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Question Paper Code : 91471

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh Semester

Electrical and Electronics Engineering

EE 6006 – APPLIED SOFT COMPUTING

(Common to : Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2013)

(Also common to : PTEE 6006 – Applied Soft Computing for B.E. (Part-Time) – Sixth Semester – Regulations – 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Compare an artificial neuron and a biological neuron.
2. State the delta learning rule.
3. What is a Hopfield network ?
4. Outline the applications of artificial neural networks.
5. Define a fuzzy set. Give example.
6. Name any two fuzzy membership functions.
7. In what way is the fuzzy PID control operation is better than the traditional PID control operation ?
8. Why is the error value used as an input signal for fuzzy based inverted pendulum model ?
9. "Genetic algorithm operates on the concept of survival of the fittest". Justify the statement.
10. What is crossover ? Give example.



11. a) What is a ball propagation neural network ? Elaborate the steps in the back propagation training algorithm. (13)

(OR)

- b) Outline the steps in the training algorithm of ADALINE neural network with an example. (13)

12. a) Explain in detail on the applicability of a multi-layer feed forward neural network controller for an inverted pendulum model. (13)

(OR)

- b) i) Elaborate the importance of feedback networks. (5)

- ii) Present an outline of neural networks for transient response of a continuous time system. (8)

13. a) Define defuzzification. Outline the various methods of defuzzification with an example. (13)

(OR)

- b) Elaborate how fuzzy inference rules are formulated with relevant examples. (13)

14. a) Consider an aircraft landing problem, define the input and output parameters. Obtain membership values for the considered parameters and formulate fuzzy inference rules. Derive the defuzzified output values from the fuzzy associative memory table formulated. (13)

(OR)

- b) Draw the block diagram of fuzzy logic based liquid level control system. Carry out fuzzification, inference mechanism and defuzzification process over the system and depict the control action taken employing fuzzy technique. (13)



15. a) What is genetic algorithm ? Outline the steps in evolving a solution to a problem using genetic algorithm. (13)

(OR)

- b) What is mutation ? Outline the mutation operators in genetic algorithms with an example. (13)

PART - C

(1×15=15 Marks)

16. a) Using the Back-propagation training algorithm, find the new weights when the network Fig. 1 is presented the input pattern [0.2 0.4 0] and target output is 0.7. Employ learning rate $\alpha = 0.2$ and use bipolar sigmoidal activation function. (15)

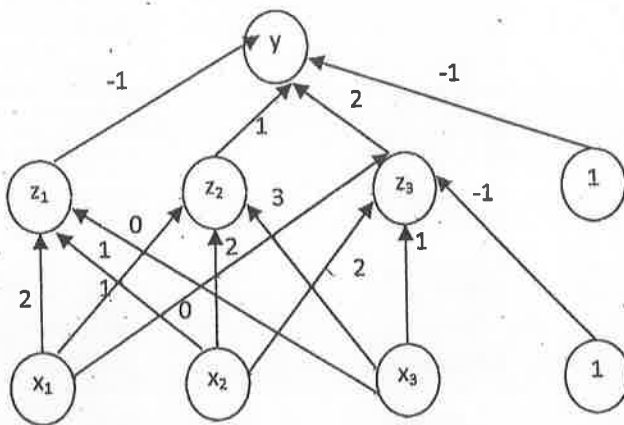


Fig. 1

(OR)

- b) Elaborate the applicability of genetic algorithm approach for economic dispatch problem along with the multi-objective function employed to carry out the optimization process. (15)

18. (i) What is genetic algorithm? Outline the steps in evolving a solution to a problem using genetic algorithm.

(ii) What is mutation? Describe the mutation operators in genetic algorithm with an example.

19. (i) Show the back propagation training algorithm. Indicate the new weights when the error of the 1st neuron in the output layer (0.1) is 0 and target output is 0.7. Display learning rate = 0.1 and use sigmoid transfer function.



(ii) Indicate the applicability of genetic algorithm approach in solving genetic problem along with the main objective function applied to solve the optimization problem.