**COMP 3710 Applied Artificial Intelligence**

**Seminar/Lab 9.**

**Fuzzy Control for A/C**

1. **Objectives**

* How to design a fuzzy control system

1. Let’s design a fuzzy controller for an air conditioning system in a room.
   1. The target room temperature: 18.
   2. Inputs:
      * *Theta* (room temperature) over [18, 40]
      * *dTheta* (temperature difference) over [-5, 5]
   3. Output:

* *Current*, is [0, 10].
  1. Decide fuzzy sets and their membership functions.
* *NM*, *NS*, *ZE*, *PS*, and *PM*, for *dTheta*
* ??? for *Theta*
* ??? for *Current*
  1. Decide minimum 10 reasonable fuzzy rules. (You may use the similar rules that are used in the inverted pendulum problem explained in the class slides.)
  2. Describe the above fuzzy rules in a table.

1. Implementation: next week
2. Exercise

a

b

0

p

d

q

c

When p is given, how to compute q?

q = 2(p-a)/(b-a) How?

When c is given, how to compute d?

???

(a+b)/2

1

0

d

c

b

a

a

When d is given, how to compute c?

c = a + d(b-a)/2 How?

How to compute the area of the trapezoid of (a, d, d, b)?

Area = d(b-c) How?

1. Submission

* Fuzzy sets with their membership functions in 2) – 10 marks
* You SHOULD use a word processor for this assignment. Otherwise you will get zero. (In some cases, it is very hard to read your handwriting.)
* Due: 6:00 PM, November 15, 2017
* Any late submission will NOT be accepted.