

Finite Element Methods in the Basis of Jacobi Polynomials

Subtitle

An MMSC Special Topic on [FINITE ELEMENT METHODS](#)

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Abstract

In this project report we will review the central concepts utilised in the group work conducted to make progress in the Partial Differential Equation (PDE) problem associated with the electrochemical model of a battery cell and present numerical results ([Schwab 1998](#)).

Our Goal: Numerically obtain the solution $\{a(x, T), b(x, T)\}$.

The Finite Difference schemes are implemented in Julia and Python, whereas the Spectral Method is implemented in C++.

Figure 1: The Graphical User Interface (GUI) of the Spectral Solver.

1 Problem Introduction

References

Schwab, Ch (1998). *p- and hp- finite element methods : theory and applications in solid and fluid mechanics*. eng. Numerical mathematics and scientific computation. Oxford: Clarendon. ISBN: 9780198503903.

Acronyms

GUI	Graphical User Interface	1
PDE	Partial Differential Equation	1