



Open Thesis (MA)

Distributed stochastic model predictive control of dynamically coupled multi-agent systems

<p>Description:</p> <p>Stochastic MPC has gained attention as a viable option to explicitly consider uncertainty in complex control systems. In the context of distributed systems, where subsystems are interconnected and often locally separated, centralized MPC approaches may suffer from scalability or infeasibility issues. Cooperative distributed MPC (DMPC) schemes aim to resolve this issue by replacing the central OCP by several small-scale OCPs which are solved in a distributed fashion. To this end, distributed optimization algorithms such as the ADMM are employed. The consideration of uncertainties in the context of DMPC implies that the state uncertainties of an agent must be taken into account by the neighboring agents, which complicates the development of a distributed algorithm. The goal of this thesis is to develop of a fully distributed MPC approach for multi-agent systems with coupled dynamics under consideration of stochastic uncertainties, providing guaranteed stability and chance constraint satisfaction in closed-loop. Various extensions are possible, such as the consideration of nonlinear systems. The developed scheme will then be implemented and tested in simulation.</p> <p>Prerequisites:</p> <ul style="list-style-type: none">• Lecture <i>MPC</i> or similar• Strong background in control theory• Interest in theoretical problems	<p>Supervisor: Matthias Steffel Room 3.243</p> <p>Area: MPC Distributed MPC Stochastic MPC</p> <p>Properties: Type: MA 30% literature 40% theory 30% implementation</p> <p>Beginning: anytime</p>
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Further information on www.ist.uni-stuttgart.de/lehre/bama

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