3. properties of classical & fuzzy sets

Commutativity	Identity
Associativity	Transitivity
Distributivity	Involution
Idempotency	De Morgan's law

1. Commutativity

$A \cup B = B \cup A$ union

$A \cap B = B \cap A$ intersection

2. Associativity

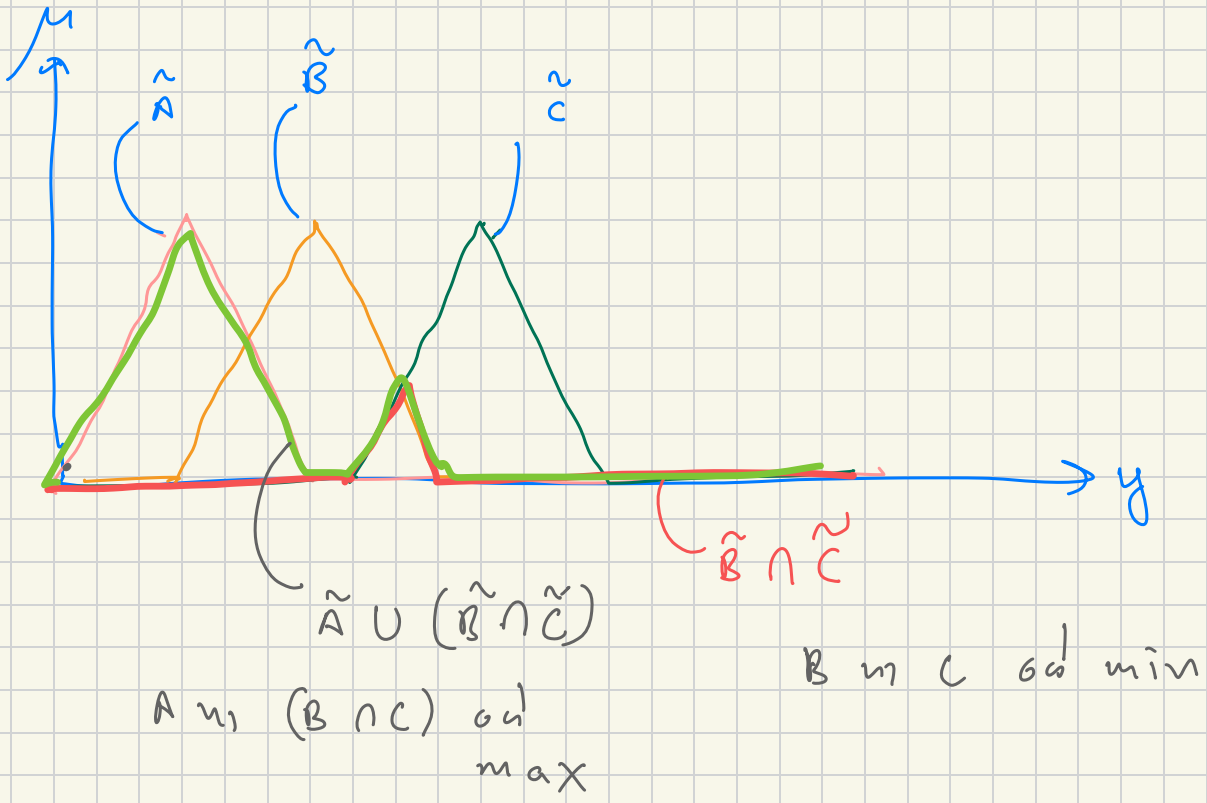
$A \cup (B \cup C) = (A \cup B) \cup C$

$A \cap (B \cap C) = (A \cap B) \cap C$

3. Distributivity

$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$



4. Idempotency

$$A \cup A = A$$

$$A \cap A = A$$

5. Identity

Null set (ϕ) has no element in it

$$\chi_{\phi}(x) = 0 \qquad \mu_{\phi}(x) = 0$$

universal set U all set elem without repeating

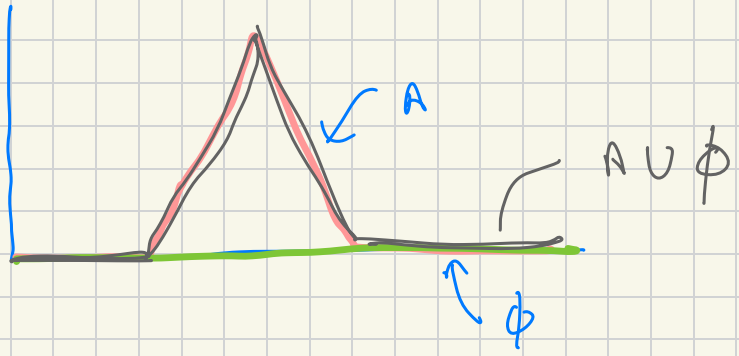
