Fakultät für Maschinenbau
Institut für Automobilforschung
Professur Alternative Fahrzeugantriebe

Master Thesis 2015

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Degree Program: Master of Science

Field of Study: Automotive Software Engineering

Begin, Duration: 15.06.2015 – 6 Months

Development of a Methodology and Validation of Measurement-data Based Lithium Ion Battery Model

Supervisors: Prof. Dr. Wolfram Hardt (Informatik)
Prof. Dr.-Ing. Thomas von Unwerth
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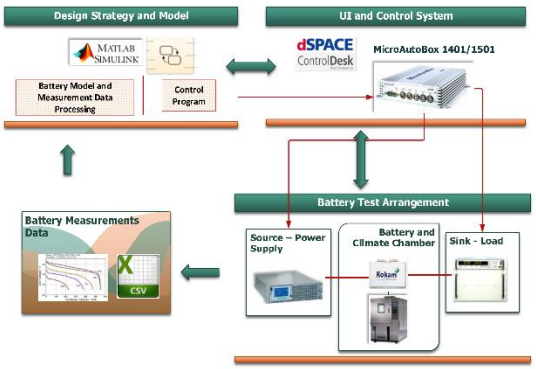
Task:

At the Department of Advanced Powertrains (ALF), extensive research in e-mobility with focus on fuel cell power trains is conducted, nevertheless hybrid power trains comprising of high power battery systems are also research areas in this department. For concept evaluation using drivetrain simulations, it is necessary to understand the behaviour of Li-ion battery and develop fast computing battery models. A semi empirical approach is pursued making use of look-up tables generated from the measurement data.



Objective:

Development of a standalone system for battery measurements acquisition and validation of battery model based on the recorded measurements. Furthermore, development of generalization strategy for the processing of aggregated measurements.

The tasks include

1. Building an electrical test set up for and development of a control strategy for charge- discharge of the Li-Ion battery.
2. Development of control process in Matlab/Simulink/State-flow environment and dSPACE Microautobox is used as the ECU in this project to control source-sink-climate chamber and battery.
3. Implementation of automation functionality for charge-discharge profile measurements process taking into account the necessary temperature and state of charge limitations
   3.1. Functionality development in Matlab-Stateflow-Simulink
   3.2. User control interface by dSPACE ControlDesk.
4. Evaluation of different charge discharge profiles to extract measurements for cell characterization.
5. Development of a generalization strategy for classification and optimization of useful measurements.