

Bachelor-/Masterthesis

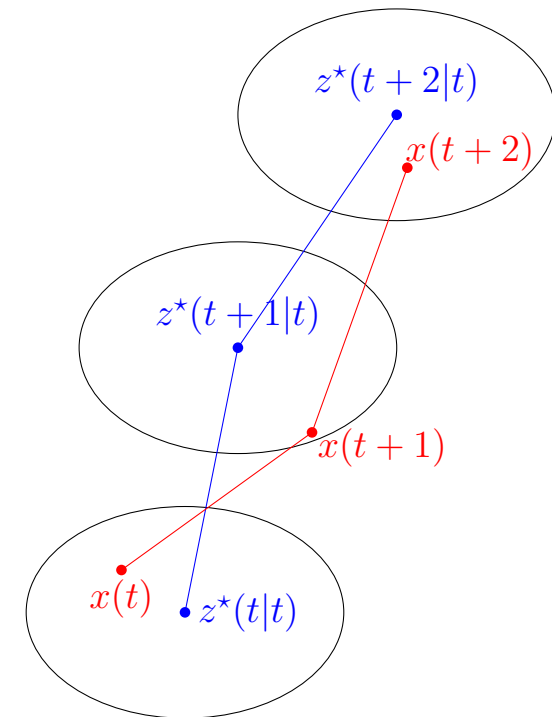
Tube-based robust economic model predictive control

The objective of economic model predictive control (MPC) is to deal with general performance criteria, which might be related to the economics of the underlying process. Although this can lead to stage costs that may not be positive definite, closed-loop properties (e.g. asymptotic stability and asymptotic average performance) for economic MPC schemes were provided in recent years.

As real-world systems are subject to disturbances and uncertainties, robust control methods are required to guarantee desired closed-loop properties. One such robust control scheme is the so-called tube-based MPC, where the state of a nominal (undisturbed) system is controlled by a standard MPC while an additional pre-stabilizing controller guarantees the real state to lie in a tube around the nominal state. Current research focuses on solving problems arising by combining economic and tube-based MPC schemes, as providing bounds for transient (i.e. on a finite time interval) properties of the closed-loop system.

Possible topics for Bachelor-/Masterthesis include theoretical works, e.g., designing a tube-based economic MPC scheme which satisfies transient average constraints and providing results on the satisfaction of these constraints in the presence of disturbances, as well as practical oriented works on simulation and implementation of recently developed MPC schemes.

Requirements: Theoretical foundations in mathematics and control theory, MPC (e.g. the lecture "Model Predictive Control").



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