Unlock the Power of Partial Differential Equations with "The Action Principle and Partial Differential Equations"

Partial differential equations (PDEs) are a fundamental tool for understanding and modeling a wide range of phenomena in science and engineering. From the flow of fluids to the vibrations of structures, PDEs play a crucial role in describing the behavior of complex systems.

The Action Principle and Partial Differential Equations. (AM-146),Volume 146 (Annals of Mathematics Studies)

by Demetrios Christodoulou

★★★★☆ 4.8 out of 5

Language	: English
File size	: 27865 KB
Screen Reader	: Supported
Print length	: 328 pages

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"The Action Principle and Partial Differential Equations" is a comprehensive and accessible to this essential mathematical tool. Written by renowned experts in the field, this book provides a rigorous foundation in the theory of PDEs while also showcasing their practical applications.

Contents

The book is divided into three parts:

- **Part I: The Action Principle**

- **Part II: Partial Differential Equations**

- **Part III: Applications**

Part I introduces the action principle, a fundamental concept in analytical mechanics that provides a powerful framework for deriving and solving PDEs. Part II delves into the mathematical theory of PDEs, covering topics such as classification, well-posedness, and solution methods. Part III explores the applications of PDEs in various fields, including:

- Fluid mechanics (e.g., Navier-Stokes equations)

- Thermodynamics (e.g., heat equation)

- Quantum mechanics (e.g., Schrödinger equation)

Features

"The Action Principle and Partial Differential Equations" offers several key features that make it an invaluable resource for students, researchers, and practitioners:

- **Clear and concise exposition**: The authors present the material in a logical and accessible manner, making it easy for readers to follow and understand the concepts.

- **Historical context**: The book provides historical anecdotes and insights, tracing the development of PDEs from their early beginnings to modern applications.

- **Rigorous proofs**: The authors provide rigorous mathematical proofs throughout the book, ensuring the validity and correctness of the presented results.

- **Extensive exercises**: Each chapter includes a set of exercises that test the reader's understanding and provide practice in solving PDEs.

- **Supplementary resources**: The book's website offers additional materials, including lecture notes, code examples, and solutions to selected exercises.

Benefits

By studying "The Action Principle and Partial Differential Equations," readers will:

- Gain a deep understanding of the fundamental principles of PDEs.

- Master the techniques for solving PDEs analytically and computationally.

- Develop an appreciation for the wide-ranging applications of PDEs in science and engineering.

- Enhance their problem-solving skills and mathematical intuition.

- Prepare for research and careers in fields that rely heavily on PDEs.

"The Action Principle and Partial Differential Equations" is an essential resource for anyone who wants to understand and apply partial differential equations. With its clear exposition, rigorous proofs, and comprehensive coverage, this book is the definitive guide to this foundational mathematical tool.

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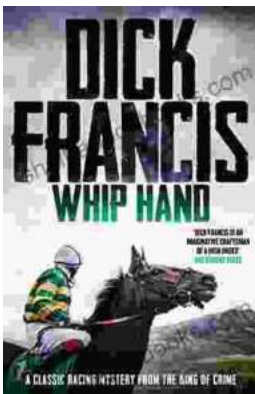★★★★☆ 4.8 out of 5

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