Texts in Applied Mathematics 65

David G. Schaeffer · John W. Cain

Ordinary Differential Equations: Basics and Beyond

This book develops the theory of ordinary differential equations (ODEs), starting from an introductory level through to a graduate-level treatment of the qualitative theory, including bifurcation theory (but not chaos). While proofs are rigorous, the exposition is reader-friendly, aiming for the informality of face-to-face interactions.

A unique feature of this book is the integration of rigorous theory with numerous applications of scientific interest. Besides providing motivation, this synthesis clarifies the theory and enhances scientific literacy. Other features include: (i) a wealth of exercises at various levels, along with commentary that explains why they matter and (ii) a dedicated website with software templates, problem solutions, and other resources supporting the text and (iii) a large number and variety of illustrations. Given its many applications, the book is suitable for senior undergraduates and graduate students in mathematics and science and engineering courses. The thoughtful presentation, which anticipates many confusions of beginning students, makes the book suitable for a teaching environment that emphasizes self-directed, active learning (including the so-called inverted classroom).

Mathematics

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