Cross entropy

$$E = -\sum_i \left[t_i \log(y_i) + (1-t_i) \log(1-y_i) \right]$$

$$\frac{\partial E}{\partial y_i} = -\left[\frac{t_i}{y_i} + (1-t_i)(-1) \left(\frac{1}{1-y_i} \right) \right]$$

$$= \frac{1-t_i}{1-y_i} - \frac{t_i}{y_i}$$

$$\frac{\partial y_i}{\partial s_i} = y_i \cdot (1-y_i)$$

$$\delta = y_i \cdot (1-y_i) \cdot \left[\frac{1-t_i}{1-y_i} - \frac{t_i}{y_i} \right]$$

$$= \left\{ y_i \cdot (1-t_i) - t_i (1-y_i) \right\}$$

$$= y_i - y_i t_i - t_i + y_i t_i$$