(01.) Para derivar o algoritmo ELF vamos tomar o erro elevado a $2k$ e fazer $k=2$. O gradiente fica:

$$\frac{\partial e^{2k}(k)}{\partial w} = \left[2k \cdot e(k) \frac{\partial e^{2k-1}(k)}{\partial w_0(k)} \cdot 2k e(k) \frac{\partial e^{2k-1}(k)}{\partial w_1(k)} \dots \frac{2k e(k) \partial e^{2k-1}(k)}{\partial w_n(k)} \right]$$

$$\frac{\partial e^{2k}(k)}{\partial w} = -2k e^{2k-1}(k) x(k) \quad \text{para } k \text{ qualquer}$$

p/ $k=2$:

$$\frac{\partial e^{4}(k)}{\partial w} = -4 e^{3}(k) x(k) \quad \text{logo}$$

$$\vec{w}(k+1) = \vec{w}(k) + 4\mu e^{3}(k) \vec{x}(k)$$