w_2 x_2)}}$$

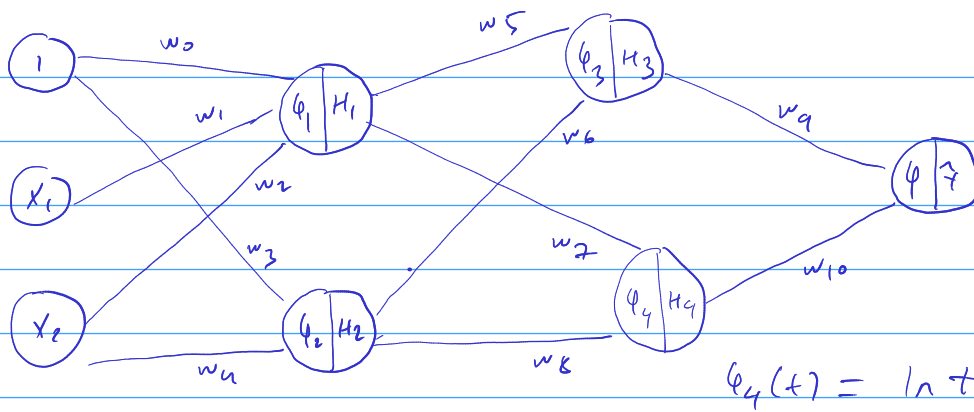


$$\phi(t) = \frac{1}{1 + e^{-t}}$$

$$\phi_1(t) = t^2$$

$$\phi_3 = \frac{1}{z}$$

$$\phi(t) = t$$



$$\phi_2(t) = \cos(t)$$

(Input layer)

(Hidden layer)

(Hidden layer)

(Output layer)

$\phi_1, \phi_2, \phi_3, \phi_4, \phi$: activation functions

$$H_1 = \phi_1(w_0 + w_1 x_1 + w_2 x_2) = (w_0 + w_1 x_1 + w_2 x_2)^2$$

$$H_2 = \phi_2(w_0 + w_1 x_1 + w_2 x_2) = \cos(w_0 + w_1 x_1 + w_2 x_2)$$

$$H_3 = \phi_3(w_5 H_1 + w_6 H_2) = \frac{1}{w_5 H_1 + w_6 H_2}$$

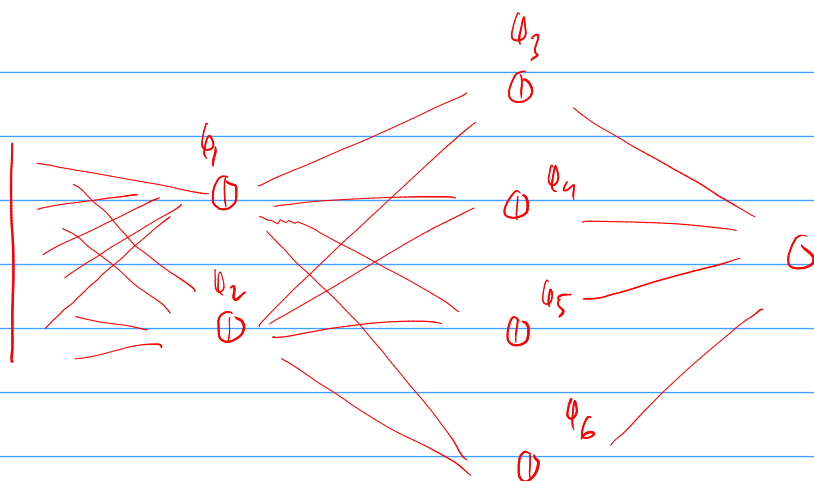
$$= \frac{1}{w_5 (w_0 + w_1 x_1 + w_2 x_2)^2 + w_6 \cos(w_0 + w_1 x_1 + w_2 x_2)}$$

$$H_4 = \phi_4(w_7 H_1 + w_8 H_2) = \ln(w_7 H_1 + w_8 H_2)$$

$$= \ln \left[w_7 (w_0 + w_1 x_1 + w_2 x_2)^2 + w_8 \cos(w_0 + w_1 x_1 + w_2 x_2) \right]$$

$$\hat{y} = \phi(w_9 H_3 + w_{10} H_4) = w_9 H_3 + w_{10} H_4$$

$$\hat{y} = \frac{w_9}{w_5 (w_0 + w_1 x_1 + w_2 x_2)^2 + w_6 \cos(w_0 + w_1 x_1 + w_2 x_2)} + w_{10} \ln \left[w_7 (w_0 + w_1 x_1 + w_2 x_2)^2 + w_8 \cos(w_0 + w_1 x_1 + w_2 x_2) \right]$$



2 x 4