Forward Pass E = X(C) $H = E \times W_1 + b_1$

$$Z = \tanh(H)$$

$$\hat{\mathbf{v}} = Z \times W_2 + h_2$$

BackPropagation

$$L = \frac{1}{2}(\hat{y} - y)^{2}$$
$$\frac{\partial L}{\partial \hat{y}} = \frac{1}{n} \sum_{n} (\hat{y} - y)$$
$$\frac{\partial L}{\partial L} \frac{\partial L}{\partial \hat{y}}$$

$$\frac{\partial L}{\partial \hat{y}} = \frac{1}{n} \sum_{\hat{y}} (\hat{y} - y)$$

$$\frac{\partial L}{\partial b_2} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial b_2}$$

$$\frac{\partial L}{\partial b_2} = \frac{\partial L}{\partial y} \frac{\partial \hat{y}}{\partial y}$$

$$\frac{\partial L}{\partial b_2} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial b_2}$$
$$\frac{\partial L}{\partial W_2} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial W_2}$$
$$\frac{\partial L}{\partial L} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial Z} \frac{\partial L}{\partial H}$$

$$\frac{\partial L}{\partial b_2} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial b_2}$$

$$\frac{\partial L}{\partial W_2} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial W_2}$$

$$\frac{\partial L}{\partial b_1} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial Z} \frac{\partial Z}{\partial H} \frac{\partial H}{\partial b_1}$$

$$\frac{\partial L}{\partial W_1} = \frac{\partial L}{\partial \hat{y}} \frac{\partial \hat{y}}{\partial Z} \frac{\partial Z}{\partial H} \frac{\partial H}{\partial W_1}$$

$$\frac{\partial L}{\partial L} = \frac{\partial L}{\partial L} \frac{\partial \hat{y}}{\partial Z} \frac{\partial Z}{\partial H} \frac{\partial H}{\partial W_1}$$

 $-\frac{\partial \hat{v}}{\partial \hat{v}} \frac{\partial Z}{\partial Z} \frac{\partial H}{\partial H} \frac{\partial E}{\partial E}$