



For our R&D center in Friedrichshafen, we are looking for motivated students for this task:

Master's thesis

Non-linear real-time MPC for an electromagnetic actuator

Modern control engineering methods play a key role in the development of mechatronic actuators for future automotive applications. Here, approaches which promise a reducibly good actuator behavior under (nearly) optimal usage of the feasible control inputs are of particular interest. In this thesis, the non-linear model predictive control of an electromagnetic actuator needs to be investigated. Constraints on both the control inputs and the state variables shall be considered systematically. A sufficiently accurate mathematical model of the relevant actuator dynamics is already available.

Tasks:

- Selection of promising methods from scientific literature
- Implementation of the selected methods in a laboratory real-time hardware
- Theoretical and practical evaluation of the selected methods

Requirements:

- Control engineering: Non-linear stability theory, non-linear model predictive control
- Mathematics: Dynamic optimization, numerical solution of ordinary differential equations
- Experience in the real-time implementation of closed-loop control algorithms

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