ELE075 - Sistemas Nebulosos
Atividade Prática 2 - Parte 1

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I.

$$Q = \begin{vmatrix} 0 & 0.8 & 0.6 & 0.25 \\ 0.7 & 0.98 & 0.15 & 0.5 \end{vmatrix}$$

$$R = \begin{vmatrix} 1 & 0.4 & 0.2 \\ 0.1 & 0.4 & 0.7 \\ 0.4 & 0.15 & 0.05 \\ 0.85 & 0.3 & 0.1 \end{vmatrix}$$

$$L = \begin{vmatrix} 1 & 0.2 & 0.6 & 0.8 \\ 0.85 & 0.3 & 0.8 & 0.88 \end{vmatrix}$$

$$M = Q \wedge \neg L = \begin{vmatrix} 0 & 0.8 & 0.4 & 0.2 \\ 0.15 & 0.7 & 0.15 & 0.12 \end{vmatrix}$$

$$P = Q \circ R = \begin{vmatrix} 0.24 & 0.32 & 0.56 \\ 0.7 & 0.392 & 0.686 \end{vmatrix}$$

II.

$$A = \begin{vmatrix} 1 & 0.5 & 0.4 & 0.2 \end{vmatrix}$$

$$R = \begin{vmatrix} 1 & 0.8 & 0 & 0 \\ 0.8 & 1 & 0.8 & 0 \\ 0 & 0.8 & 1 & 0.8 \\ 0 & 0 & 0.8 & 1 \end{vmatrix}$$

$$B = A \circ R = \begin{vmatrix} 1 & 0.8 & 0.5 & 0.4 \end{vmatrix}$$

III.

As curvas de pertinências são como na Figura 1.

$$\mu_{young}(x) = gaussian(x, 0, 20)$$

$$\mu_{old}(x) = gaussian(x, 100, 30)$$

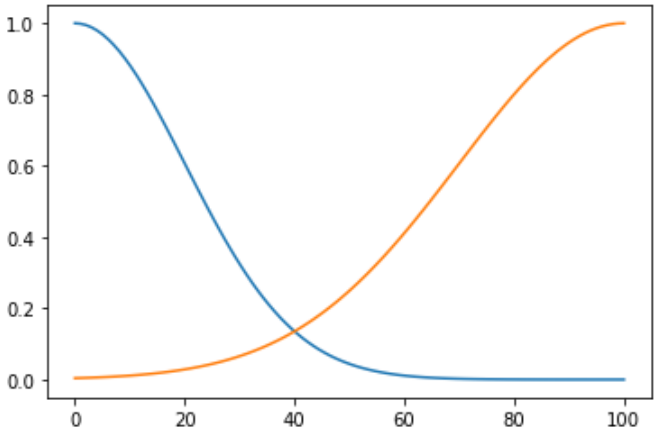

Figura 1. Curvas de pertinência, em azul μ_{young} e em laranja μ_{old}

IV.

As curvas de pertinências são como na Figura 2.

$$\mu_a(x) = \neg\mu^2_{young} \wedge \neg\mu^2_{old}$$

$$\mu_b(x) = \mu^2_{young} \wedge \mu^2_{old}$$

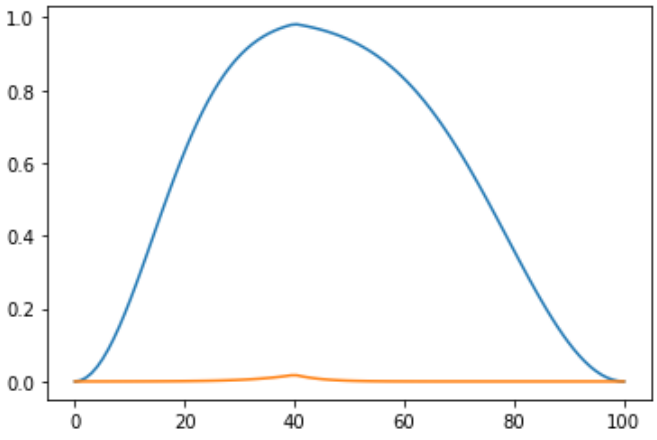

Figura 2. Curvas de pertinência, em azul μ_a e em laranja μ_b

V.

$$A_1 = \begin{vmatrix} 0.2 & 0.4 & 0.5 \end{vmatrix}$$

$$A_2 = \begin{vmatrix} 1 & 1 & 0.3 \end{vmatrix}$$

$$B_1 = \begin{vmatrix} 0.1 & 0.3 \end{vmatrix}$$

$$B_1 = \begin{vmatrix} 0.6 & 0.2 \end{vmatrix}$$

$$A_1 \to B_1$$
$$A_2 \to B_2$$

$$A' = \begin{vmatrix} 0 & 1 & 0 \end{vmatrix}$$

$$B' = A' \circ (\underset{i}{\cup} A_i \to B_i) = \begin{vmatrix} b_1 & b_2 \end{vmatrix}$$

VI.

A curva de pertinência é como na Figura 3.

$$\mu_{A_1} = trapmf(x, \begin{bmatrix} 3 & 4 & 5 & 6 \end{bmatrix})$$

$$\mu_{A_2} = trapmf(x, \begin{bmatrix} 6 & 6.5 & 7 & 7.5 \end{bmatrix})$$

$$\mu_{C_1} = trimf(x, \begin{bmatrix} 3 & 4 & 5 \end{bmatrix})$$

$$\mu_{C_2} = trimf(x, \begin{bmatrix} 4 & 5 & 6 \end{bmatrix})$$

$$A_1 \to C_1$$
$$A_2 \to C_2$$

$$\mu_{A'} = trimf(x, \begin{bmatrix} 5 & 6 & 7 \end{bmatrix})$$

$$\mu_{C'} = \underset{i}{\vee}[\vee(\mu_{A'} \wedge \mu_{A_i}) \wedge \mu_{C_i}]$$

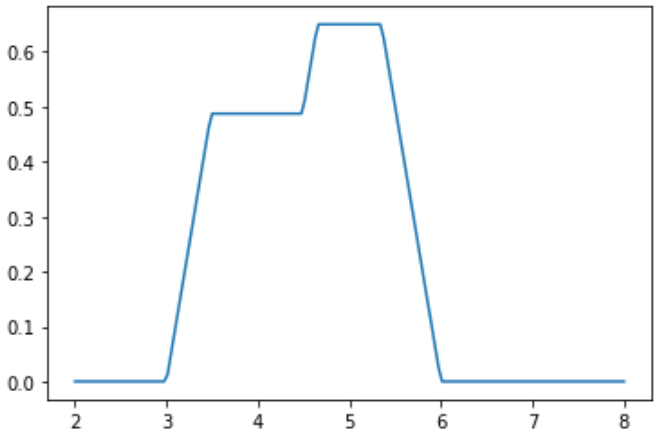

Figura 3. Curvas de pertinência de C'.