

## Master thesis

# Data-based representation for feedback linearizable systems from noisy data

Data-driven analysis and control of dynamical systems relies on a data-based representation of all the trajectories of the underlying system, which is obtained using input/output data. Recently, a data-based representation of all trajectories of feedback linearizable nonlinear systems was presented. However, it was assumed that the offline data used to obtain this representation were noiseless.

The goal of this thesis is to investigate the effect of noisy data on the proposed data-based representation. The interested student is expected to use that representation to design controllers and test it in simulation.

## Tasks

- Develop a data-based representation (approximation) of trajectories of a nonlinear system based on noisy data and provide error bounds on the quality of approximation.
- Investigate the problem of designing persistently exciting inputs given a certain function approximator (e.g., basis functions).
- Provide simulation examples to illustrate the results.

## Requirements

- Excellent Matlab skills and good command of English language.
- Attended RT I/II, nonlinear control and preferably data/learning-based control.

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