Open Thesis (MA)

Data-Driven Controller Design

**Description:**

Designing controllers directly from measured data, without any model knowledge, is a research topic of increasing interest. Yet, most existing methods do not address theoretical guarantees for the closed loop. The goal of this thesis is to design data-driven controllers, which render the closed loop dissipative, which contains, e.g., the $\mathcal{H}_\infty$-controller as the most relevant special case. This work builds upon existing results to verify dissipativity properties of unknown systems from measured data. As a first step, these results could be applied to validate closed-loop dissipativity of a given controller. By optimizing over the controller parameters, this can be used to design new controllers from data. The goal of the thesis is to find a computationally tractable formulation of this optimization problem and to prove the desired properties for the closed loop. Moreover, the developed methods should be applied in simulation and compared to existing methods.

**Prerequisites:**

- Strong background in control theory and mathematics
- Interest in theoretical problems
- Good knowledge of Matlab

**Supervisor:**

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**Area:**

Data-Driven Control
Dissipativity
Linear Systems

**Properties:**

Type: MA

20% literature
50% theory
30% simulation

**Beginning:**

now

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

Aushang vom 26. Juli 2019