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Question Paper Code : 82126

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Elective

Power Electronics and Drives

PE 9275/PS 9002/10233 PSE 12/CO 951/CL 9002/UCO 9151 – SOFT COMPUTING
TECHNIQUES

(Common to M.E. Control and Instrumentation, M.E. Electrical Drives and
Embedded Control M.E., Power System Engineering M.E. Embedded System
Technologies and M.E. Power Management and M.E. High Voltage Engineering)

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Enumerate the merits of expert systems over traditional programs.
2. What's meant by rule based systems?
3. Why is the McCulloch–Pitts neuron model widely used in logic functions?
4. What is the impact of weight in an Artificial Neural Network?
5. What is the cardinality of a fuzzy set? Whether a power set can be formed for a fuzzy set?
6. Denote any three fuzzy set operations.
7. What are the various types of cross over and mutation techniques?
8. What is the significance of hybrid GA?
9. What are the different MATLAB–simulink blocks in fuzzy logic toolbox?
10. What are the salient features of MATLAB neural network toolbox.

PART B — (5 × 16 = 80 marks).

11. (a) (i) Draw and explain the architecture of intelligent control. (10)
 (ii) Briefly discuss about symbolic reasoning system. (6)

Or

- (b) (i) Draw and describe the architecture of common expert system. (10)
 (ii) Enumerate the application of expert system. (6)
12. (a) Explain the architecture with suitable model and training algorithm of adaptive linear neuron.

Or

- (b) Constructive an auto associative discrete Hopfield network with input vector $[1 \ 1 \ 1 \ -1]$. Test the discrete Hopfield network with missing entries in first and second components of the stored vector.
13. (a) Consider a Local Area Network of inter connected work stations that communicate using Ethernet protocols at maximum rate of 12Mbps. The two fuzzy sets are given as follows represent the loading of the LAN

$$\tilde{s}(x) = \left\{ \frac{1.0}{0} + \frac{1.0}{1} + \frac{0.8}{2} + \frac{0.2}{5} + \frac{0.1}{7} + \frac{0.0}{9} + \frac{0.0}{10} \right\}$$

$$\tilde{c}(x) = \left\{ \frac{0.0}{0} + \frac{0.0}{1} + \frac{0.0}{2} + \frac{0.5}{5} + \frac{0.7}{7} + \frac{0.8}{9} + \frac{1.0}{10} \right\}$$

Where suffix 's' represents silent and 'c' represents congestion. Perform algebraic sum, algebraic product, bounded sum and bounded difference over the two fuzzy sets.

Or

- (b) (i) Explain any five types of defuzzification techniques? (6)
 (ii) Explain the working principle of FIS with suitable block diagram and also distinguish between Mamdani FIS and Sugeno FIS. (10)
14. (a) Explain the operation of a simple Genetic Algorithm with the aid of flow chart.

Or

- (b) Describe the Ant Colony optimization technique with flow chart.
15. (a) Explain the application of Genetic Algorithm in power system optimization problem with suitable example.

Or

- (b) Write a detailed note on stability analysis of fuzzy control system with an example.