2025feb12

$$\begin{bmatrix} f_1 \\ f_2 \end{bmatrix} = \begin{bmatrix} w_{1,1} & w_{1,2} \\ w_{2,1} & w_{2,2} \end{bmatrix}$$

$$\frac{\partial L}{\partial f} = \begin{bmatrix} -0.5 \\ 0.4 \end{bmatrix} = \begin{bmatrix} \frac{\partial L}{\partial f_1} \\ \frac{\partial L}{\partial f_2} \end{bmatrix} = \begin{bmatrix} 9 & 1 \\ 4 & 9 \end{bmatrix}$$

$$f_1 = w_{1,1} h_1 + w_{1,2} h_2 = 9h_1 + h_2$$

$$f_2 = w_{2,1} h_1 + w_{2,2} h_2 = 4h_1 + 9h_2$$

$$\frac{\partial L}{\partial h_1} = \frac{\partial L}{\partial f_1} \frac{\partial f_1}{\partial h_1}^{9} + \frac{\partial L}{\partial f_2} \frac{\partial f_2}{\partial h_1}^{4} = 9 \frac{\partial L}{\partial f_1} + 4$$

$$\frac{\partial L}{\partial h_2} = \frac{\partial L}{\partial f_1} \frac{\partial f_1}{\partial h_2}^{1} + \frac{\partial L}{\partial f_2} \frac{\partial f_2}{\partial h_2}^{9} = 1 \frac{\partial L}{\partial f_1} + 9$$

$$\frac{\partial L}{\partial h} = \begin{bmatrix} 9 & 4 \\ 1 & 9 \end{bmatrix} \begin{bmatrix} -0.5 \\ 0.4 \end{bmatrix}$$