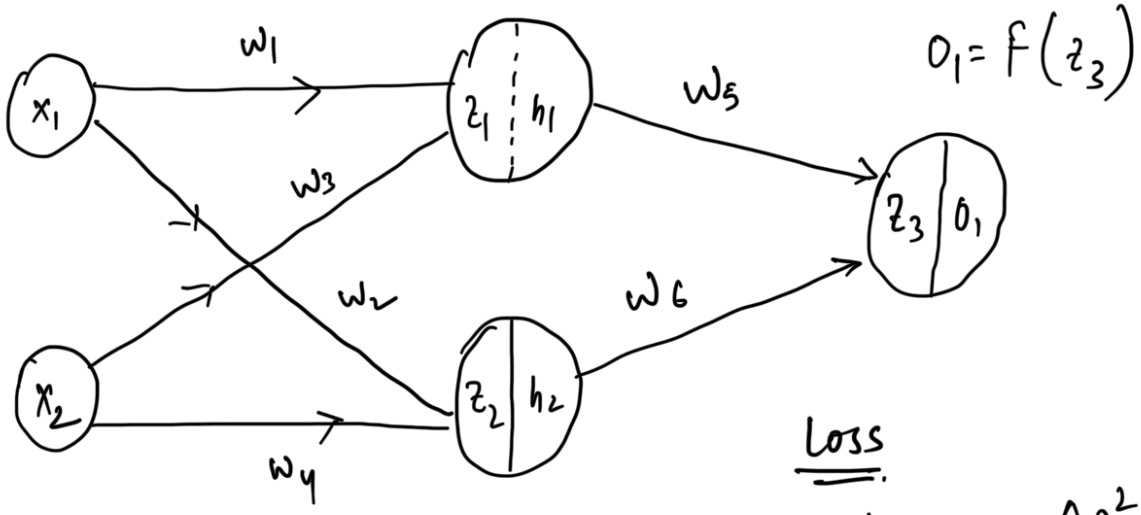
Backpropagation

f : Sigmoid



Loss

$$C = \frac{1}{n} \sum (y - \hat{y}_i)^2$$

1. Forward pass

2. Backpropagation

2nd layer

$$\frac{\partial C}{\partial w_5} = \frac{\partial C}{\partial O_1} \cdot \frac{\partial O_1}{\partial z_3} \cdot \frac{\partial z_3}{\partial w_5}$$

$$= 2(y - \hat{y}_i) \cdot f(z_3)(1 - f(z_3)) \cdot h_1$$

$$\frac{\partial C}{\partial w_6} = \frac{\partial C}{\partial O_1} \cdot \frac{\partial O_1}{\partial z_3} \cdot \frac{\partial z_3}{\partial w_4}$$

$$= 2(y - \hat{y}_i) \cdot f(z_3)(1 - f(z_3)) \cdot h_2$$

$$\frac{\partial C}{\partial w_1} = \frac{\partial C}{\partial o_1} \cdot \frac{\partial o_1}{\partial z_3} \cdot \frac{\partial z_3}{\partial h_1} \cdot \frac{\partial h_1}{\partial z_1} \cdot \frac{\partial z_1}{\partial w_1}$$

$$= 2\left(y - \hat{y}_i\right) \cdot f(z_3)\left(1 - f(z_3)\right) \cdot w_5 \cdot h_1(1 - h_1) \cdot x_1$$

and all..