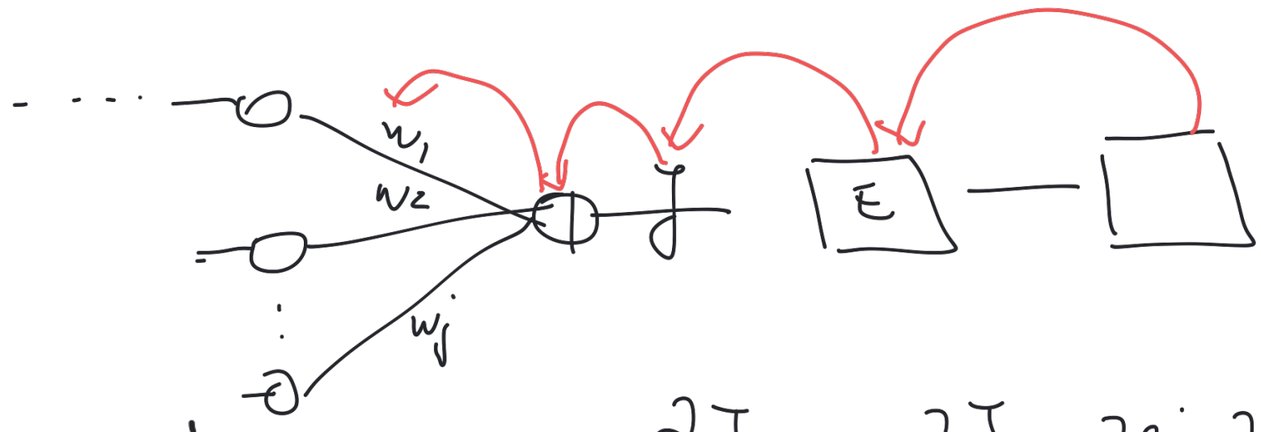
Problem 10

$$J = \frac{1}{2}\sum_{i=1}^{N_1} e_i^2 + \lambda \cdot \sum_j w_j^2$$

$$w_j^{(t+1)} = w_j^{(t)} - \eta \cdot \frac{\partial J}{\partial w_j^{(t)}}$$



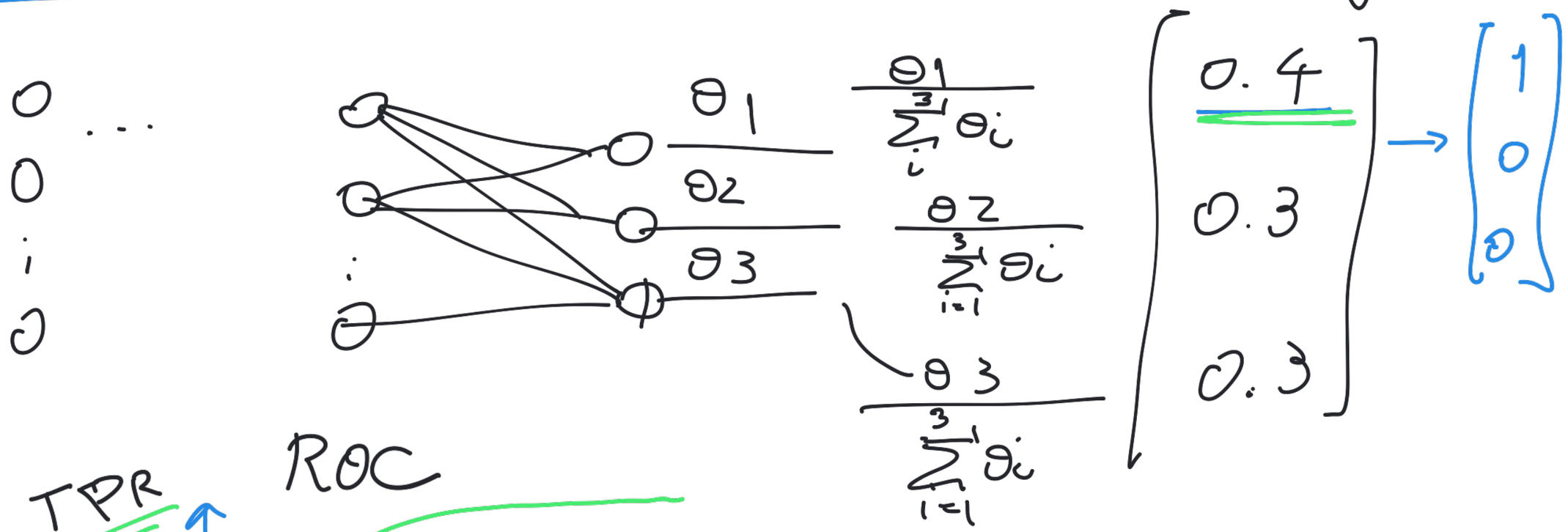

$$\frac{\partial J}{\partial w_j} = \frac{\partial J}{\partial e_i} \cdot \frac{\partial e_i}{\partial y_i} \cdot \frac{\partial y_i}{\partial v_i} \cdot \frac{\partial v_i}{\partial w_j}$$

