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Mathematical Solutions for Complex Engineering Systems

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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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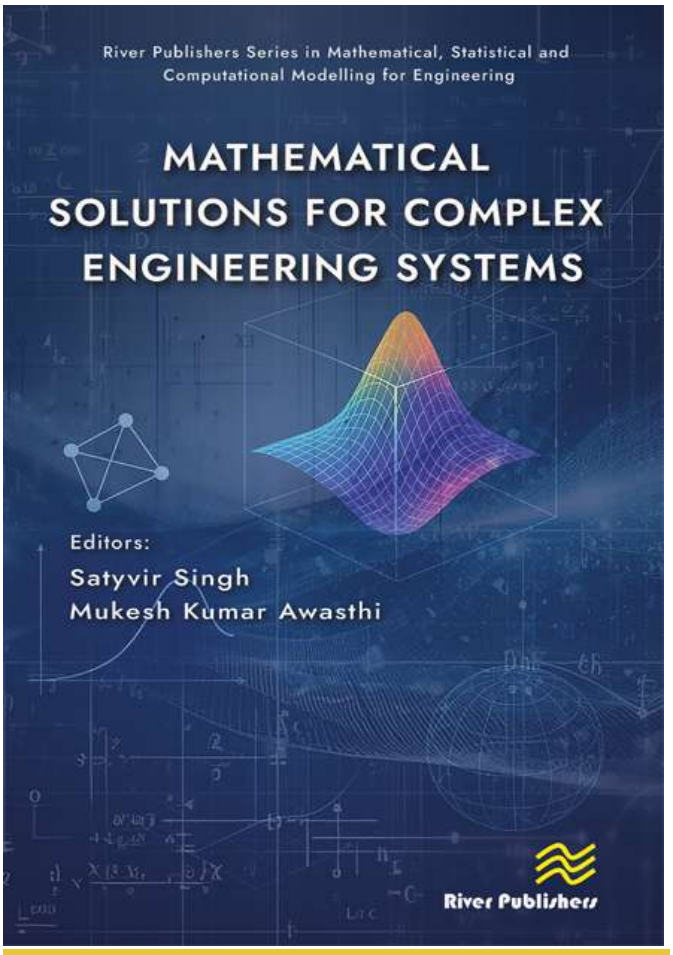

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