Assignment 3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

1) Defuzzification is done to obtain

   a. Crisp output
   b. The best rule to follow
   c. Precise fuzzy value
   d. None of the above

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   a.

2) If \( A \) and \( B \) are two fuzzy sets and \( x \in A, y \in B \). Let \( C = A \oplus B \). Then

   a. \( \mu_{C}(x,y) = \min[\mu_{A}(x),\mu_{B}(y)] \)
   b. \( \mu_{C}(x,y) = \min\{1, \mu_{A}(x) + \mu_{B}(y)\} \)
   c. \( \mu_{C}(x,y) = \max\{0, \mu_{A}(x) + \mu_{B}(y) - 1\} \)
   d. \( \mu_{C}(x,y) = \max(\mu_{A}(x),\mu_{B}(y)) \)

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   b.

3) Takagi-Sugeno approach to FLC design is computationally more expensive compared to Mamdani approach because
4) The train is running fast. Here **fast** can be represented by

- a. Fuzzy Set
- b. Crisp Set
- c. Fuzzy & Crisp Set
- d. None of the mentioned

No, the answer is incorrect.
Score: 0
Accepted Answers:

d.

5) In Lambda-cut method the value of $\lambda$ can be

- a. Greater than 10
- b. Between 1 and 10
- c. Between 0 and 1
- d. Any value

No, the answer is incorrect.
Score: 0
Accepted Answers:

c.

6) Suppose, a fuzzy set $\text{Young}$ is defined as follows:

$$\text{Young} = \{(10,0.5), (20,0.8), (30,0.8), (40,0.5), (50,0.3)\}$$

Then the crisp value of $\text{Young}$ using MoM method is

- a. 25
- b. 20
- c. 35
- d. 50
No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

7) If the fuzzy set has two sub regions, then the centre of gravity of the sub regions can be used to calculate the defuzzified value.

a. with the median of all the area
b. with the mean of all the area
c. with the largest area
d. with the smallest area

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

8) Which of the following is not a centroid method?

a. Centre of gravity method (CoG)
b. Centre of sum method (CoS)
c. Centre of area method (CoA)
d. Centre of Mass (CoM)

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

9) Consider the three output fuzzy sets as shown in the following plots:

The crisp value of $C = C_1 \cup C_2 \cup C_3$ using CoG method is

a. 4.9
b. 5.2
c. 3.9
d. 5.8

$\square$ a.
10) For a fuzzy relation $R$

$$R = \begin{bmatrix} 0.7 & 0.2 & 0.3 \\ 0.9 & 0.5 & 1 \\ 0.8 & 0.3 & 0.7 \end{bmatrix}$$

λ-cut relations for $\lambda = 0.8$

a. $R_0 = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix}$

b. $R_0 = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$

c. $R_0 = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

d. $R_0 = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

No, the answer is incorrect.
Score: 0
Accepted Answers: 
a.

11) What are the following sequence of steps taken in designing a fuzzy logic machine?

a. Fuzzification->Rule evaluation->Defuzzification
b. Rule evaluation->Fuzzification->Defuzzification
c. Fuzzy Sets->Defuzzification->Rule evaluation
d. Defuzzification->Rule evaluation->Fuzzification

No, the answer is incorrect.
Score: 0
Accepted Answers: 
a.
If the output fuzzy set $\mathcal{C} = C_1 \cup C_2 \cup \ldots \cup C_n$, then the crisp value according to Cent Sum (CoS) is defined as (Symbols have their usual meaning)

\[ x^* = \frac{\sum_{i=1}^{n} x_i(A_i)}{\sum_{i=1}^{n} A_i} \]

\[ y^* = \frac{\sum_{i=1}^{n} x_i \mu_C(x_i)}{\sum_{i=1}^{n} \mu_C(x_i)} \]

\[ z^* = \frac{\sum_{i=1}^{n} x_i A_{C_i}}{\sum_{i=1}^{n} A_{C_i}} \]

\[ w^* = \frac{\sum_{i=1}^{n} \mu_{C_i}(x_i)x_i}{\sum_{i=1}^{n} \mu_{C_i}(x_i)} \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

13) If $A$ is a fuzzy set, then $\overline{A_{\lambda}} \neq A_{\lambda}$

a. except for value of $\lambda = 0.5$

b. except for value of $\lambda = 1$

c. except for value of $\lambda = 0$

d. for all values of $\lambda$

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

14) If $R$ is a fuzzy set, then $\overline{R_{\lambda}} \neq R_{\lambda}$

a. except for value of $\lambda = 0.5$

b. except for value of $\lambda = 1$

c. except for value of $\lambda = 0$

d. for all values of $\lambda$

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

15)
Assume, a fuzzy set $A$ can be defined on $x$ as follows.

$$A_1 = \{(x_1, 0.8), (x_2, 0.2), (x_3, 0), (x_4, 1)\},$$

and according to lambda cut method

- $A_{0.5} = x_1, x_4$
- $A_{0.5} = x_1$
- $A_{0.5} = x_1, x_2$
- $A_{0.5} = x_4$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- a.

16) Which can be used as an input to a fuzzy controller?

- A crisp set
- A fuzzy set
- Both crisp set and fuzzy set
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
- a.

17) Which statement is true?

- Mamdani approach characterized by its low interpretability and low accuracy.
- Takagi and Sugeno’s approach characterized by high accuracy but at the cost of high interpretability.
- Takagi and Sugeno’s approach follows precise fuzzy modelling and obtains high accuracy but at the cost of low interpretability.
- Mamdani approach characterized by its low interpretability and high accuracy.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- c.

18) Which defuzzification method is used in the problem of mobile robot?

- Weighted average method
- Centre of sum method
- Lambda cut method
- Maxima method
No, the answer is incorrect.
Score: 0
Accepted Answers:
b.