Convex Optimization Methods for Robust and Optimal Control Design

Capstone Project

Project Title:

Robust and Optimal Control of an Over-Actuated Autonomous Vehicle for Trajectory Tracking under Uncertain Environmental Conditions

Team Members:

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Scope of Work:

- Derive state-space model of an over-actuated autonomous vehicle having all-wheel independent drive and all-wheel independent steering with extended ($\pm 90°$) steering angles (i.e., independent 4WD4WS configuration)
- Modify the model to include uncertainty in terms of frictional coefficients of road-wheel interconnect
- Define parametrized reference trajectories for standard/benchmark vehicle maneuvers
- Formulate robust and optimal control problem (using LMIs) exploiting redundancies of the over-actuated autonomous vehicle for trajectory tracking under uncertain environmental conditions (varying frictional coefficients)

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