

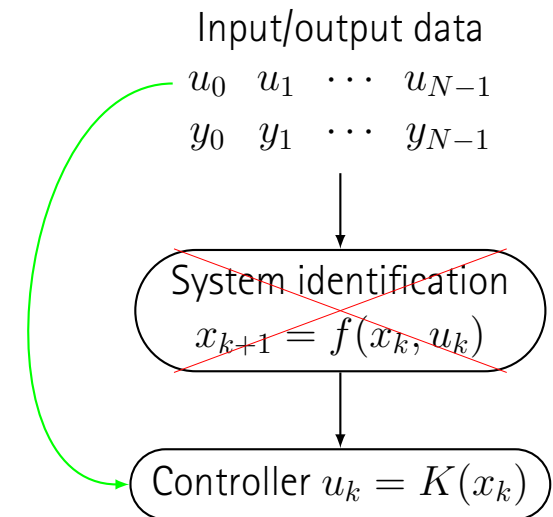
Bachelor-/Master thesis

Data-/Learning-based control of nonlinear systems

Data-based control is the field of designing controllers purely from input/output data, without explicitly identifying a mathematical model of the system. Learning-based control is the field of learning a control strategy for an unknown dynamical system from input/output data, without knowledge of the system dynamics. In both of these fields, our goal is to show rigorous mathematical guarantees for stability and robustness of such approaches.

To start, one typically needs to obtain a data-based representation of the trajectories of the unknown dynamical systems. Such representations are difficult to obtain for nonlinear systems. Therefore, possible research topics in this include deriving data-based representations for nonlinear systems, then using them to design control techniques with stability and robustness guarantees. Other possibilities include comparing existing data-based control strategies to model-based counterparts in simulation or on real-world systems.

Candidate students should have excellent mathematical background in systems and control theory (RTI, RTII) and preferably attended some of the advanced lectures like nonlinear control, data-/learning-based control and model-predictive control.



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