Issued: 2/2/2010 **ISE 790 HW#3** Due: Thursday 2/11/2010

Exercises

Given the following observed data:

Age x_1	Property x_2	Insurance Fee y
25	30000	1000
27	55000	1500
30	35000	1100
31	60000	1600
34	65000	1700
35	40000	1200
45	31000	2100
47	57000	2700
50	24000	2200
52	61000	2800
55	39000	2300
58	64000	2900

You are asked to use the following three different approaches to model this insurance fee problem:

(1.) [15 pts] Hong-Lee's approach. (see "*Induction of Fuzzy Rules and Membership Functions from Training Examples*", appeared in Fuzzy Sets and Systems Vol. 84 (1996), pp. 33-47.)

(a) Use Hong-Lee's approach to find the membership functions and fuzzy inference rules. Please do it step by step with your comments.

(b) Given age = 40 and property = 48000, what is your inferred insurance fee?

(2.) Fuzzy c-mean method. Please do it step by step with your comments.

(a) Use fuzzy c-mean method to cluster the insurance fee y.

(b) Use fuzzy c-mean method to cluster the data set (x_1, y)=(age, insurance fee).

(c) Use fuzzy c-mean method to cluster the data set (x_1, x_2, y)=(age, property, insurance fee).

(d) Given age = 40 and property = 48000, what is your inferred insurance fee?

(3.) Fuzzy regression model. Please do it step by step with your comments.

(a) If the triangle membership function is assumed with symmetric spreads, try to derive a fuzzy regression model where the required possibility level is 0.75.

(b) Given age = 40 and property = 4800, what is your inferred insurance fee?

(4.) Compare and analyze the pros and cons of these three approaches based on your results. Please state clearly your arguments.