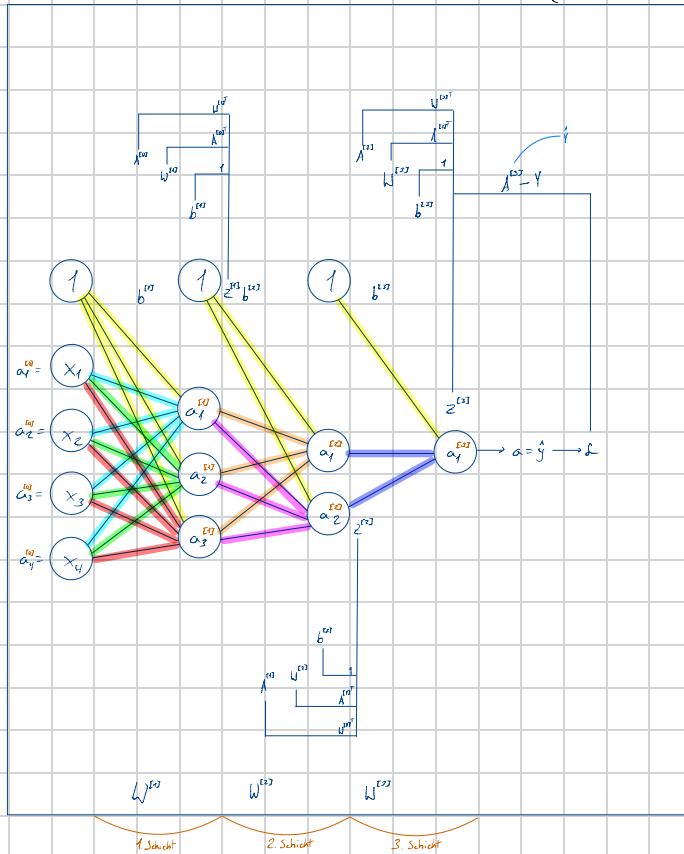


$$z^{(t)} = w^{(t)} a + b^{(t)}$$

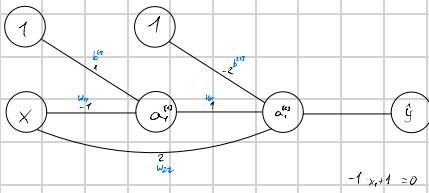
$$a^{(t)} = \sigma(z^{(t)}) \longrightarrow \frac{1}{1 + e^{-z^{(t)}}} \xrightarrow{\text{def}} a(1-a) \Rightarrow A \times (1-A)$$



$$dW^{(t)} = \frac{\partial L}{\partial Z^{(t)}} \cdot \frac{\partial Z^{(t)}}{\partial A^{(t+1)}} \cdot \frac{\partial A^{(t+1)}}{\partial Z^{(t+1)}} \cdot \frac{\partial Z^{(t+1)}}{\partial A^{(t+2)}} \cdot \frac{\partial A^{(t+2)}}{\partial Z^{(t+2)}}$$

2)

$$(x, y_T) = (0, 0.5)$$



$$a_1^{(1)} = w_{11}^{(1)} \cdot x_1 + b_1 = -10 + 1 \quad \frac{1}{1+e^{-10}} = 0.731$$

$$O_1^{(2)} = W_{21}^{(2)} \cdot x_1 + W_{22}^{(2)} \cdot x_2 + b = 1 \cdot 0.89 + 2.0 - 2 = -1.263 \quad \frac{1}{1e^{-1.263}} = 0.22$$

$$f(0.8, 0.5) = 0.881$$

$$\frac{\partial f}{\partial \alpha^T} = \begin{pmatrix} \frac{\partial f}{\partial \alpha^1} & \dots & \frac{\partial f}{\partial \alpha^n} \end{pmatrix} = \begin{pmatrix} 0.22 - 0.28 \\ 0.28 - 0.28 \end{pmatrix} = \begin{pmatrix} -0.06 \\ 0 \end{pmatrix}$$

$$d\vec{a}^m = (\vec{a} - \vec{y}) \cdot W^m \rightarrow W \cdot (\vec{a} - \vec{y}) = \begin{bmatrix} 2 \cdot (-0.28) \\ 1 \cdot (-0.28) \end{bmatrix} = \begin{bmatrix} -0.56 \\ -0.28 \end{bmatrix}$$

$$\frac{\partial \hat{d}_a^{(0)}}{\partial d_a^{(0)}} = \sigma(d_a^{(0)}) = \begin{bmatrix} 0.364 \\ 0.430 \end{bmatrix}$$

$$\frac{\partial f}{\partial w_4} = \frac{1}{f} \cdot \partial z^{[4]} \cdot 0 = 0$$

$$db^{(n)} = \frac{1}{1} \cdot np \sin(d\varepsilon^{(n)}) = 0.794$$

$$\left[\begin{array}{c} \omega_{xx} \\ \omega_{yy} \\ \omega_{zz} \\ \omega_{xy} \\ \omega_{yz} \\ \omega_{zx} \end{array} \right] = 0.01 \cdot \left[\begin{array}{c} \sin \theta \\ \cos \theta \\ -\sin \phi \\ \cos \phi \\ -\sin \psi \\ \cos \psi \end{array} \right] = \left[\begin{array}{c} -1 \\ t \\ 0 \\ 0.707 \\ -0.205 \\ 0 \end{array} \right] = \left[\begin{array}{c} 0 \\ 1.002 \\ 0 \\ 2 \\ -0.25 \\ -1.337 \end{array} \right]$$