Open Project(MA)

Data-Driven Control for Linear Parameter-Varying Systems

Description:

Data-driven system analysis and control have received increasing interest in the control community in the recent years. Several works have focused on designing controllers for unknown linear time-invariant (LTI) systems directly from noisy data. Linear parameter-varying (LPV) systems are linear systems involving a time-varying scheduling signal and they provide a powerful framework for addressing nonlinear analysis and control problems using linear methods. Recently, we propose a data-driven min-max model predictive control (MPC) scheme for LPV systems using only a sequence of input-state data [1]. In this project, we aim to extend the proposed framework, reducing conservatism by incorporating estimates of the scheduling signals and uncertainty bounds. The work will emphasize theoretical guarantees, alongside practical implementation and simulation using Matlab. Please don't hesitate to contact me if you are interested in this project.

[1] Y. Xie, J. Berberich, F. Brändle, F. Allgöwer. Data-driven min-max MPC for LPV systems with unknown scheduling signal. arXiv:2411.05624, 2024.

Prerequisites:

- Solid background in control engineering; Interested in theoretical problems

- Basic knowledge of data-driven control or robust control will be beneficial

Supervisor:

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Area:

Data-Driven Control
Robust Control
Model Predictive Control

Properties:

Type: **MA**

20% literature
50% theory
30% implementation

Beginning:
any time

More information: https://www.ist.uni-stuttgart.de/teaching/bama/