

$$\begin{array}{l}
 5 \times 5 \\
 4 \times 5 \\
 \text{Neuronas Pasgos}
 \end{array}
 \quad
 p = [-0.1 \ 0.2 \ 0.4 \ -0.5 \ 0.7]$$

$$\epsilon = 0.36$$

$$\textcircled{1} \quad w^1 = \begin{bmatrix} 1 & -1 & -1 & 1 & -1 \\ 1 & -1 & 1 & -1 & 1 \\ -1 & 1 & 1 & -1 & -1 \\ -1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{array}{l} \text{clase 1} \\ \text{clase 2} \\ \text{clase 3} \\ \text{clase 4} \end{array} \quad b^1 = \begin{bmatrix} 5 \\ 5 \\ 5 \\ 5 \end{bmatrix}; \quad w^2 = \begin{bmatrix} 1 & -\epsilon & -\epsilon & -\epsilon \\ -\epsilon & 1 & -\epsilon & -\epsilon \\ -\epsilon & -\epsilon & 1 & -\epsilon \\ -\epsilon & -\epsilon & -\epsilon & 1 \end{bmatrix}$$

$$a^1 = \text{purelin}(w^1 p + b^1)$$

$$a^1 = \text{purelin} \left( \begin{bmatrix} 1 & -1 & -1 & 1 & -1 \\ 1 & -1 & 1 & -1 & 1 \\ -1 & 1 & 1 & -1 & -1 \\ -1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} -0.1 \\ 0.2 \\ 0.4 \\ -0.5 \\ 0.7 \end{bmatrix} + \begin{bmatrix} 5 \\ 5 \\ 5 \\ 5 \end{bmatrix} \right)$$

$$a = \text{purelin} \left( \begin{bmatrix} -1.9 \\ 1.3 \\ 0.5 \\ 0.9 \end{bmatrix} + \begin{bmatrix} 5 \\ 5 \\ 5 \\ 5 \end{bmatrix} \right) = \begin{bmatrix} 3.1 \\ 6.3 \\ 5.5 \\ 5.9 \end{bmatrix}$$

$t=0$

$$a^2(0) = a^1$$

$$a^2(1) = \text{poslin}(w^2 a^2(0))$$

$$a^2(1) = \text{poslin} \left( \begin{bmatrix} 1 & -0.36 & -0.36 & -0.36 \\ -0.36 & 1 & -0.36 & -0.36 \\ -0.36 & -0.36 & 1 & -0.36 \\ -0.36 & -0.36 & -0.36 & 1 \end{bmatrix} \begin{bmatrix} 3.1 \\ 6.3 \\ 5.5 \\ 5.9 \end{bmatrix} \right) = \text{poslin} \left( \begin{bmatrix} -3.272 \\ 1.08 \\ -0.008 \\ 0.536 \end{bmatrix} \right)$$

$$a^2(1) = \begin{bmatrix} 0 \\ 1.08 \\ 0 \\ 0.536 \end{bmatrix}$$

$$t=1$$

$$a^2(2) = \text{poslin} \left( \begin{bmatrix} 1 & -0.36 & -0.36 & -0.36 \\ -0.36 & 1 & -0.36 & -0.36 \\ -0.36 & -0.36 & -0.36 & 1 \\ -0.36 & -0.36 & -0.36 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 1.08 \\ 0 \\ 0.536 \end{bmatrix} \right)$$

$$a^2(2) = \text{poslin} \left( \begin{bmatrix} -0.5877 \\ 0.8876 \\ -0.5877 \\ 0.1472 \end{bmatrix} \right) = \begin{bmatrix} 0 \\ 0.8876 \\ 0 \\ 0.1472 \end{bmatrix}$$

$$t=2$$

$$a^2(3) = \text{poslin} \left( \begin{bmatrix} 1 & -0.36 & -0.36 & -0.36 \\ -0.36 & 1 & -0.36 & -0.36 \\ -0.36 & -0.36 & -0.36 & 1 \\ -0.36 & -0.36 & -0.36 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0.8876 \\ 0 \\ 0.1472 \end{bmatrix} \right)$$

$$a^2(3) = \text{poslin} \left( \begin{bmatrix} -0.3723 \\ 0.8340 \\ -0.372 \\ -0.372 \end{bmatrix} \right) = \begin{bmatrix} 0 \\ 0.83 \\ 0 \\ 0 \end{bmatrix}$$

El vector de entrada  $\varphi$  es de clase 2

Para comprobar convergencia, se hace otra iteración

$$a^2(4) = \text{poslin} \left( W^2 \cdot \begin{bmatrix} 0 \\ 0.83 \\ 0 \\ 0 \end{bmatrix} \right) = \text{poslin} \left( \begin{bmatrix} -0.2988 \\ 0.83 \\ -0.2988 \\ -0.2988 \end{bmatrix} \right)$$

$$a^2(4) = \begin{bmatrix} 0 \\ 0.83 \\ 0 \\ 0 \end{bmatrix} \quad \checkmark$$