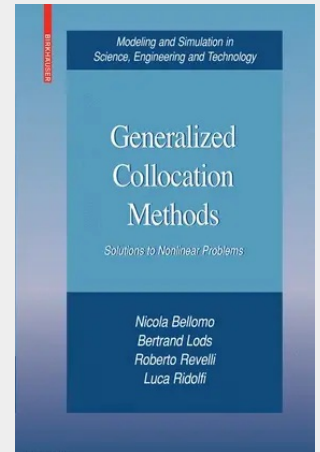


Generalized Collocation Methods

This book examines various mathematical tools—based on generalized collocation methods—to solve nonlinear problems related to partial differential and integro-differential equations. Using a unified approach combining modeling, mathematical methods, and scientific computation, the book covers specific problems and models related to vehicular traffic flow, population dynamics, wave phenomena, heat convection and diffusion, transport phenomena, and pollution.

is written for an interdisciplinary audience of graduate students, engineers, scientists, and applied mathematicians with an interest in modeling real-world systems by differential or operator equations. The work may be used as a supplementary textbook in graduate courses on modeling and nonlinear differential equations, or as a self-study handbook for researchers and practitioners wishing to expand their knowledge of practical solution techniques for nonlinear problems.

Analysis of nonlinear models and problems is crucial in the application of mathematics to real-world problems. This book approaches this important topic by focusing on collocation methods for solving nonlinear evolution equations and applying them to a variety of mathematical problems. These include wave motion models, hydrodynamic models of vehicular traffic flow, convection-diffusion models, reaction-diffusion models, and population dynamics models. The book may be used as a textbook for graduate courses on collocation methods, nonlinear modeling, and nonlinear differential equations. Examples and exercises are included in every chapter.



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