

# The back-propagation algorithm

- Update each output weight  $w_i$ , using
  - $w_i := w_i - \eta \delta x'_i$
  - where  $\delta = (y - t)y(1 - y)$
- Update each hidden layer weight  $v_{i,j}$ , using
  - $v_{i,j} := v_{i,j} - \eta \delta'_i x_j$
  - where  $\delta'_i = x'_i(1 - x'_i)\delta w_i$
- If there are multiple output neurons,
  - $w_i$  is updated for each output neuron independently
  - $\delta'_i = x'_i(1 - x'_i) \sum \delta_o w_{o,i}$ 
    - where  $o$  ranges over the output nodes