

18201057.

Quiz - 1

Given,

local induced error of $\delta_f = \delta_t$

previous layer = $\delta_n \delta_p$

output of $y_f = \sigma(\delta_f)$

n layer, $\delta_n = \sigma'(\delta_n)$

$\delta_p = \sigma''(\delta_p)$

$\delta_m = \sigma'(\delta_m)$

$v_j = \sum_i w_{ji} x_i$

$e_j = d_j - y_j$

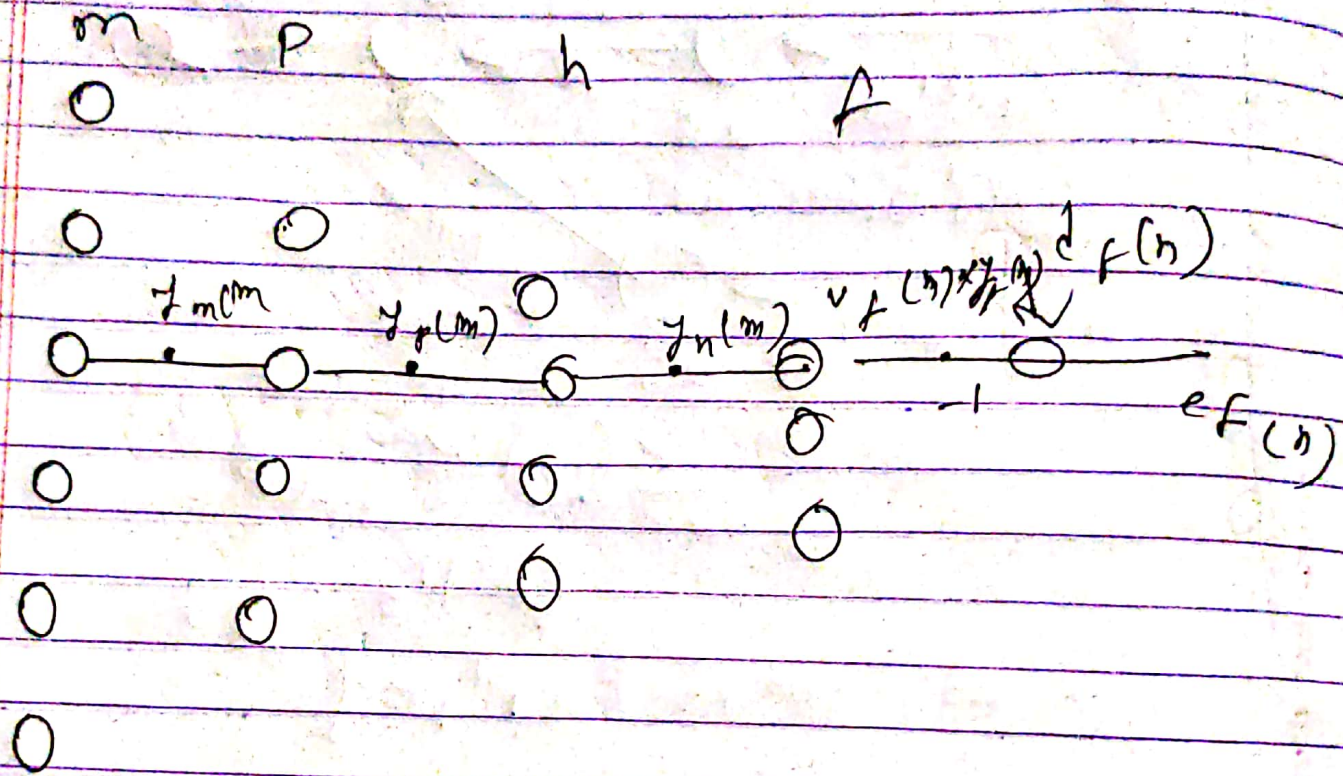
Total error $E = \frac{1}{2} \sum_j e_j^2$

Error for output layer $f = (y_{target} - y_f)$
 $= \delta_f$

changing weights, $\Delta w_{ji} = \eta \delta_j x_i$

let, $\eta = 0.1$

$$\delta_j = e_j \cdot Q'(v_j)$$



$$m \leftarrow p \leftarrow h \leftarrow f$$

$$j_f = Q'(v_f)$$

$$j_n = Q''(v_n)$$

$$j_p = Q'''(v_p)$$

$$j_m = Q'(v_m)$$

using the chain rule

$$\delta_j = - \frac{\partial E}{\partial j_j} \times \frac{\partial j_j}{\partial v_j}$$

$$\delta_m = - \left[\left(\frac{\delta E}{\delta \psi} \cdot \frac{\delta \psi}{\delta f} \cdot \frac{\delta f}{\delta v_f} \right) \right]$$

for h \Rightarrow

$$\left(\frac{\delta v_f}{\delta w_{feh}} \cdot \frac{\delta w_{feh}}{\delta j_h} \cdot \frac{\delta j_h}{\delta v_h} \right)$$

