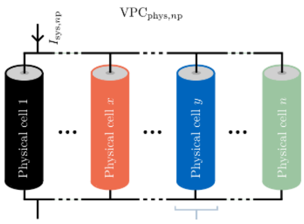
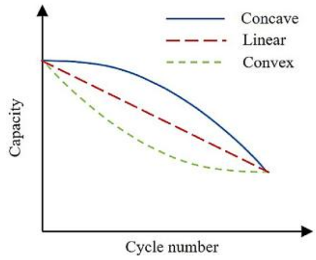
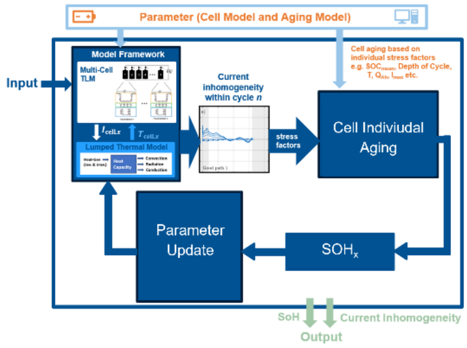
Lehrstuhl für Elektrische Energiespeichertechnik
Fakultät für Elektrotechnik und Informationstechnik
Technische Universität München

– Research Internship / Master Thesis –

# Simulation Study on the Aging Dynamics of LFP/C Cells in Parallel Cell Configurations




## Background

High-performance applications often connect large numbers of battery cells both in series and in parallel. Parallel connection is particularly challenging, because non-uniform boundary conditions can cause an uneven current distribution among the cells. Over time this may lead to different aging rates for individual cells, which in turn alters the current distribution within the parallel cell configuration.

In this context, the question arises under which boundary and cycling conditions a long-term convergence or divergence of cell aging can be observed in a parallel battery assembly.

## Tasks

Within this master's thesis, a simulation framework for modeling cell aging in parallel connections is to be extended with a parameter set for an LFP/C cell and then used for a systematic study. The goal is to analyze aging in parallel configurations under varying boundary and cycle conditions:

- AP1. Literature Research
- AP2. Implement an existing LFP/C parameter set and aging function in the simulation framework
- AP3. Simulation-based preliminary study of the initial current distribution in parallel LFP/C cells under partial cycling
- AP4. Plan and conduct a systematic simulation study on aging dynamics in parallel cell configurations
- AP5. Data processing and development of suitable analysis methods
- AP6. Written thesis

## Requirements

- Prior knowledge in lithium-ion batteries
- Prior knowledge in aging phenomena of lithium-ion batteries is a plus
- Good Knowledge in MATLAB

## Focus

☐ Cell Characterization
☐ Experimental Test Series
☐ Hardware Development
☐ Software Design
☒ Modelling
☒ Simulation
☒ Literature Review

## Degree Program

☒ Electrical/Information Engineering
☐ Computer Science
☒ Mechanical Engineering
☒ Physics
☐ Mathematics
☐ Chemical Engineering
☐ Industrial Engineering

## Start Date

From 01.09.2025

## Contact

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