**Cps-573,Fall 2021- Project Proposal**

**Type of project:**

Modeling and analyzing the linear matrix inequalities based on three vehicle platoons.

List of tools that will be used in the project: dReach, SpaceEx, Flow\*.

This is an individual project.

**Project Description:**

In order to verify hybrid systems many different tools and methods such as Flow\*,dReach,SpaceEx….etc,can be used. These tools were then further tested by several corresponding benchmarks provided by authors. These benchmarks include different types of hybrid systems whose dynamics can be linear, continuous, non-linear, timed, rectangular, etc.

In this project,we consider the platoon of 3 vehicles guided by a leader.The spacing error is defined as the difference between the distance of the truck to its predecessor and a reference distance.The goal of the reachability analysis for this system is to determine a lower bound for assuring collision-free driving.The dynamics of the platoon is described by the following differential equation:

x’=Ax+Ba

Where A is a constant system matrix,B is a constant input matrix and a is the acceleration of the leader .The proposed benchmark consists of 2 modes and 2 transitions.

priority benchmarks I would like to incorporate first into Hyst:

1) SpaceEx benchmarks

2) dReach benchmarks

3) Flow\* HyComp benchmarks