Institut für
Mechatronische Systeme
Leibniz Universität Hannover
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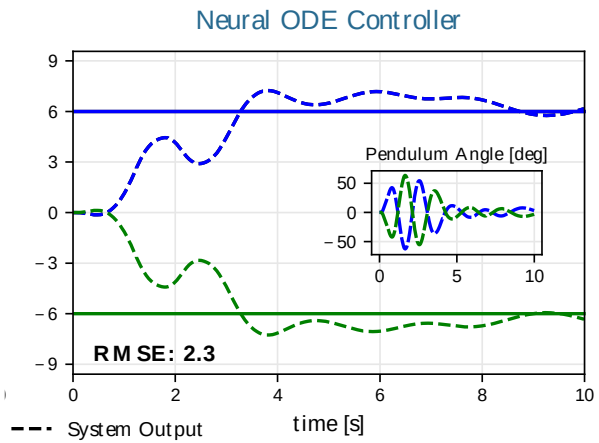
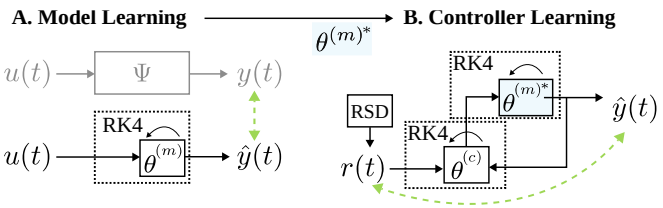
Bachelor/Student/Master Thesis (group work possible!)

Deep Learning-based Control using Neural ODEs

Description

Exploiting machine learning for control can help to achieve accuracy and autonomy in real-world systems. In prior work (youtube), we have developed a method named Automatic Neural ODE Control (ANODEC) that can efficiently design neural ODE feedback controllers from input-output data. However, ANODEC has a single data collection phase and the amount of required data must be known a-priori. This thesis aims to overcome this limitation by developing an iterative version of ANODEC.





Tasks

- Literature research for similar problem formulations
- Formalization as a precise problem statement
- Understanding of existing software
- Method development and validation in simulation

Supervisors

Jan-Hendrik Ewering
Michael Meindl

Requirements

- Self-dependent student with high intrinsic motivation
- Excellent Python Programming Skills
- Basic understanding of Machine Learning and Reinforcement Learning
- First experience with a deep-learning framework (such as TF, PyTorch, JAX)

Start

As of now

This general topic will be further specified in an individual discussion to match the requirements of a Bachelor/Student/Master Thesis or a group work.