	x_1	x_2	y
1	0	0	0
2	0	1	1
3	1	0	1
4	1	1	1

k (rows 1–4)

$N=4, p=2$

$x_{k1} \xrightarrow{w_1}$

$f(x_{k1}w_1 + x_{k2}w_2) \rightarrow \hat{y}_k$

$x_{k2} \xrightarrow{w_2}$

$$f(a) = \begin{cases} 1, & \alpha\nu\ a \geq 0.5 \\ 0, & \alpha\lambda\lambda\iota\acute{\omega}\varsigma \end{cases}$$

$$w_j = w_j + n(y_k - \hat{y}_k)x_{kj} \rightarrow w_j^{new} = w_j^{old} + n(y_k - \hat{y}_k^{old})x_{kj}$$

ΑΡΧΙΚΕΣ ΤΙΜΕΣ:

$w_1 = 0.05$ $w_2 = 0.025$ $n = 0.2$

ΒΗΜΑ 1

$x_{11}=0, x_{12}=0 \Rightarrow \alpha = x_{11}w_1 + x_{12}w_2 = 0*0.05 + 0*0.025 = 0 \Rightarrow f(a) = f(0) = 0 \Rightarrow E_1 = |0-0| = 0$

$x_{21}=0, x_{22}=1 \Rightarrow \alpha = x_{21}w_1 + x_{22}w_2 = 0*0.05 + 1*0.025 = 0.025 \Rightarrow f(a) = f(0.025) = 0 \Rightarrow E_2 = |1-0| = 1$

$x_{31}=1, x_{32}=0 \Rightarrow \alpha = x_{31}w_1 + x_{32}w_2 = 1*0.05 + 0*0.025 = 0.05 \Rightarrow f(a) = f(0.05) = 0 \Rightarrow E_3 = |1-0| = 1$

$x_{41}=1, x_{42}=1 \Rightarrow \alpha = x_{41}w_1 + x_{42}w_2 = 1*0.05 + 1*0.025 = 0.075 \Rightarrow f(a) = f(0.075) = 0 \Rightarrow E_4 = |1-0| = 1$

$E = E_1 + E_2 + E_3 + E_4 = 0 + 1 + 1 + 1 = 3$

ΒΗΜΑ 2

$w_1 = w_1 + n(y_1 - y'_1)x_{11} \Rightarrow w_1 = 0.05 + 0.2(0-0)0 = 0.05$

$w_2 = w_2 + n(y_1 - y'_1)x_{12} \Rightarrow w_2 = 0.025 + 0.2(0-0)0 = 0.025$

$x_{11}=0, x_{12}=0 \Rightarrow \alpha = x_{11}w_1 + x_{12}w_2 = 0*0.05 + 0*0.025 = 0 \Rightarrow f(a) = f(0) = 0 \Rightarrow E_1 = |0-0| = 0$

$w_1 = w_1 + n(y_2 - y'_2)x_{21} \Rightarrow w_1 = 0.05 + 0.2(1-0)0 = 0.05$

$w_2 = w_2 + n(y_2 - y'_2)x_{22} \Rightarrow w_2 = 0.025 + 0.2(1-0)1 = 0.225$

$x_{21}=0, x_{22}=1 \Rightarrow \alpha = x_{21}w_1 + x_{22}w_2 = 0*0.05 + 1*0.225 = 0.225 \Rightarrow f(a) = f(0.225) = 0 \Rightarrow E_2 = |1-0| = 1$

$w_1 = w_1 + n(y_3 - y'_3)x_{31} \Rightarrow w_1 = 0.05 + 0.2(1-0)1 = 0.25$

$w_2 = w_2 + n(y_3 - y'_3)x_{32} \Rightarrow w_2 = 0.225 + 0.2(1-0)0 = 0.225$

$x_{31}=1, x_{32}=0 \Rightarrow \alpha = x_{31}w_1 + x_{32}w_2 = 1*0.25 + 0*0.225 = 0.25 \Rightarrow f(a) = f(0.25) = 0 \Rightarrow E_3 = |1-0| = 1$

$w_1 = w_1 + n(y_4 - y'_4)x_{41} \Rightarrow w_1 = 0.25 + 0.2(1-0)1 = 0.45$

$w_2 = w_2 + n(y_4 - y'_4)x_{42} \Rightarrow w_2 = 0.225 + 0.2(1-0)1 = 0.425$

$x_{41}=1, x_{42}=1 \Rightarrow \alpha = x_{41}w_1 + x_{42}w_2 = 1*0.45 + 1*0.425 = 0.875 \Rightarrow f(a) = f(0.875) = 1 \Rightarrow E_4 = |1-1| = 0$

$E = E_1 + E_2 + E_3 + E_4 = 0 + 1 + 1 + 0 = 2$

ΒΗΜΑ 3

$w_1 = w_1 + n(y_1 - y'_1)x_{11} \Rightarrow w_1 = 0.45 + 0.2(0-0)0 = 0.45$

$w_2 = w_2 + n(y_1 - y'_1)x_{12} \Rightarrow w_2 = 0.425 + 0.2(0-0)0 = 0.425$

$x_{11}=0, x_{12}=0 \Rightarrow \alpha = x_{11}w_1 + x_{12}w_2 = 0*0.45 + 0*0.425 = 0 \Rightarrow f(a) = f(0) = 0 \Rightarrow E_1 = |0-0| = 0$

$w_1 = w_1 + n(y_2 - y'_2)x_{21} \Rightarrow w_1 = 0.45 + 0.2(1-0)0 = 0.45$

$w_2 = w_2 + n(y_2 - y'_2)x_{22} \Rightarrow w_2 = 0.425 + 0.2(1-0)1 = 0.625$

$x_{21}=0, x_{22}=1 \Rightarrow \alpha = x_{21}w_1 + x_{22}w_2 = 0*0.45 + 1*0.625 = 0.625 \Rightarrow f(a) = f(0.625) = 1 \Rightarrow E_2 = |1-1| = 0$

$w_1 = w_1 + n(y_3 - y'_3)x_{31} \Rightarrow w_1 = 0.45 + 0.2(1-0)1 = 0.65$

$w_2 = w_2 + n(y_3 - y'_3)x_{32} \Rightarrow w_2 = 0.625 + 0.2(1-0)0 = 0.625$

$x_{31}=1, x_{32}=0 \Rightarrow \alpha = x_{31}w_1 + x_{32}w_2 = 1*0.65 + 0*0.625 = 0.65 \Rightarrow f(a) = f(0.65) = 1 \Rightarrow E_3 = |1-1| = 0$

$w_1 = w_1 + n(y_4 - y'_4)x_{41} \Rightarrow w_1 = 0.65 + 0.2(1-1)1 = 0.65$

$w_2 = w_2 + n(y_4 - y'_4)x_{42} \Rightarrow w_2 = 0.625 + 0.2(1-1)1 = 0.625$

$x_{41}=1, x_{42}=1 \Rightarrow \alpha = x_{41}w_1 + x_{42}w_2 = 1*0.65 + 1*0.625 = 1.275 \Rightarrow f(a) = f(1.275) = 1 \Rightarrow E_4 = |1-1| = 0$

$E = E_1 + E_2 + E_3 + E_4 = 0 + 0 + 0 + 0 = 0$

Τελικές τιμές: $w_1 = 0.65$ και $w_2 = 0.625$