Assignment 7: Bicycle Model Control

Mar. 11th, 2019

Objectives

- To understand the state and inputs of a kinematic bicycle model
- To know how to compute control inputs for a desired bicycle model trajectory

In this assignment, you are provided with a kinematic bicycle model describing the differential equations of motion for a given vehicle, as well as its control inputs. You will discretize these equations of motion, and use them to generate trajectories for the vehicle.

Resources and Instructions

There are 2 TODO sections to complete in the given Jupyter notebook:

1. Implement the step() function for the bicycle model according to the given equations of motion.

2. Compute the required control inputs that cause the bicycle model to follow a specified figure 8 trajectory.

Deliverables

HTML output: In the Jupyter Notebook, go to File > Download as > HTML (.html).
Submit a ZIP file containing the HTML output and the PDF file.

Run all code blocks before downloading the HTML.

Please follow the naming convention for your zip file: a7_<user_id>.zip .

Due Date

11:59 PM, Monday Mar. 25th, 2019.
No late submissions will be accepted. There will be no extensions.

Marking Scheme

Assignments are marked on a 0-5 point scale.

You will be given 2 points for correctly implementing the step() function. You will be given 3 points for correctly generating the figure 8 trajectory. The figure 8 trajectory doesn't have to be perfect, but it should be quite close.

Policies

Collaboration
You can discuss the problem with peers, but you must design and implement your own solution independently.

Use of online resources
You may consult online resources for inspiration, but you must develop your own code.