Backpropagation Equations

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1 Component form

2 Matrix form

$$\delta^L = \nabla_a C \odot \sigma'(z^L) \tag{1}$$

$$\delta^l = ((w^{l+1})^T \delta^{l+1}) \odot \sigma'(z^l) \tag{2}$$

$$\frac{\partial C}{\partial b^l_j} = \delta^l_j \tag{3}$$

$$\frac{\partial C}{\partial w^l_{jk}} = a^{l-1}_k \delta^l_j \tag{4}$$