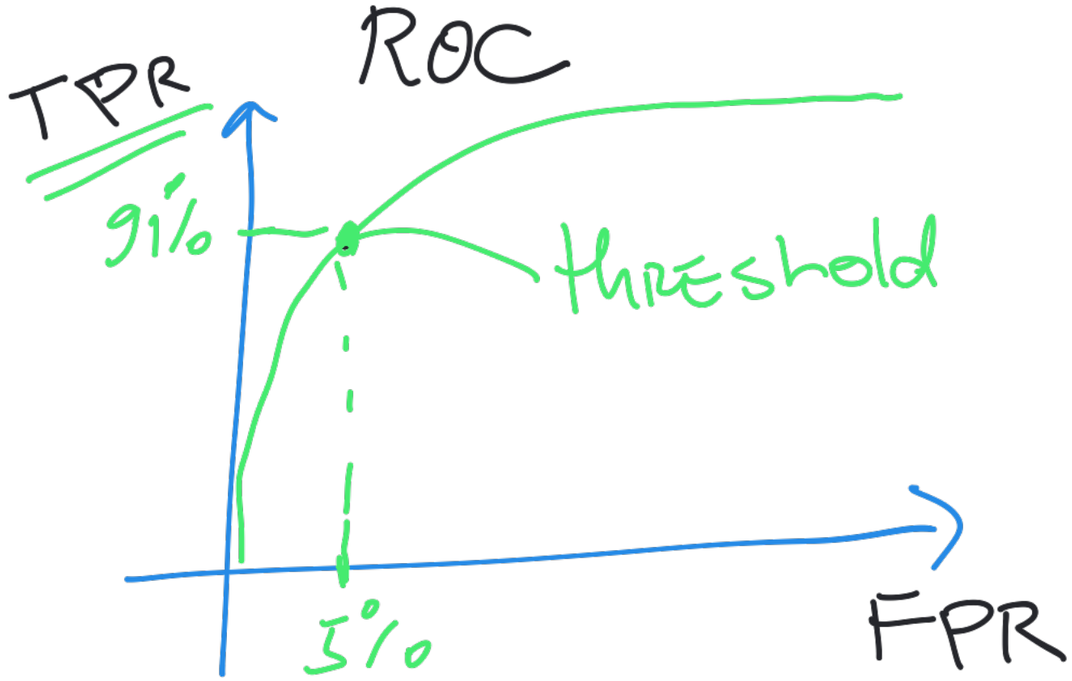
$$\frac{\partial J}{\partial w_j} = \frac{\partial}{\partial w_j}\left(\frac{1}{2}\sum_{i=1}^{N_1} e_i^2\right) + \frac{\partial}{\partial w_j}\left(\lambda \sum_j w_j^2\right)$$

$$= -e_i \cdot \phi'(v_i) \cdot y_k + 2 \cdot \lambda \cdot w_j$$

# Problem 11

3-class with one-hot encoding




Threshold at the output layer, we will have TP, TN, FP, FN