



Open Thesis (MA)

Economic Model Predictive Control for Optimal Periodic Operation

Description:

Model Predictive Control is widely used in practical applications and there exist various well-understood schemes. However, their theoretical guarantees often rely on nice properties of the corresponding stage cost, whereas in Economic Model Predictive Control (EMPC), the stage cost does not satisfy these properties in general. Hence, in EMPC it is harder to derive rigorous guarantees and especially in setups where the optimal operating behavior is periodic there are open questions. For example, most schemes dealing with periodic operating behaviors lack asymptotic stability and transient performance guarantees.

Recently, a new EMPC scheme with discounted stage cost was introduced, which overcomes some of the disadvantages other schemes have and therefore seems to be a promising starting point to further address these problems.

Consequently, we aim to better understand this scheme and extend its theoretic analysis. Also, the use of discounted stage costs in other setups is of interest.

Prerequisites:

- Lecture *MPC* or similar
- Strong background in control theory
- Interest in theoretical problems

Supervisor:

Jonas Mair
Lukas Schwenkel
Room 2.243

Area:

MPC
Optimal Control
Economic MPC

Properties:

Type: **MA**

30% Literature
40% Theory
30% Implementation

Beginning:

anytime

Further information on www.ist.uni-stuttgart.de/lehre/bama

Notice from November 27, 2024