

C9-R4: SOFT COMPUTING

NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.
 - a) What are the differences between hard and soft computing?
 - b) What is mutation? Why it is needed?
 - c) What is an evolution strategy? How is it implemented?
 - d) How does an ANFIS learn?
 - e) What do you understand by Regression Analysis? Explain least square method for Regression Analysis.
 - f) What are the main steps in developing a rule based expert system?
 - g) Define fuzzy inference. What are the main steps in fuzzy inference process?

(7x4)
2. Enumerate the advantages and disadvantages of the three major optimization algorithms: gradient descent technique, Newton based technique and genetic algorithms. Derive some conclusion about the single based and population based optimization methods.

(9+9)
3. Discuss how neural networks and genetic algorithms techniques could integrate to generate a better overall performance system as an evolutionary neural network. Discuss how the learning rate affects the performance of the population based learning algorithms.

(9+9)
4. Explain the various steps for implementing genetic algorithms. What is Roulette wheel selection technique? How does it work? Explain using a suitable example.

(7+4+7)
5. How does a Neuro Fuzzy System learn? What system parameters are learned or tuned during training? How does a Neuro Fuzzy System identify false rules given by a human expert? Give an example.

(5+5+8)
6. How is a set of weights of a neural network encoded in a chromosome? Give an example. Describe the genetic operations used to optimize the weights of a neural network.

(9+9)
7. Why is a neural expert system capable of approximate reasoning? What are fuzzy filtered neural networks? How reinforcement learning is implemented in Neuro Fuzzy Systems?

(7+4+7)