2ª Lista de Exercícios

Andevaldo da Encarnação Vitório

Questão 1

There are a fuzzy rule and fuzzy sets.

$$R : \text{If } x \text{ is } A \text{ then } y \text{ is } C.$$
$$\text{or } R : A(x) \rightarrow C(y)$$

A	a_1	a_2	a_3	a_4
μ_A	0.2	0.4	0.6	0.8

C	y_1	y_2	y_3
μ_C	0.4	0.6	0.9

Calculate the implementation relations $R(x, y)$ by using the min and product operators.

Solution: Using minimum T-norm operator:

$R(x,y)_{\min} =$

	y_1	y_2	y_3
a_1	0.2	0.2	0.2
a_2	0.4	0.4	0.4
a_3	0.3	0.6	0.9
a_4	0.4	0.6	0.8

Using product T-norm operator:

$R(x,y)_{\text{prod}} =$

	y_1	y_2	y_3
a_1	0.08	0.12	0.18
a_2	0.16	0.24	0.36
a_3	0.24	0.36	0.54
a_4	0.32	0.48	0.72

Questão 2

There is a fact A' given for the rule in the above exercise.

A'	a_1	a_2	a_3	a_4
$\mu_{A'}$	0.5	0.6	0.7	1.0

Calculate the output C' when you apply composition operations to the fact A' and the rule $R(x, y)$.
Solução: Resposta:

Questão 3

There is a fuzzy rulebase with only one rule:

R : If x is A then y is b then z is C,
where $A = (0, 1, 2), B = (1, 2, 3)$ and $C = (5, 6, 7)$.
are triangular fuzzy sets.

a) Calculate the output fuzzy sets when input is given as $x_0 = 1$ and $y_0 = 1.5$.

b) Find the output fuzzy set when input is given as $A' = (1, 2, 3)$ and $B' = (1.5, 2.5, 3.5)$