Data-based controller validation

Description:

While there are many methods for learning controllers from data, these methods often lack stability guarantees. The lack of stability guarantees can prevent the application of these methods in real-world scenarios. Therefore, the goal of this project is to find a data-driven method to verify stability of a learned controller. While there already exist approaches to verify controllers (cf. block diagram, van Heusden et al. (2009)), we want to extend these results to a potentially less restrictive conic condition (or other dissipation inequalities) and/or to more general systems by making use of recently developed approaches to find dissipation inequalities from input-output data. This project would include the theoretical analysis, comparison to existing methods and extensive simulations of controller learning and validation.

Prerequisites:

- Strong background in systems and control
- Experience with Matlab
- Interest in optimization, mathematical problems, learning, simulations

Supervisor:
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Area:
Data-driven systems analysis

Properties:
Type: MA
30% literature
20% theory
50% simulation

Beginning:
now

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

Aushang vom 6. Februar 2019