Lehrstuhl für Elektrische Energiespeichertechnik
School of Engineering and Design
Technische Universität München

– FP – MA –

Data-driven and Probabilistic Modeling of Battery Energy Storage Systems

Background

Battery energy storage systems (BESS) are increasingly deployed in stationary applications that support the integration of renewable generation and improve the stability of our power system. Operational and control strategies play a crucial to ensure the most profitable and robust operation.

A model of the storage system is required to analyze and optimize the operational strategy, but the laboratory work necessary to characterize the battery cells and other system components can turn prohibitively expensive and time consuming. An opportunity arises from field data obtained from systems in operation, but also presents new challenges due to the availability and quality of measurements.

The goal of this work is to explore and implement data-driven and probabilistic methods to build BESS models from operational field data.

Tasks

- Literature research on probabilistic inference methods.
- Development of BESS models that learn from data and perform predictions with quantified uncertainty.
- Validation and assessment of model accuracy for various use cases and data quality scenarios.

Requirements

The following competencies are required for a successful work:

- Knowledge in battery system modeling.
- Very good programming skills.
- Experience with data-science, machine-learning or probabilistic programming is of advantage.
- Motivated and independent work.

Fields

☐ Cell characterization
☐ Experiments
☐ Hardware development
☒ Software development
☒ Modeling
☐ Optimization
☒ Simulation
☒ Literature research

Program

☒ Electrical Eng.
☒ Mechanical Eng.
☒ Computer science
☐ Physics
☐ Mathematics
☐ Chemical Eng.
☐ Industrial Engineering

Start

As of now

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