



# **Decomposition Methods for Differential Equations: Theory and Applications (Chapman & Hall/CRC Numerical Analysis and Scientific Computing Series)**

*Juergen Geiser*

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**Decomposition Methods for Differential Equations: Theory and Applications** describes the analysis of numerical methods for evolution equations based on temporal and spatial decomposition methods. It covers real-life problems, the underlying decomposition and discretization, the stability and consistency analysis of the decomposition methods, and numerical results.

The book focuses on the modeling of selected multi-physics problems, before introducing decomposition analysis. It presents time and space discretization, temporal decomposition, and the combination of time and spatial decomposition methods for parabolic and hyperbolic equations. The author then applies these methods to numerical problems, including test examples and real-world problems in physical and engineering applications. For the computational results, he uses various software tools, such as MATLAB®, R3T, WIAS-HiTNIHS, and OPERA-SPLITT.

Exploring iterative operator-splitting methods, this book shows how to use higher-order discretization methods to solve differential equations. It discusses decomposition methods and their effectiveness, combination possibility with discretization methods, multi-scaling possibilities, and stability to initial and boundary values problems.

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