

CIS 4930/6930 Principles of Cyber-Physical Systems

Final Project: Due: May 1st, 2014

Problem Description

In this final project, you will consider the hybrid system as described in Example 4.8 in the book, build an appropriate hybrid automata model, and use the tool SpaceEx (which is available at <http://spaceex.imag.fr>) to analyze and verify the model you build. The following actions among others need to be taken to successfully complete this project.

1. Study and get yourselves familiar with the tool SpaceEx by reading the documentations and following the tutorial provided in its website.
2. The model shown in Figure 4.13 needs to be revised to make the vehicle *always* stay within the track.
3. The track where the vehicle runs needs to be modeled. To make this project a bit more interesting, a similar shape for the track as shown in Figure 4.13 should be modeled.
4. Safety properties need to be checked to make sure that the vehicle always stays within the track.

The successful completion of this project also requires you create a **report** describing with sufficient level of details how the control and track models are developed, assumptions made during the modeling process, and the analysis of the results from verifying the models by using SpaceEx.

Grading: this is a group project. Each group should have no more than two members. Names of group members must be shown on the first line of the **report** file. A single grade will be assigned to both group members.

What to Submit

A single zip file containing all the necessary model files and a **report** file as indicated above.

Note: the submitted model files must be complete so that the results as shown/discussed in the report can be replicated. Substantial loss of credits may be incurred if

- Any part of the reported results fails to be replicated.
- The report is not well organized and clearly readable.

Requirements

- Your file name must be in the format **final-{last name of a group member}** to help me recognize the owner of the file.
- This project is for groups of two members.
- All writings and figures must be created using some text/graphics editors. Otherwise, substantial loss of points may be incurred if your documents are unreadable.