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Sinopsis

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Moving mesh methods are an effective, mesh-adaptation-based approach for the numerical solution of mathematical models of physical phenomena. Currently there exist three main strategies for mesh adaptation, namely, to use mesh subdivision, local high order approximation (sometimes combined with mesh subdivision), and mesh movement. The latter type of adaptive mesh method has been less well studied, both computationally and theoretically.

This book is about adaptive mesh generation and moving mesh methods for the numerical solution of time-dependent partial differential equations. It presents a general framework and theory for adaptive mesh generation and gives a comprehensive treatment of moving mesh methods and their basic components, along with their application for a number of nontrivial physical problems. Many explicit examples with computed figures illustrate the various methods and the effects of parameter choices for those methods. The partial differential equations considered are mainly parabolic (diffusion-dominated, rather than convection-dominated).

The extensive bibliography provides an invaluable guide to the literature in this field. Each chapter contains useful exercises. Graduate students, researchers and practitioners working in this area will benefit from this book.

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