Electric Vehicle Propulsion and Control – UNIVAQ

E-Pico Master's Thesis

Robust Longitudinal Model-Based Design Controller for Connected and Autonomous Vehicles

Goals

The thesis proposal focuses on developing a robust cooperative control system for connected and automated vehicles (CAVs), with particular attention to ensuring safety through inter-vehicle distance constraints. It considers challenges such as stochastic communication delays, state noises, and channel interferences. The research aims to address these issues by formulating a distributed model predictive control (DMPC) problem for CAVs, explicitly accounting for vehicle physical limitations and the interconnected safety constraints among neighbouring vehicles.

Requirements

You should have a basic understanding of vehicles dynamics, advanced control strategies.

[1] Z. Wang, Y. Gao, C. Fang, L. Liu, D. Zeng and M. Dong, "State-Estimation-Based Control Strategy Design for Connected Cruise Control With Delays," in IEEE Systems Journal, vol. 17, no. 1, pp. 99-110, March 2023, doi: 10.1109/JSYST.2022.3172277.

[2] W. Bai, B. Xu, H. Liu, Y. Qin and C. Xiang, "Robust Longitudinal Distributed Model Predictive Control of Connected and Automated Vehicles With Coupled Safety Constraints," in IEEE Transactions on Vehicular Technology, vol. 72, no. 3, pp. 2960-2973, March 2023, doi: 10.1109/TVT.2022.3217896.

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