Lab 8: Distributed Platoon Control 3

Exercise 1. (*Exam preparation*)

Evaluate the priority-based non-cooperative distributed model predictive control controller you developed to show its performance in the exam.

a) Vehicles with IDs 1, 2, 3, 5 and 7 form a platoon. Vehicle 7 is the leading vehicle, while the others follow in descending order. The vehicles' poses at $t = 0$ are given by the poses in which the vehicles are when they are newly simulated. Use the reference distance and the constraints you previously implemented. The platoon should follow the speed profile given by

$$v_{\text{ref}} = \begin{cases} 0.5\,\text{m/s}, & 0\,\text{s} \leq t < 15\,\text{s} \\ 1.4\,\text{m/s}, & 15\,\text{s} \leq t < 25\,\text{s} \\ 0.8\,\text{m/s}, & 25\,\text{s} \leq t < 35\,\text{s} \\ 0.0\,\text{m/s}, & 35\,\text{s} \leq t. \end{cases} \tag{1}$$

Stop the experiment at $t = 40\,\text{s}$. Examine the controller's performance with plots of the inter-vehicle distances, the velocities and accelerations. Generate relevant plots after an experiment with `plot_platooning`.

b) Tune your implementation to achieve a lower cost value in `plot_platooning`.

c) Download the slide template for your exam presentation from moodle and fill it with content. Please *only* provide results that are requested in the slides. Upload your presentation before the deadline to moodle.

Checkpoint

Get a tutor to check your work. You should be able to

- successfully take the exam :)
