Título:

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Provides state-of-the-art original works and surveys on several key areas in applied mathematics
Combines rigorous mathematical procedures and important examples from applications
With its many examples, the book is accessible to graduate students and can serve as a source for graduate student projects
Has a strong multidisciplinary focus, promoting the methodology of mathematical modeling and computational experiment as a ubiquitous tool in applications
This volume presents a selection of in-depth studies and state-of-the-art surveys of several challenging topics that are at the forefront of modern applied mathematics, mathematical modeling, and computational science. These three areas represent the foundation upon which the methodology of mathematical modeling and computational experiment is built as a tool in all areas of applications of mathematics. The articles cover both fundamental and applied research, and provide the reader with state-of-the-art achievements in the development and application of new theories at the interfaces of applied mathematics, modeling, and computational science.

The book can serve as a reference on several important current topics in modern applied mathematics and modeling, including random matrix theory with its innovative applications, and dynamic blocking problems. Other important areas covered include: energy stable weighted essentially non-oscillatory schemes with applications in fluid dynamics and aerospace sciences; elliptic curves over finite fields and their applications in cryptography; multiple scale methods coupling network and continuum models and their applications in various areas involving porous media; new and efficient finite difference schemes for hyperbolic equations; statistical geometric and topological techniques and their applications in the life sciences; optimal control applications combining discrete and continuous features.

The material presented in this book aims at fostering interdisciplinary collaborations required to meet the modern challenges of applied mathematics, modeling and computational science. At the same time, the contributions combine rigorous mathematical and computational procedures and examples from a variety of applications ranging from engineering to life sciences, and provide a

rich source for graduate student projects.

Content Level » Research

Keywords » computational science - dynamic blocking problems - elliptic curves - mathematical modeling - random matrix theory

Related subjects » Applications - Mathematics