



Open Thesis (MA)

Robust Verification of Dissipativity Properties from Noisy Data

<p>Description:</p> <p>Analyzing systems based directly on measured data, without any model knowledge, is a research topic of increasing interest. Yet, most existing methods do not provide theoretical guarantees if the data are affected by noise. The goal of this thesis is to develop an approach for the verification of dissipativity properties of unknown systems based on noisy input-output data, containing, e.g., the estimation of the \mathcal{H}_∞-norm as the most relevant special case. To this purpose, existing results for dissipativity analysis from noise-free data using Willems' Fundamental Lemma should be robustified against noise. Recent works in the field of data-driven model predictive control have leveraged tools from distributionally robust optimization to guarantee robustness w.r.t. noisy data. As a starting point, these ideas may be transferred to the problem of dissipativity analysis, leading to an algorithm for the estimation of dissipativity properties from noisy data with robustness guarantees. Moreover, the developed approach should be applied in simulation and compared to existing methods.</p> <p>Prerequisites:</p> <ul style="list-style-type: none">• Strong background in control theory and mathematics• Interest in theoretical problems• Lectures: Data-Driven Control (recommended)	<p>Supervisor:</p> <p>Julian Berberich Room 2.236</p> <p>Area:</p> <p>Data-Driven Control Dissipativity Stochastics</p> <p>Properties:</p> <p>Type: MA</p> <p>30% literature 50% theory 20% simulation</p> <p>Beginning:</p> <p>now</p>
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Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

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