

Connecting Great Minds

A Practical Course in Differential Equations and Mathematical Modelling

Classical and New Methods • Nonlinear Mathematical Models • Symmetry and Invariance Principles

by **Nail H Ibragimov** (*Blekinge Institute of Technology, Sweden*)

A Practical Course in Differential Equations and Mathematical Modelling is a unique blend of the traditional methods of ordinary and partial differential equations with Lie group analysis enriched by the author's own theoretical developments. The book — which aims to present new mathematical curricula based on symmetry and invariance principles — is tailored to develop analytic skills and “working knowledge” in both classical and Lie's methods for solving linear and nonlinear equations. This approach helps to make courses in differential equations, mathematical modelling, distributions and fundamental solution, etc. easy to follow and interesting for students. The book is based on the author's extensive teaching experience at Novosibirsk and Moscow universities in Russia, Collège de France, Georgia Tech and Stanford University in the United States, universities in South Africa, Cyprus, Turkey, and Blekinge Institute of Technology (BTH) in Sweden. The new curriculum prepares students for solving modern nonlinear problems and will essentially be more appealing to students compared to the traditional way of teaching mathematics.

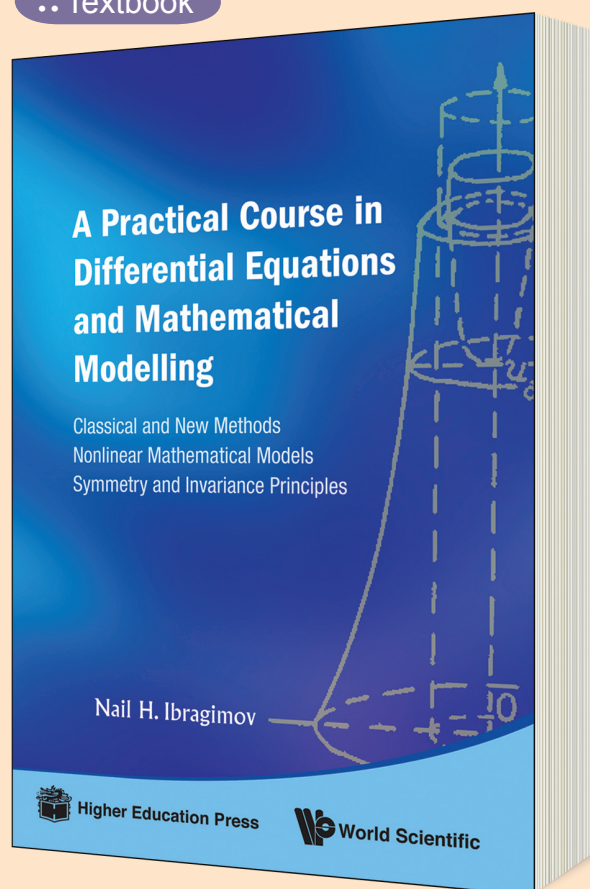
Contents: Selected Topics from Analysis; Mathematical Models; Ordinary Differential Equations: Traditional Approach; First-Order Partial Differential Equations; Linear Partial Differential Equations of the Second Order; Nonlinear Ordinary Differential Equations; Nonlinear Partial Differential Equations; Generalized Functions or Distributions; Invariance Principle and Fundamental Solutions.

Readership: Undergraduate, graduate students and university lecturers in applied mathematics, physics and engineering.

Key Features

- Includes a concise and self-contained introduction to basic classical methods for beginners
- Covers a variety of topics from the basic theory of Lie group analysis through examples of applications for solving nonlinear ordinary and partial differential equations analytically
- A valuable and user-friendly textbook for courses “Ordinary differential equations”, “Partial differential equations”, “Lie group analysis”, “Mathematical modelling” and “Distributions and fundamental solutions”

:: Textbook



360pp (approx.)
978-981-4291-94-1

Nov 2009
US\$82 £62

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 **Imperial College Press**
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