

#### Unit IV

No. of Printed Pages : 04

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7. (a) Which extracomponents can make the FLC adaptive ? Describe in brief their role in making FLC adaptive. **5**
- (b) Discuss in brief about different performance measures and different parameter estimation methods used in adaptive FLC. **10**
8. Explain different type of adaptation mechanism employed in adaptive FLC. Draw a flow chart for adaptation mechanism for actions based on  $\bar{e}$ ,  $\bar{e}^2$  and  $|e|_{\max}$ . **15**

**18BB1057**

**M. Tech. EXAMINATION, May 2019**

(Second Semester)

(C Scheme) (Main Only)

EE(I&C)

MIC528C

Fuzzy Control Systems

*Time : 3 Hours]*

*[Maximum Marks : 75*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

### **Unit I**

1. (a) Compare and contrast fuzzy logic and probability theory. Give the definition of fuzzy set in different ways. **8**  
(b) Discuss the importance of fuzzy control from an industrial perspective. **7**
2. (a) Define membership function with examples. Explain the methods used to design the membership function. **8**  
(b) Give the definition of fuzzy set and fuzzy relation. Explain the operations which can be applied on fuzzy relations with suitable example. **7**

### **Unit II**

3. What are the limitations of composition based inference ? Explain the individual rule based inference in detail with suitable example. **15**

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4. (a) What are the crisp relations and fuzzy relations ? Explain the composition of two crisp binary relations and the composition of fuzzy relations. **10**  
(b) Explain any one defuzzification method used in FKBC. **5**

### **Unit III**

5. (a) Explain the differences between Mamdani type and TSK type FLC. **8**  
(b) Differentiate between Fuzzy PID Controller and Fuzzy controller of PID type. **7**
6. Give the definition of linear and nonlinear fuzzy rules. Describe about linear and nonlinear FLC. Also discuss in brief the myths and facts about nonlinear fuzzy control. **15**

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**P.T.O.**