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Mathematical Solutions for Complex Engineering Systems

Editors:

Satyvir Singh, RWTH Aachen University, Germany

Mukesh Kumar Awasthi, Babasaheb Bhimrao Ambedkar University, Lucknow, India

In an era where engineering challenges are becoming increasingly multifaceted, Mathematical Solutions for Complex Engineering Systems serves as a comprehensive guide bridging the gap between theory and real-world applications. This book explores advanced mathematical modeling techniques, computational approaches, and optimization strategies that drive innovation across various engineering disciplines.

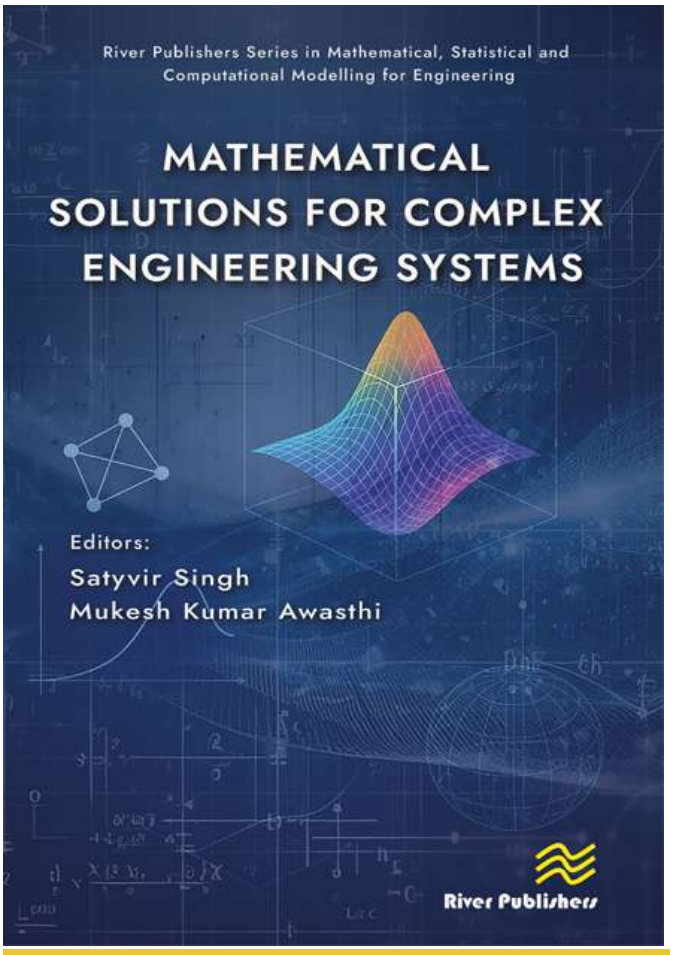
This book brings together a diverse collection of research contributions that highlight:

- Deterministic, stochastic, linear, and nonlinear models essential for analyzing multi-physical systems, from fluid dynamics to reliability engineering.
- Cutting-edge methods such as finite element analysis, boundary element methods, Keller box techniques, and machine learning-driven modeling for solving complex engineering problems.
- Case studies on nuclear power plant reliability, eco-epidemiology, nanofluid heat transfer, and pesticide impact on agricultural sustainability.
- Novel mathematical frameworks, including fractional Taylor wavelets, B-spline methods, and variational principles, for tackling nonlinear differential equations.
- Advanced concepts such as tunnel mathematics, meshfree methods, and high-resolution computational fluid dynamics (CFD) models for solving contemporary engineering challenges.

Designed for researchers, engineers, and graduate students, this book provides a robust foundation in mathematical techniques and their practical applications. With contributions from leading experts, it offers a unique blend of theoretical depth and computational efficiency, making it an essential reference for tackling modern engineering complexities.

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