M.E. Second Semester (Electrical (Electronics & Power) Engineering) (New-CGS)

13326 : Elective-II : Neuro Fuzzy Control : 2 EEPME 5

P. Pages : 2

Time : Three Hours

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AW - 3588

Max. Marks : 80

Notes :
1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Diagrams and equations should be given wherever necessary.
4. Illustrate your answer necessary with the help of neat sketches.
5. Use of slide rule logarithmic tables, Drawing instrument, Non-programmable calculator is permitted.
6. Discuss the reaction, mechanism wherever necessary.
7. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Consider the two fuzzy sets $\underline{A}$ and $\underline{B}$ as **6**

$$\underline{A} = \left\{\frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5}\right\} \text{ and}$$

$$\underline{B} = \left\{\frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5}\right\}$$

Where membership for element 1 in both $\underline{A}$ and $\underline{B}$ is implicitly zero. Calculate.

i) $\underline{A} \cup \underline{B}$, ii) $\underline{A} \cap \underline{B}$,

iii) $\overline{\underline{A} \cup \underline{B}}$.

b) State and explain frequently used properties of fuzzy sets. **7**

OR

2. a) Consider a rule : If X is A then Y is B with fuzzy sets $A = \left\{0.1/x_1, 0.4/x_2, 1/x_3\right\}$ and **7**

$B = \left\{0/y_1, 1/y_2, \frac{0.2}{y_3}\right\}$ compute the fuzzy relation R that represents the truth value of this fuzzy rule. Use first min t – norm and then the Lukasiewicz implication. Discuss the difference in the results.

b) Explain defuzzification of fuzzy set. Justify why can be any particular fuzzy set transformed into an infinite no of alpha-cut sets? **6**

3. a) Explain with example the importance of stability in fuzzy control systems. **8**

b) Explain main approaches to fuzzy control. **6**

OR

4. a) Explain Takagi-Sugeno-Kang (TSK) architecture for fuzzy controller. **7**

b) What are the primary design issues of a fuzzy controller? Explain. **7**

5.	a)	Explain why an multi layer perceptron doesnot learn if the initial weights and biases are all zeros.	6
	b)	Derive the back propagation rule to accommodate making the hyperbolic tangent function the activation function.	7

OR

6.	a)	Explain the methods of speeding up MLP Backpropagation training.	7
	b)	Draw and explain adaptive linear element (Adaline).	6
7.	a)	Explain the role of neural control in inverse dynamics.	7
	b)	Explain simulation of PI control neural networks.	6

OR

8.	a)	What is indirect control? Explain the role of neural network in it.	6
	b)	Explain the process of linearization with example.	7
9.		Explain ANFIS learning algorithm with its peculiar features.	13

OR

10.	a)	What are the basic principles of fuzzy neural systems?	7
	b)	Explain Hybrid neural network.	6
11.	a)	Design Neuro-Fuzzy control system to identify trash in cotton.	7
	b)	Design neuro fuzzy control system for integrated pest management.	7

OR

12.		Explain the application of a neural control to current control and speed control of three phase induction motor. Explain various steps in the design.	14

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