$$\chi_{U}(x) = 1 \qquad \mu_{U}(x) = 1$$

$A = \{1, 2, 3\}$

$\phi = \{\}$

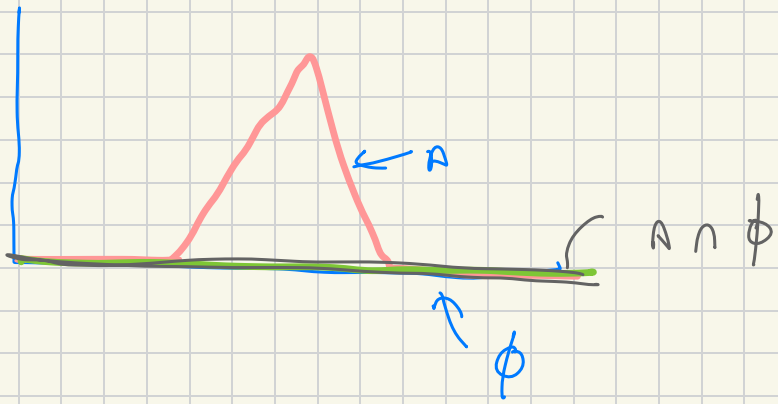
Rule 01

$$A \cup \phi = A$$



Rule 02

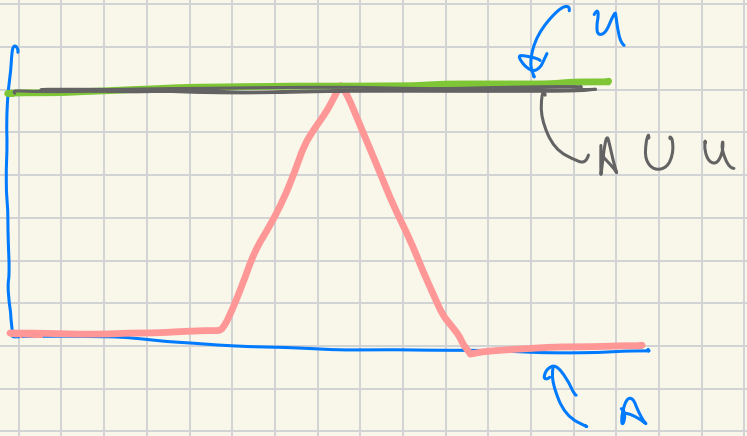
$$A \cap \phi = \phi$$



Rule 03

$$A \cup U = U$$

universal set mem value = 1



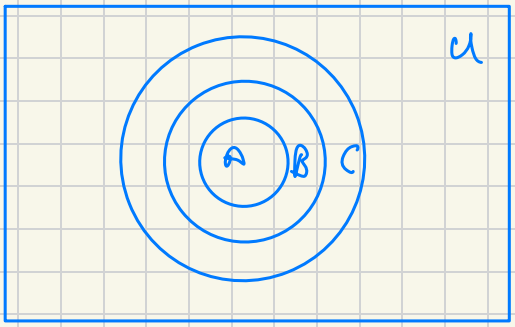
Rule 04

$$A \cap U = A$$

6. Transitivity

if $A \subseteq B$ and $B \subseteq C$ then $A \subseteq C$

subset



7. Involution

$$\bar{\bar{A}} = A$$

8. De morgan law

$$\overline{A \cap B} = \bar{A} \cup \bar{B}$$

$$\overline{A \cup B} = \bar{A} \cap \bar{B}$$

9. Law of excluded middle

$$A \cup \bar{A} = U$$

$$A \cap \bar{A} = \phi$$

this law NOT applicable for fuzzy sets