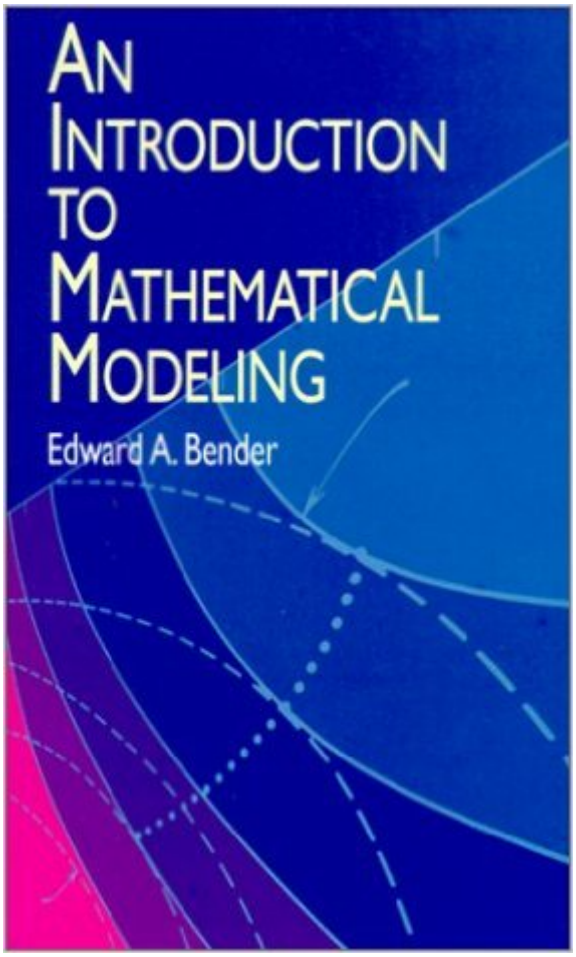
An Introduction To Mathematical Modeling (Dover Books On Computer Science)



Synopsis

Employing a practical, "learn by doing" approach, this first-rate text fosters the development of the skills beyond the pure mathematics needed to set up and manipulate mathematical models. The author draws on a diversity of fields â " including science, engineering, and operations research â " to provide over 100 reality-based examples. Students learn from the examples by applying mathematical methods to formulate, analyze, and criticize models. Extensive documentation, consisting of over 150 references, supplements the models, encouraging further research on models of particular interest.The lively and accessible text requires only minimal scientific background. Designed for senior college or beginning graduate-level students, it assumes only elementary calculus and basic probability theory for the first part, and ordinary differential equations and continuous probability for the second section. All problems require students to study and create models, encouraging their active participation rather than a mechanical approach.Beyond the classroom, this volume will prove interesting and rewarding to anyone concerned with the development of mathematical models or the application of modeling to problem solving in a wide array of applications.

Book Information

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Customer Reviews

Aimed at senior level undergraduates, the first chapter briefly discusses at a high level what mathematical models are, how theyÂ¡Ã Â re formulated and rules of thumb as to how to evaluate

them. The rest of the book surveys simple to moderately complex models applied to problems taken from a wide variety of disciplines in business, science, and engineering. As a survey course, brevity and breadth take precedent over depth and the examples are watered-down versions of problems taken from a plethora of sources cited throughout the text. However, the problems and models are not too superficial that they donÂ¡Ã Â t retain the essential issues modelers are likely to encounter.Although the book is intended primarily for college seniors and first year graduate students, Â¡Ã Â Part I: Elementary MethodsÂ¡Ã Â requires only first year calculus and basic probability whereas Â¡Ã Â Part II: More Advanced MethodsÂ¡Ã Â also requires differential equations. Therefore, the book will appeal to various levels.The book is rather dated as is evident by its lack of emphasis on numerical methods and no one should expect to be ready for any serious real world modeling as a result of reading this text alone. However, the book does not pretend to be anything more than what it is and the author cautions that it should merely supplement and not substitute mathematics and science coursework. (I would also add that a few courses in numerical methods and computer science would also be the order of the day.)Although the first chapter outlines a quick four-step process for formulating mathematical models, the author stresses the role of discussion and research behind each high level step. Any attempt to provide detailed cookbook heuristics would be a sham.

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