Open Thesis (MA)

Data-Driven Model Predictive Control

Description:

Model predictive control (MPC) is a powerful control method, which can handle nonlinear systems and constraints. For the implementation of MPC, an accurate model of the plant is required. In a recent project, an MPC approach was developed, which uses only measured input-output data to control an unknown system, without identifying a model. Since neither a model nor state-measurements of the system are available, the analysis of this MPC is challenging. Using terminal equality constraints, stability and robustness of the closed loop were proven, also in the case of noisy output measurements. The goal of this thesis is to extend this data-driven MPC framework into one or more of the following directions:

- stability guarantees without terminal constraints
- non-trivial terminal ingredients
- robust output constraint satisfaction with noisy data

Prerequisites:

- Strong background in control theory and mathematics
- Interest in theoretical problems
- Lectures: Konzepte der Regelungstechnik, Model Predictive Control

Supervisor:

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Area:

MPC
Data-Driven Control
Linear Systems

Properties:

Type: MA
20% literature
60% theory
20% simulation

Beginning:

now

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

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