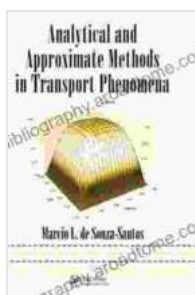


Analytical and Approximate Methods in Transport Phenomena: Mechanical

Transport phenomena, a cornerstone of mechanical engineering, governs the movement of momentum, heat, and mass within fluids. Understanding these intricate processes is crucial for a wide range of applications, from designing efficient cooling systems to optimizing chemical processes.



Analytical and Approximate Methods in Transport Phenomena (Mechanical Engineering Book 208)

by Marcio L. de Souza-Santos

★★★★★ 5 out of 5

Language : English
File size : 67831 KB
Text-to-Speech : Enabled
Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 750 pages



Analytical and Approximate Methods in Transport Phenomena: Mechanical offers a comprehensive guide to the analytical and approximate techniques used to solve complex transport problems. Written by renowned experts in the field, this seminal work provides a deep dive into the fundamental concepts and practical applications of transport phenomena in mechanical engineering.

Key Features

- **In-depth coverage:** From the fundamental principles to advanced analytical and numerical methods, the book covers the entire spectrum of transport phenomena.
- **Rigorous analysis:** Analytical solutions are derived step-by-step, providing a solid foundation for understanding the underlying physics.
- **Practical applications:** Case studies and real-world examples illustrate the practical relevance of transport phenomena in engineering design and analysis.
- **Computational insights:** Approximate methods, such as finite difference and finite element techniques, are introduced for solving complex problems numerically.
- **Interactive learning:** Solved problems, end-of-chapter exercises, and online resources enhance understanding and reinforce concepts.

Target Audience

Analytical and Approximate Methods in Transport Phenomena: Mechanical is an indispensable resource for:

- Mechanical engineering students and researchers specializing in transport phenomena
- Practicing engineers involved in the design and analysis of fluid systems, heat exchangers, and mass transfer equipment
- Scientists and researchers working in the fields of fluid dynamics, heat transfer, and mass transfer

Detailed Outline

The book is meticulously organized into six parts:

Part I:

- Fundamentals of transport phenomena
- Mathematical tools and governing equations

Part II: Fluid Dynamics

- Laminar flow
- Turbulent flow
- Boundary layer theory

Part III: Heat Transfer

- Conduction heat transfer
- Convection heat transfer
- Radiation heat transfer

Part IV: Mass Transfer

- Diffusion and mass transfer mechanisms
- Convective mass transfer
- Boundary layer mass transfer

Part V: Analytical Methods

- Methods of similarity
- Integral methods
- Perturbation methods

Part VI: Approximate Methods

- Finite difference method
- Finite element method
- Computational fluid dynamics (CFD)

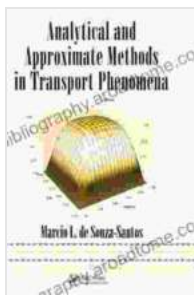
Benefits of Reading

By delving into *Analytical and Approximate Methods in Transport Phenomena: Mechanical*, readers will gain:

- A comprehensive understanding of the fundamental principles of transport phenomena
- Mastery of analytical and numerical techniques for solving complex transport problems
- Enhanced ability to design and analyze fluid, thermal, and mass transfer systems
- Deep insights into the latest advancements in transport phenomena research
- Careers in a wide range of fields, including mechanical engineering, chemical engineering, and materials science

Analytical and Approximate Methods in Transport Phenomena: Mechanical is an essential resource for anyone seeking a thorough understanding of the intricate world of transport phenomena. Its rigorous analysis, practical applications, and computational insights empower readers to tackle complex engineering challenges effectively.

Embark on this intellectual journey today and unlock the secrets of transport phenomena in mechanical engineering!

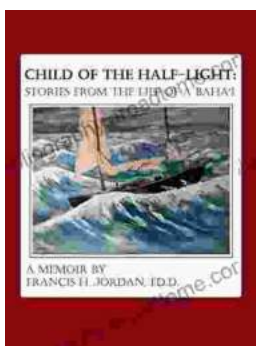


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