

MTL-717 Fuzzy sets and Application Quiz-2

1. Prove or Disprove the Following with respect to $X, Y \subseteq U$, the Universe, and $B \subseteq A$, the set of attributes

- a. $B_L(X \cap Y) = B_L(X) \cap B_L(Y)$
- b. $B_U(B_L(X)) = B_U(B_U(X)) = B_U(X)$

[3 + 3 = 6]

2. Consider the knowledge representation system given in the following table where $R = \{A, B, C\}$ is the set of attributes. Use Skowron's algorithm to find Core and Reduct of the attributes.

U	A	B	C
x1	Yes	0	high
x2	Yes	1	low
x3	Yes	2	high
x4	No	0	low
x5	No	1	medium
x6	No	2	medium
x7	Yes	1	high
x8	No	1	medium
x9	Yes	2	low
x10	Yes	1	medium

[4]

MTL-717 Fuzzy sets and Application Quiz-3

1. Prove or Disprove the following with respect to $A_i(X) \in \mathcal{F}(X)$ for all $i \in I$, where I is the index set and X is the universe.

- a. $\bigcup_{i \in I} \alpha^+ A_i = \alpha^+(\bigcup_{i \in I} A_i)$
- b. $\bigcap_{i \in I} \alpha^+ A_i \subseteq \alpha^+(\bigcap_{i \in I} A_i)$

[1.5+2.5]

2. Which of the following is/are valid membership function for a fuzzy set A of \mathbb{R} ?

a. $\mu_A(x) = \begin{cases} \frac{x-1}{3} & 1 \leq x \leq \frac{29}{7} \\ 0 & \text{otherwise} \end{cases}$

c. $\mu_A(x) = \begin{cases} \cos \frac{x+5}{4} & 0 \leq x \leq 10 \\ 0 & \text{otherwise} \end{cases}$

b. $\mu_A(x) = \frac{1}{1 + e^{-\left(\frac{4(x+7)}{5}\right)}}$

d. $\mu_A(x) = \begin{cases} \left| \ln \frac{x-4}{3} \right| & \frac{11}{2} \leq x \leq 9 \\ 0 & \text{otherwise} \end{cases}$

[2]

3. Let $A = [1 \ 2 \ 3]$ and $B = [4 \ 6 \ 8]$ be triangular fuzzy numbers.

- a. Find a fuzzy set X defined on \mathbb{R} such that $A + X = B$
- b. Find a fuzzy set Y defined on \mathbb{R} such that $X + Y = B - A$

[2+2]