ist

Universität Stuttgart
Institut für Systemtheorie und Regelungstechnik
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Open Thesis (MA)

Optimal System Operation in Data-driven Economic MPC

Description:

Model Predictive Control (MPC) is an advanced control technique that repeatedly solves an open-loop optimal control problem, which uses the system dynamics to predict future open-loop states. Standard model-based MPC schemes rely on a priori knowledge of system models. In contrast, data-driven control approaches can design controllers directly from the available data. Existing data-driven MPC schemes typically consider a standard tracking MPC that drives the system's input and output to a given setpoint. In our recent work [1], we propose a data-driven economic MPC framework that operates the system to achieve the best economic performance, which only relies on a persistently exciting trajectory of an unknown system. In this project, we will investigate the optimal operation behavior of economic MPC depending on dynamics and the cost function from the input-output trajectory of a system.

[1] Y. Xie et al, *Linear Data-Driven Economic MPC with Generalized Terminal Constraint*, IFAC World Congress, 2023.

Prerequisites:

- Strong background in control theory and mathematics
- Interest in theoretical problems
- Lectures: *Model Predictive Control*, *Data-driven Control*
- Experience with *Matlab*

Supervisor:

Yifan Xie
Room 3.236

Area:

Model Predictive Control
Data-driven Control

Properties:

Type: **MA**

30% literature
50% theory
20% simulation

Beginning:
Any time

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

Aushang vom September 27, 2023