

GANPAT UNIVERSITY
M.Tech Semester: II Electrical Engineering
Regular Examination May-June 2014
3EE201: Applications of AI in Electrical Engineering

Total Marks-70

Time:-3 Hours
Instructions:-

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Section-I

Que-1

Amit has applied for a loan to 'People's Financiers'. His salary is Rs. 1.4 lakhs and his debts amount to Rs 0.3 lakhs. Compute the risk associated with Amit using Mean of Maxima defuzzification method. The Company employs the following credit assessment rule-base: [12]

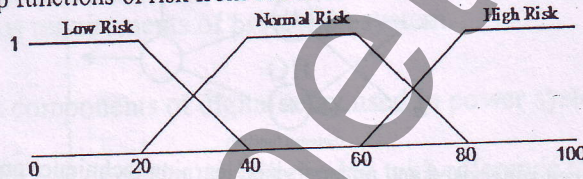
1. IF creditor salary is adequate OR creditor debts are small THEN creditor risk is low
2. IF creditor salary is marginal AND creditor debts are large THEN creditor risk is normal
3. IF creditor salary is poor THEN creditor risk is high

The membership functions for the linguistic variables are as following statements:

Creditor salary in lakhs: People with salaries of Rs. 4 lakhs or more are definitely adequately paid and possibly those earning salaries as low as 2.5 lakhs; those earning between Rs. 1lakh and Rs. 3 lakhs are regarded as marginally paid people; poor salary earners typically earn less than 1.5 lakhs, but if they earn less than Rs.1 lakh they are definitely poor.

The creditor debts in lakhs: people with debts of less than Rs. 0.5 lakhs definitely have small debts and those owing between Rs. 0.5 lakhs and 0.75 may be regarded as having small debts. Those with debts of Rs. 1 lakh or more are definitely people with large debts, but those owing between Rs. 0.5 lakhs and Rs. 1 lakh may be considered as large debtors

Risks: The membership functions of risk from 0% to 100% are as shown in figure below:



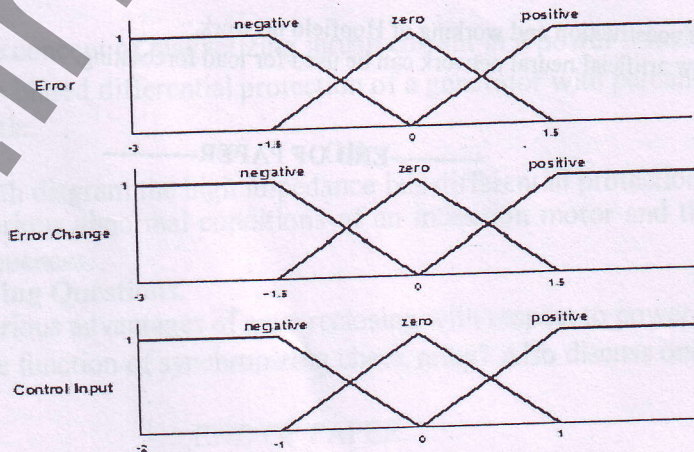
OR

Que-1

The inputs to an FLC are error and error change and the output is control input. The values of these variables are shown in Figure. For an error of 0.375 and error change of -2.25 find the crisp value of the control input. Use Mean of Maxima method for defuzzification. The rule base is given as [12]

1. If the error is positive and error change is positive then control input is positive
2. If the error is negative or error change is zero control input is negative
3. If the error is zero and error change is negative control input is negative
4. If the error is not negative then the control input is zero
5. If the error positive and error change is zero control input is positive

Show your computations clearly for each of the four tasks involved in finding the crisp value of control input.



- Que-2 (A) Write a short note on encoding with respect to genetic algorithm. [6]
 (B) What is the difference between fuzzy set and crisp set? What are the advantages of fuzzy logic? [5]

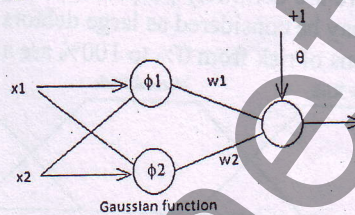
OR

- Que-2 (A) Explain the fuzzy implication with suitable example. [6]
 (B) What are the advantages of genetic algorithm over the other optimization techniques? [5]

- Que-3 **Attempt any two.**
 (A) Explain the genetic algorithm techniques for adopting the changing environment. [6]
 (B) Explain the various parallel genetic algorithms. [6]
 (C) Define the fuzzy set for the following. [6]
1. The set of real number $x \gg 1$ (x much greater than one)
 2. The set of high temperature (temperature greater than 35°C is definitely high)
 3. The set of medium height (height of 175 cm is definitely medium height)

Section-II

- Que-4 (A) Apply the pseudo inverse learning technique for X-OR mapping in the following RBF network. [7]



- (B) Differentiate between supervised and unsupervised learning techniques and give example of each. [5]

OR

- Que-4 (A) Derive the generalized delta learning rule for multi layered feed forward network. [8]
 (B) Explain the learning process with example. [4]

- Que-5 (A) Explain the biological neural network and how the signal is transformed from one neuron to another. Also explain the artificial neural network to mimic this property. [8]
 (B) Differentiate between feed forward and recurrent network. [3]

OR

- Que-5 (A) Draw the fundamental genetic algorithm and explain each step. [7]
 (B) What is the importance of setting the crossover and mutation probability? [4]

- Que-6 (A) Explain the construction and working of Hopfield network. [6]
 (B) Explain how artificial neural network can be used for load forecasting. [6]

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