

REDES ASOCIATIVAS

3.6

$$S_1 = (1 \ 0 \ 0 \ 0)$$

$$S_2 = (1 \ 0 \ 0 \ 1)$$

$$S_3 = (0 \ 1 \ 0 \ 0)$$

$$S_4 = (0 \ 1 \ 1 \ 0)$$

$$t_1 = (1 \ 0)$$

$$t_2 = (1 \ 0)$$

$$t_3 = (0 \ 1)$$

$$t_4 = (0 \ 1)$$

Para calcular la matriz de pesos: $W_{ij} = \sum_{p=1}^P (2S_i(p) - 1)(2t_j(p) - 1)$

$$W_{11} = 1 + 1 + 1 + 1 = 4$$

$$W_{12} = -1 - 1 - 1 - 1 = -4$$

$$W_{21} = -1 - 1 - 1 - 1 = -4$$

$$W_{22} = +1 + 1 + 1 + 1 = 4$$

$$W_{31} = -1 - 1 + 1 - 1 = -2$$

$$W_{32} = 1 + 1 - 1 + 1 = 2$$

$$W_{41} = -1 + 1 + 1 + 1 = 2$$

$$W_{42} = 1 - 1 - 1 - 1 = -2$$

$$\Rightarrow W = \begin{pmatrix} 4 & -4 \\ -4 & 4 \\ -2 & 2 \\ 2 & -2 \end{pmatrix}$$

Testing:

$$(y_{in_1}, y_{in_2}) = S_1 W = (1 \ 0 \ 0 \ 0) W = (4, -4) \longrightarrow (1, 0) \text{ OK}$$

$$(y_{in_1}, y_{in_2}) = S_2 W = (1 \ 0 \ 0 \ 1) W = (6, -6) \longrightarrow (1, 0) \text{ OK}$$

$$(y_{in_1}, y_{in_2}) = S_3 W = (0 \ 1 \ 0 \ 0) W = (-4, 4) \longrightarrow (0, 1) \text{ OK}$$

$$(y_{in_1}, y_{in_2}) = S_4 W = (0 \ 1 \ 1 \ 0) W = (-6, 6) \longrightarrow (0, 1) \text{ OK}$$

REDES DE HOPFIELD

Entrenamiento: (1,0,1,0) y (0,1,0,1)

Determinar matriz de pesos. Testing: (0,0,1,0) y (0,1,0,0)

$$S_1 = (1,0,1,0) \rightarrow \begin{pmatrix} 1 \\ -1 \\ 1 \\ -1 \end{pmatrix} (1 \ -1 \ 1 \ -1) = \begin{pmatrix} 1 & -1 & 1 & -1 \\ -1 & 1 & -1 & 1 \\ 1 & -1 & 1 & -1 \\ -1 & 1 & -1 & 1 \end{pmatrix}$$

$$S_2 = (0,1,0,1) \rightarrow \begin{pmatrix} -1 \\ 1 \\ -1 \\ 1 \end{pmatrix} (-1 \ 1 \ -1 \ 1) = \begin{pmatrix} 1 & -1 & 1 & -1 \\ -1 & 1 & -1 & 1 \\ 1 & -1 & 1 & -1 \\ -1 & 1 & -1 & 1 \end{pmatrix}$$

$$\Rightarrow W = \begin{pmatrix} 0 & -2 & 2 & -2 \\ -2 & 0 & -2 & 2 \\ 2 & -2 & 0 & -2 \\ -2 & 2 & -2 & 0 \end{pmatrix}$$

TEST:

	1	0	0	0	
1	1	0	0	0	1°
0	1	0	0	0	3°
0	1	0	1	0	4°
0	1	0	0	0	2°

	1	0	1	0	
1	1	0	1	0	2°
0	1	0	1	0	1°
0	1	0	1	0	4°
0	1	0	1	0	3°

(1 0 1 0)

	0	1	0	0	
0	0	1	0	0	2°
1	0	1	0	0	1°
0	0	1	0	0	3°
0	0	1	0	1	4°

	0	1	0	1	
0	0	1	0	1	3°
1	0	1	0	1	1°
0	0	1	0	1	4°
0	0	1	0	1	2°

(0 1 0 1)