

Project work (4 SWS / 6 ects)

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Topic: On uncertainty modeling of 3-tank systems and diesel engine throttles



3-tank system and electro-mechanical throttle

When modeling the transfer characteristics of technical systems, uncertainties have to be acknowledged. Uncertainties on the system output origin from model simplifications, unmodelled disturbances, disturbed input data etc. Within a research project a method to augment deterministic models to describe such uncertainties and to identify such models is being developed.

Within this project work two technical systems that are available within the measurement and control department are to be analyzed with respect to their modeling relevant uncertainties. From the 3-tank system it is already known the valves show some uncertainty on their transfer characteristics. Secondly, the characteristic of the power amplifier depend on its temperature, which is typically neglected in modeling. Electro-mechanical throttles that are used for diesel engines of cars have significant friction effects. These cause uncertainty of the rotational motion in response to the electrical control signal.

This work will prepare the basis for case studies of the developed modeling and identification methods. The following sub-tasks are planned:

- Familiarization with electro-mechanical throttles, basic analysis and literature investigation on specific uncertainties
- Detailed analysis of a selected throttle available in the department and experimental quantification of the uncertainty
- Familiarization with 3-tank systems, basic analysis and literature investigation on specific uncertainties
- Detailed analysis of the 3-tank system available in the department and experimental quantification of the uncertainty
- Critical assessment and discussion of the uncertainties of both systems and their suitability to serve as case studies in the research project
- Documentation and presentation of results

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