CIS $4930/6930$ **Principles of Cyber-Physical Systems**
Homework #7: due $11:55$**pm, Apr 11th**

Problem Description

P1 Consider question 10 in the exercise section at the end of Chapter 4 and Figure 4.17 and 4.18. Finish the following.

1. Plot a trajectory for x_i, $i \in \{1, 2\}$ over a time period from 0 to 10 seconds.
2. Is the automaton shown in Figure 4.18 a rectangular hybrid automaton? Justify your answer.
3. (**required for CIS 6930**) Is there a maximal value for x_i, $i \in \{1, 2\}$ as defined by the automaton? If yes, compute that maximal value. Otherwise, explain why such maximal does not exist.

To answer the above questions, use the parameters as defined in 10(a) on page 104.

P2 (**Extra credits**) Refer to Example 10.8 in the book and related code in the same chapter. Create a Promela model and use SPIN to validate the conclusion drawn in Example 10.8. The basic idea is that two processes are created to model two threads calling function `addListener` where the linked list data structure used in that example is modeled with shared variables. You also need to create a LTL property to specify the data structure should *never* be corrupted.

What to Submit

A zipped folder in the `.zip` format including following items:

- A file including the answers for P1.
- A single Promela model including the LTL specification for P2.

Requirements

- Your file name must be in the format **hw7-{your last name}.zip** to help me recognize the owner of the file.
- This assignment is individual.
- All writings must be clear and readable. Figures for timed automata need to be drawn with some graphics editing SW. Otherwise, substantial loss of points may be incurred.