

Reg. No.

Question Paper Code

12017

17 JUL 2023

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL/MAY 2023

Second Semester

M.E - Power Electronics and Drives

20PPEEL202 - SOFT COMPUTING TECHNIQUE

(Regulations 2020)

Duration: 3 Hours

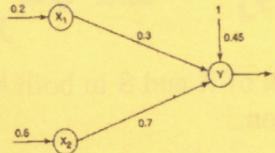
Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

Marks,  
K-Level, CO  
2,K3,CO1

1. Calculate net input of the network shown including Bias input:



2. What is Mcculloch pitts model?  
3. Define hamming distance.  
4. Mention applications of Hopfield net.  
5. For the fuzzy relation R, find the  $\lambda$  cut relation for  $\lambda=0.7$

2,K1,CO1  
2, K1,CO2  
2, K1,CO2  
2, K3,CO3

$$R = \begin{bmatrix} 0.2 & 0.5 & 0.7 & 1 & 0.9 \\ 0.3 & 0.5 & 0.7 & 1 & 0.8 \\ 0.4 & 0.6 & 0.8 & 0.9 & 0.4 \\ 0.9 & 1 & 0.8 & 0.6 & 0.4 \end{bmatrix}$$

6. Define bounded difference of fuzzy set.  
7. Compare genetic algorithms with traditional algorithms.  
8. Explain single point crossover with one example.  
9. Explain dispopt function in FIS.  
10. Mention the properties of Neuro fuzzy hybrid system.

2, K1,CO3  
2, K2,CO4  
2, K2,CO4  
2,K2,CO5  
2,K2,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Explain the architecture of Madaline and write the step by step procedure for training the Madaline with necessary flowchart.  
OR  
b) Implement AND function and OR function using Perceptron networks for bipolar targets.

13,K3,CO1  
13,K3,CO1

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

12017

12. a) (i). Compare auto associative and hetroassociative memories. 7,K3,CO2  
 (ii) Explain the architecture and training algorithm of ART1. 7,K3,CO2

**OR**

- b) Explain the architecture of CPN and write the step by step procedure for training the CPN with necessary flowchart 13,K3,CO2
13. a) Consider two fuzzy sets  $A = \{0.2/1 + 0.3/2 + 0.4/3 + 0.5/4\}$  13,K4,CO3  
 $B = \{0.1/1 + 0.2/2 + 0.2/3 + 1/4\}$   
 Find the algebraic sum, algebraic product, bounded sum and bounded difference of the given fuzzy sets.

**OR**

- b) Two fuzzy relations are given by: 13,K4,CO3

$$R = \begin{matrix} & y_1 & y_2 \\ \begin{matrix} x_1 \\ x_2 \end{matrix} & \begin{bmatrix} 0.6 & 0.3 \\ 0.2 & 0.9 \end{bmatrix} \end{matrix} \quad \text{and} \quad \xi = \begin{matrix} & z_1 & z_2 & z_3 \\ \begin{matrix} y_1 \\ y_2 \end{matrix} & \begin{bmatrix} 1 & 0.5 & 0.3 \\ 0.8 & 0.4 & 0.7 \end{bmatrix} \end{matrix}$$

Obtain T as composition of R and S in both Max-Min composition and Max-Product composition.

14. a) Explain the working of Genetic programming with necessary flow chart. 13,K3,CO4
- OR**
- b) What is meant by reproduction? Explain in detail about Roulette-Wheel selection and random selection. 13,K3,CO4
15. a) Explain the Genetic Neuro Hybrid Systems with appropriate block diagrams. 13,K3,CO5

**OR**

- b) Explain in detail about Fuzzy inference and fuzzy logic controller. 13,K3,CO5

### PART - C (1 × 15 = 15 Marks)

16. a) (i) Using GA approach solve the problem of maximizing the function  $f(x) = x^2$  where x is permitted to vary between 0 to 31. 7,K4,CO4  
 (ii) Explain how ANN, fuzzy logic and GA can be combined for certain applications. 8,K3,CO5

**OR**

- b) (i) Using the GA process, minimize the function  $f(x) = x^2 + 5x$ . Assume the necessary operators for the process. 8,K4,CO4  
 (ii) Explain the adaptive neuro fuzzy inference system in MATLAB. 7,K3,CO5