



Open Thesis (MA)

Robust Model Predictive Control

<p>Description:</p> <p>Model Predictive Control (MPC) is a powerful strategy widely used for managing systems with multi-variable dynamics and constraints. While effective in many applications, ensuring robustness to disturbances and model uncertainties remains a significant challenge. Traditional MPC frameworks often lack the tools to systematically address the worst-case performance under such conditions.</p> <p>To overcome this, peak-to-peak gain analysis and integral quadratic constraints (IQCs) offer promising solutions. Peak-to-peak gain evaluates the system's maximum response to bounded disturbances, providing a robust performance metric. IQCs extend classical control tools by modeling uncertainties and nonlinearities with precision, allowing for a deeper understanding of system behavior.</p> <p>By combining these techniques within the MPC framework, we aim to develop a robust control strategy that enhances system reliability under uncertain and dynamic conditions. This innovative approach bridges theoretical control concepts with practical applications in high-performance, safety-critical systems.</p> <p>Prerequisites:</p> <ul style="list-style-type: none">• Lecture <i>Robust control</i> or similar• Lecture <i>MPC</i> or similar• Strong background in control theory• Interest in theoretical problems	<p>Supervisor:</p> <p>Funcke, Niklas; Schwenkel, Lukas Room 3.243</p>
	<p>Area:</p> <p>Robust control MPC Robust MPC</p>
	<p>Properties:</p> <p>Type: MA</p> <p>30% literature 40% theory 30% implementation</p>
	<p>Beginning:</p> <p>anytime</p>

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

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