Taller AI:

2. a) $A \cap A^c = \phi$; Si $A = \phi$ se cumple.

Sea $N(A) = \{x \in X : \mu_A(x) = 1\}$ (núcleo). Sea A un conj. difuso (cd) tal que: $\exists x \in X$ t.q. $\mu_A(x) \in (0,1)$.

Supongamos que $A \cap A^c = \phi$

Como $\mu_A(x) \in (0,1) \Rightarrow \mu_{A^c}(x) = 1 - \mu_A(x) \in (0,1)$

Por lo tanto, $\mu_{A \cap A^c}(x) = \min\{\_,\_\} > 0$.

Con lo que $A \cap A^c \neq \phi$.

b. Sea A un c.d. en X t.q $\exists x \in X$ t.q $\mu_A(x) \in (0,1)$.

$\Rightarrow \mu_{A^c}(x) \in (0,1) \Rightarrow \mu_{A \cup A^c}(x) = \max\{\_,\_\} < 1$.

Luego $N(A \cup A^c) \neq X$.

c. Tener en cuenta $\min\{x,x\} = \max\{x,x\} = x$.

d. Sea A c.d en X.

Sea $x \in X$. $\mu_{(A^c)^c}(x) = 1 - \mu_{A^c}(x)$

$= 1 - (1 - \mu_A(x)) = \mu_A(x)$ □

e. Por conmutatividad del $\max$, $\min$

f. Sea A. c.d en X. Sea $x \in X$.

$\overset{\Delta}{\mu_{(A \cap B) \cap C}}(x) = \min\{\min\{\mu_A(x), \mu_B(x)\}, \mu_C(x)\}$

① $\mu_A(x) \leq \mu_B(x) < \mu_C(x)$

$\Delta = \min\{\mu_A(x), \mu_C(x)\}$

$= \mu_A(x)$

$= \min\{\mu_A(x), \mu_B(x)\}$

$= \min\{\mu_A(x), \min\{\mu_B(x), \mu_C(x)\}\}$

Análogamente se hace $\mu_B(x) \leq \mu_A(x) < \mu_C(x)$

② $\mu_A(x) < \mu_C(x) \leq \mu_B(x)$

$\Delta = \min\{\mu_A(x), \mu_C(x)\}$

$= \min\{\mu_A(x), \min\{\mu_B(x), \mu_C(x)\}\}$

Análogo, $\mu_B(x) < \mu_C(x) < \mu_A(x)$

③ $\mu_C(x) < \mu_A(x) \leq \mu_B(x)$

$\Delta = \min\{\mu_A(x), \mu_C(x)\}$

$= \min\{\mu_A(x), \min\{\mu_B(x), \mu_C(x)\}\}$

④ $\mu_C(x) < \mu_B(x) \leq \mu_A(x)$

$\Delta = \min\{\mu_B(x), \mu_C(x)\}$

$= \mu_C(x)$

$= \min\{\mu_A(x), \mu_C(x)\}$

$= \min\{\mu_A(x), \min\{\mu_B(x), \mu_C(x)\}\}$.

Análogo para $\cup$

g. $(A \cup B) \cap (B \cup C) = \min\{\max\{\mu_A, \mu_B\}, \max\{\mu_B, \mu_C\}\}$.

$\mu_{A \cup (B \cap C)}(x) = \max\{\mu_A, \min\{\mu_B, \mu_C\}\}$

$\Delta = \ldots$

① $\mu_A < \mu_B < \mu_C$

$\Delta = \max\{\mu_A, \mu_B\}$

$= \mu_B$

$= \min\{\mu_B, \mu_C\}$

$= \min\{\max\{\mu_A, \mu_B\}, \max\{\mu_A, \mu_C\}\}$

Análogo a $\mu_A < \mu_C < \mu_B$

② $\mu_C < \mu_A < \mu_B$

$\Delta = \max\{\mu_A, \mu_C\}$

$= \mu_A$

$= \min\{\mu_A, \mu_B\}$

$= \min\{\max\{\mu_A, \mu_C\}, \max\{\mu_A, \mu_B\}\}$

$= \min\{\max\{\mu_A, \mu_B\}, \max\{\mu_A, \mu_C\}\}$

Análogo $\mu_B < \mu_A < \mu_C$

③ $\mu_B < \mu_C < \mu_A$

$\Delta = \max\{\mu_A, \mu_B\}$

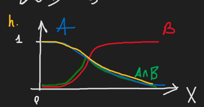
$= \mu_A$

$= \min\{\mu_A, \mu_A\}$

$= \min\{\max\{\mu_A, \mu_B\}, \max\{\mu_A, \mu_C\}\}$

Análogo a $\mu_C < \mu_B < \mu_A$.

h.



$A \cup (A \cap B)$

① $\mu_A \leq \mu_B$

$\max\{\mu_A, \min\{\mu_A, \mu_B\}\} = \max\{\mu_A, \mu_A\}$

$= \mu_A$

② $\mu_A \geq \mu_B$

$\max\{\mu_A, \min\{\mu_A, \mu_B\}\} = \max\{\mu_A, \mu_B\} = \mu_A$

i)

Supongamos que $\mu_{A \cup (A^c \cap B)}(x) = \mu_{A \cup B}(x)$

① $\mu_A < \mu_B$, $1 - \mu_A < \mu_B$

$\max\{\mu_A, \min\{\mu_{A^c}, \mu_B\}\} = \max\{\mu_A, \mu_{A^c}\} \neq \max\{\mu_A, \mu_B\}$.

Luego $A \cup (A^c \cap B) \neq A \cup B$

j) $\mu_{\overline{A \cup B}}(x) \overset{?}{=} \mu_{\bar{A} \cap \bar{B}}(x)$

$\mu_A \leq \mu_B$:

$\mu_{\overline{A \cup B}}(x) = 1 - \mu_{A \cup B}(x)$

$= 1 - \max\{\mu_A, \mu_B\}$

$= 1 - \mu_B$

$= \min\{1 - \mu_B, 1 - \mu_A\}$

$= \mu_{\bar{A} \cap \bar{B}}$.