2023_01_16_ Problema 2

$\rho = 1.0$

f. act. = sigmoid $\quad g(x) = 1/(1+e^{-x}) \quad g'(x) = x(1-x)$

$x^t = (1, 1) \quad t = (0.1, 0.9)$

$\theta_1^1 = [1, 1, 1] \quad \theta_2^1 = [1, -1, -1]$

$\theta_1^2 = [1, 1, 1] \quad \theta_2^2 = [1, -1, -1]$

capa oculta

$\phi_1^1 = \theta_1^{1t} x = 1 + 1 \cdot 1 + 1 \cdot 1 = 3 \longrightarrow S_1^1 = 1/(1+e^{-3}) = 0,9525$

$\phi_2^1 = \theta_2^{1t} x = 1 + -1 \cdot 1 + -1 \cdot 1 = -1 \longrightarrow S_2^1 = 1/(1+e^{--1}) = 0,2689$

capa última

$\phi_1^2 = \theta_1^{2t} S_1 = 1 + 1 \cdot 0,9525 + 1 \cdot 0,2684 = 2,2209 \rightarrow S_1^2 = 1/(1+e^{-2,2209})$

$\phi_2^2 = \theta_2^{2t} S_1 = 1 + -1 \cdot 0,9525 + -1 \cdot 0,2684 = -0,2209 \rightarrow S_2^2 = 1/(1+e^{--0,2209})$

$S_1^2 = 0,9$

$S_2^2 = 0,445$

calculo error

$\delta_1^2 = (0,1 - 0,9) \cdot 0,9(1 - 0,9) = -0,072$

$\delta_2^2 = (0,9 - 0,445) \cdot 0,445(1 - 0,445) = 0,112$

$\delta_1^1 = (\delta_1^2 \theta_{11}^2 + \delta_2^2 \theta_{21}^2) \cdot S_1^1 (1 - S_1^1) = (-0,072 \cdot 1 + 0,112 \cdot 1) \cdot 0,9525(1 - 0,9525)$

$\delta_2^1 = (\delta_1^2 \theta_{12}^2 + \delta_2^2 \theta_{22}^2) \cdot S_2^1 (1 - S_2^1) = (-0,072 \cdot 1 + 0,112 \cdot -1) 0,2684(1 - 0,2684)$

$\delta_1^1 = 0,0018$

$\delta_2^1 = -0,036$

Actualización parámetros

$\theta_{10}^1 = \theta_{10} + \rho \delta_1^1 (1) = 1 + 1 \cdot -0,036 \cdot 1 = 0,964$

$\theta_{11}^1 = \theta_{11}^1 + \rho \delta_1^1 x_1 = -1 + 1 \cdot -0,036 \cdot 1 = -1,036$

$\theta_{12}^1 = \theta_{12}^1 + \rho \delta_1^1 x_2 = -1 + 1 \cdot -0,036 \cdot 1 = -1,036$