$$\varepsilon = \max(0, -z_{out} \cdot t)$$

"Forward"

$$z_3 = x_1 w_{13} + x_2 w_{23} + b_3 \qquad a_3 = g(z_3)$$

$$z_4 = x_2 w_{24} + a_3 w_{34} + b_4 \qquad a_4 = g(z_4)$$

$$z_{out} = V_3 a_3 + V_4 a_4 + b_{out} \text{ (Perceptron)}$$

"Backprop"

$$\frac{\partial \varepsilon}{\partial z_{out}} = 1_{\{-z_{out} \cdot t \geq 0\}} (-t)$$

$$\frac{\partial \varepsilon}{\partial z_4} = \frac{\partial z_{out}}{\partial z_4} \frac{\partial \varepsilon}{\partial z_{out}} \qquad \frac{\partial z_{out}}{\partial z_4} = V_4 \cdot g'(z_4)$$

$$\frac{\partial \varepsilon}{\partial z_3} = \frac{\partial z_{out}}{\partial z_3} \frac{\partial \varepsilon}{\partial z_{out}} + \frac{\partial z_4}{\partial z_3} \frac{\partial \varepsilon}{\partial z_4}$$

$$= V_3 g'(z_3) \frac{\partial \varepsilon}{\partial z_{out}} + w_{34} g'(z_3) \cdot \frac{\partial \varepsilon}{\partial z_4}$$

$$\frac{\partial \varepsilon}{\partial w_{13}} = \frac{\partial z_3}{\partial w_{13}} \cdot \frac{\partial \varepsilon}{\partial z_3} = x_1 \frac{\partial \varepsilon}{\partial z_3}$$