**HW7 Part 1: Computing weight updates by hand**

x = [1 1] y = [0 0] ypred = [ 1 1] w = 0.05 learning\_rate = 0.3

z0 = 1 z1 = 0.5374 z2 = 0.5374 y1 = 0.5259 y2= 0.5259

Compute errors

δy1 = y1\*(1–y1)\*(y1–y1-true) = 0.5259\*(1-0.5259)\*(0.5259-0) = 0.1311

δy2 = y2\*(1–y2)\*(y2–y2-true) = 0.5259\*(1-0.5259)\*(0.5259-0) = 0.1311

δz1 = z1\*(1–z1)\*(Σwδ) = 0.5374\*(1-0.5374)\*([0.05\*0.1311]+[0.05\*0.1311]) = 0.0032597

δz2 = z2\*(1–z2)\*(Σwδ) = 0.5374\*(1-0.5374)\*([0.05\*0.1311]+[0.05\*0.1311]) = 0.0032597

Update Weights

w(2)10 = w(2)10 – 0.3\*δy1\*z0 = 0.05 - 0.3\*0.1311\*1 = 0.01067

w(2)20 = w(2)20 – 0.3\*δy2\*z0 = 0.05 - 0.3\*0.1311\*1 = 0. 01067

w(2)11 = w(2)11 – 0.3\*δy1\*z1 = 0.05 - 0.3\*0.1311\*0.5374 = 0.02886

w(2)21 = w(2)21 – 0.3\*δy2\*z1 = 0.05 - 0.3\*0.1311\*0.5374 = 0.02886

w(2)12 = w(2)12 – 0.3\*δy1\*z2 = 0.05 - 0.3\*0.1311\*0.5374 = 0.02886

w(2)22 = w(2)22 – 0.3\*δy2\*z2 = 0.05 - 0.3\*0.1311\*0.5374 = 0.02886

w(1)10 = w(1)10 – 0.3\*δz1\*x0 = 0.05 - 0.3\*0.0032597\*1 = 0.04902

w(1)20 = w(1)20 – 0.3\*δz2\*x0 = 0.05 - 0.3\*0.0032597\*1 = 0.04902

w(1)11 = w(1)11 – 0.3\*δz1\*x1 = 0.05 - 0.3\*0.0032597 \*1 = 0.04902

w(1)21 = w(1)21 – 0.3\*δz2\*x1 = 0.05 - 0.3\*0.0032597\*1 = 0.04902

w(1)12 = w(1)12 – 0.3\*δz1\*x2 = 0.05 - 0.3\*0.0032597\*1 = 0.04902

w(1)22 = w(1)22 – 0.3\*δz2\*x2 = 0.05 - 0.3\*0.0032597\*1 = 0.04902

**HW7 Part 3**

I did not add a bias term to any of my data while doing this. My plots looks a little off from Adriana’s example.



