Update rule for linear function

$$\frac{dL}{dw_2} = \frac{dL}{da_2} \times \frac{da_2}{dz_2} \times \frac{dz}{dw_2}$$

$$= \left[-\frac{y}{a_2} - \frac{1-y}{1-a_2} \right] a_2 (1-a_2) \cdot a_1$$

$$\frac{dL}{dw_2} = (a_2 - y) a_1$$

$$\frac{dL}{db_2} = a_2 - y$$

$$\frac{dL}{dw_1} = \frac{dL}{da_2} \frac{da_2}{dz_2} \frac{dz_2}{da_1} \frac{da_1}{dz_1} \frac{dz_1}{dw_1}$$

$$= (a_2 - y) \cdot w_2 \cdot 1 \cdot x$$

$$\frac{dL}{db_1} = (a_2 - y) w_2$$

Updat rule for tanh activation function

$$f(x) = \tanh(x)$$

$$f'(x) = 1 - f(x)^2$$

$$\frac{dL}{dw_2} = (a_2 - y) \cdot a_1$$

$$\frac{dL}{db_2} = a_2 - y$$

$$\frac{dL}{dw_1} = \frac{dL}{da_2} \cdot \frac{da_2}{dz_2} \cdot \frac{dz_2}{da_1} \cdot \frac{da_1}{dz_1} \cdot \frac{dz_1}{dw_1}$$

$$= (a_2 - y) \cdot w_2 (1 - a_1^2) x$$

$$\Rightarrow \frac{dL}{db_1} = (a_2 - y) \cdot w_2 (1 - a_1^2)$$