Learning rate $(\alpha) = 0.5$

inputs $(x_1 = 0.05, \ x_2 = 0.10)$

biases $(b_1 = 0.35, \ b_2 = 0.60)$

Target $(t_1 = 0.01, \ t_2 = 0.99)$

$w_1 = 0.15 \qquad w_2 = 0.2$

$w_3 = 0.25 \qquad w_4 = 0.30$

$w_5 = 0.40 \qquad w_6 = 0.45$

$w_7 = 0.50 \qquad w_8 = 0.55$

$H_{in1} = b_1 + x_1 w_1 + x_2 w_2 = 0.35 + (0.05 \times 0.15) + (0.1 \times 0.2) = 0.3775$

$H_1 = f(H_{in1}) = \dfrac{1}{1+e^{-0.3775}} = 0.5933$

$H_{in2} = b_1 + x_1 w_3 + x_2 w_4 = 0.35 + (0.05 \times 0.25) + (0.1 \times 0.3) = 0.3925$

$H_2 = f(H_{in2}) = \dfrac{1}{1+e^{-0.3925}} = 0.5969$

$Y_{in1} = b_2 + H_1 w_5 + H_2 w_6 = 0.6 + (0.5933 \times 0.4) + (0.5969 \times 0.45) = 1.1059$

$Y_1 = f(Y_{in1}) = \dfrac{1}{1+e^{-1.1059}} = 0.7514$

$Y_{in2} = b_2 + H_1 w_7 + H_2 w_8 = 0.6 + (0.5933 \times 0.5) + (0.5969 \times 0.55) = 1.2249$

$Y_2 = f(Y_{in2}) = \dfrac{1}{1+e^{-1.2249}} = 0.7729$

Calculating Error

$\delta_{Y_k} = (t_k - Y_k) \, f'((Y_{in})_k)$

$\delta_{Y_1} = (0.01 - 0.7514) \times 0.7514(1 - 0.7514) = -0.1385$

$\delta_{Y_2} = (0.99 - 0.7729) \times 0.7729(1 - 0.7729) = 0.0381$

Back propagation Using Error Correction function

$\Delta w_5 = \alpha \, \delta y_1 H_1 = 0.5 \times -0.1385 \times 0.5933 = -0.0411$

$\Delta w_6 = \alpha \, \delta y_1 H_2 = 0.5 \times -0.1385 \times 0.5969 = -0.0413$

$\Delta w_7 = \alpha \, \delta y_2 H_1 = 0.5 \times 0.0381 \times 0.5933 = 0.0113$

$\Delta w_8 = \alpha \, \delta y_2 H_2 = 0.5 \times 0.0381 \times 0.5969 = 0.0114$

$\delta in H_1 = \delta y_1 w_5 + \delta y_2 w_7 = (-0.1385 \times 0.4)$

$= (-0.1385 \times 0.4) + (0.0381 \times 0.5) = -0.0364$

$\delta H_1 = (\delta in H_1) f'(H in_1) = -0.0364 \times 0.5933(1 - 0.5933) = -0.0088$

$\delta in H_2 = \delta y_1 w_6 + \delta y_2 w_8 = (-0.1385 \times 0.45) + (0.0381 \times 0.55) = -0.0414$

$\delta H_2 = (\delta in H_2) f'(H in_2) = -0.0414 \times 0.5969(1 - 0.5969) = -0.0100$

$\Delta w_1 = \alpha \, \delta H_1 x_1 = 0.5 \times -0.0088 \times 0.05 = -0.00022$

$\Delta w_2 = \alpha \, \delta H_1 x_2 = 0.5 \times -0.0088 \times 0.1 = -0.00044$

$\Delta w_3 = \alpha \, \delta H_2 x_1 = 0.5 \times -0.01 \times 0.05 = -0.00025$

$\Delta w_4 = \alpha \, \delta H_2 x_2 = 0.5 \times -0.01 \times 0.1 = -0.0005$

Calculating New Values

$w_1(new) = 0.15 - 0.00022 = 0.1498$

$w_2(new) = 0.2 - 0.00044 = 0.1996$

$w_3(new) = 0.25 - 0.00025 = 0.2498$

$w_4(new) = 0.30 - 0.0005 = 0.2995$

$w_5(new) = 0.40 - 0.0411 = 0.3589$

$w_6(new) = 0.45 - 0.0413 = 0.4087$

$w_7(new) = 0.5 + 0.0113 = 0.5113$

$w_8(new) = 0.55 + 0.0114 = 0.5614$