for m \Rightarrow

$$\left(\frac{\delta v_p}{\delta w_{pm}} \cdot \frac{\delta w_{pm}}{\delta j_m} \cdot \frac{\delta j_m}{\delta v_m} \right)$$

for p \Rightarrow

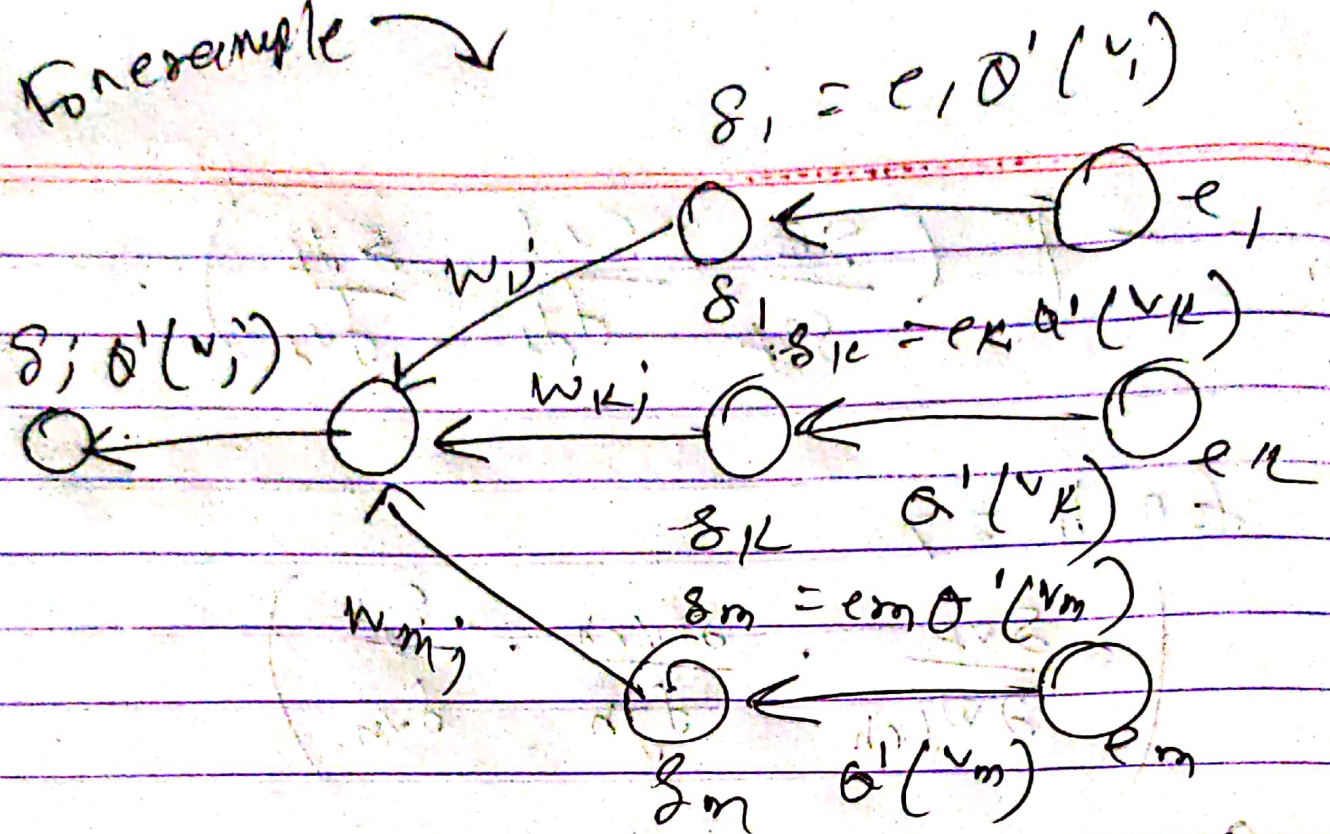
$$\left(\frac{\delta v_h}{\delta w_{hp}} \cdot \frac{\delta w_{hp}}{\delta j_p} \cdot \frac{\delta j_p}{\delta v_p} \right)$$

concatenating every layer's result.
total induced error is

$$\delta_m = - \left[\left(\frac{\delta E}{\delta \psi} \cdot \frac{\delta \psi}{\delta f} \cdot \frac{\delta f}{\delta v_f} \right) \right]$$

$$\frac{\delta v_p}{\delta w_{pm}} \cdot \frac{\delta w_{pm}}{\delta j_m} \cdot \frac{\delta j_m}{\delta v_m} \cdot \frac{\delta v_h}{\delta w_{hp}} \cdot \frac{\delta w_{hp}}{\delta j_p} \cdot \frac{\delta j_p}{\delta v_p} \cdot \frac{\delta v_f}{\delta w_{feh}} \cdot \frac{\delta w_{feh}}{\delta j_h} \cdot \frac{\delta j_h}{\delta v_h}$$

For example \rightarrow



$$s_j = \theta'(v_j) \sum_{k \in C} s_k w_{kj}$$

$$s_j = \theta'(v_j) [s_1 w_{1j} + s_2 w_{2j} + s_3 w_{3j}]$$