

Development of an automated test workflow for parameter identification of permanent magnet synchronous machines

The permanent magnet synchronous machine (PMSM) is a popular type of drive which is used in a wide variety of applications. They come in a wide variety of designs and sizes.

Regardless of its size, a PMSM can be characterized by a few key parameters. For example, these are of decisive importance for modeling and control.

In this thesis, these characteristic parameters and maps will first be identified and standardized in an objectoriented Matlab class. Subsequently, an automated measurement sequence is to be developed on the test bench, together with subsequent data processing, which creates an object according to the standardized class for each measured machine. The sequence is to be tested on several machines for verification.

Student profile:

- Basic knowledge in the field of electrical machines, power electronics and control engineering
- Experience with (object-oriented) Matlab scripting is a plus
- Experience with dSpace, Controldesk and test bench work
- Structured, independent and thorough way of working





Fig. 1: Motor test bench for measuring and characterizing electrical machines

Work packages:

- Familiarization with the topic and literature
- Identification of relevant machine parameters with regard to modeling, control, etc.
- Creation of a standardized storage system for machine parameters in an object-oriented Matlab environment
- Familiarization with the test bench environment (Simulink / Controldesk, dSpace)
- Creation of automated measurement sequences for parameter and map identification
- Development of automated data processing of the measurement results for transfer to the Matlab class
- Measurement of several PMSMs on the test bench
- Detailed, orderly documentation and code preparation

