Mathematics

Focusing on growth and decay processes, interacting populations, and heating/cooling problems, **Mathematical Modelling with Case Studies: A Differential Equations Approach using Maple™ and MATLAB®, Second Edition** presents mathematical techniques applicable to models involving differential equations that describe rates of change. Although the authors concentrate on models involving differential equations, the ideas used can be applied to many other areas.

The book carefully details the process of constructing a model, including the conversion of a seemingly complex problem into a much simpler one. It uses flow diagrams and word equations to aid in the model building process and to develop the mathematical equations. Employing theoretical, graphical, and computational tools, the authors analyze the behavior of the models under changing conditions. They discuss the validation of the models and suggest extensions to the models with an emphasis on recognizing the strengths and limitations of each model.

Through applications and the tools of Maple™ and MATLAB®, this text provides hands-on model building skills. It develops, extends, and improves simple models as well as interprets the results.

Features

- Focuses on compartmental models, population models, and heat transfer problems
- Uses compartment diagrams and word equations to help readers conceptualize the formulation of differential equations
- Includes many case studies to provide a practical understanding of how the models are used in current research, such as environmental science, biology, and archaeology
- Supplies Maple and MATLAB codes in the text and online so results can be reproduced exactly
- Offers end-of-chapter problems for practicing with the formulation, analysis, and interpretation of differential equation models

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CRC Press
Taylor & Francis Group
an **informa** business
www.crcpress.com

6000 Broken Sound Parkway, NW
Suite 300, Boca Raton, FL 33487
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2 Park Square, Milton Park
Abingdon, Oxon OX14 4RN, UK

ISBN 978-1-4200-8348-4

9 781420 083484

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