

1. Record Nr.	UNINA9910787948303321
Autore	Shahin Mazen <1947->
Titolo	Explorations of mathematical models in biology with Maple // Mazen Shahin
Pubbl/distr/stampa	Hoboken, New Jersey : , : Wiley, , 2015 2015
ISBN	1-118-55217-2 1-118-55215-6
Edizione	[1st ed.]
Descrizione fisica	1 online resource (307 p.)
Collana	New York Academy of Sciences
Classificazione	461.9 570.1/51
Disciplina	570.1/51
Soggetti	Biology - Mathematical models Biology - Data processing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"With website"--Cover Includes bibliographical references (p. 286-287) and index
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Machine generated contents note: Preface Chapter 1. Overview of Discrete Dynamical Modeling and Maple 1.1 Introduction to Modeling and Difference Equations 1.2 The Modeling Process 1.3 Getting Started with Maple Chapter 2. Modeling with First-order Difference Equations 2.1 Modeling with First-order Linear Homogenous Difference Equations with Constant Coefficients 2.2 Modeling with Non-homogenous First-order Linear Difference Equations 2.3 Modeling with Nonlinear Difference Equations: Logistic Growth Models 2.4 Logistic Equations and Chaos Chapter 3. Modeling with Matrices 3.1 Systems of Linear Equations Having Unique Solutions 3.2 The Gauss-Jordan Elimination Method with Models 3.3 Introduction to Matrices and Matrix Operations 3.4 Determinants and Systems of Linear Equations 3.5 Eigenvectors and Eigenvalues 3.6 Eigenvalues and Stability of Linear Systems Chapter 4. Modeling with Systems of Linear Difference Equations 4.1 Modeling with Markov Chains 4.2 Age-structured Population Models 4.3 Modeling with Second-order Linear Difference Equations Chapter 5. Modeling with Nonlinear Systems of Difference Equations 5.1 Modeling of Interacting Species 5.2 The SIR Models of Infectious Disease 5.3

Sommario/riassunto

"With an emphasis on Maple applications to showcase graphical and numerical techniques, this book investigates and analyzes the behavior of solutions of mathematical models and also features interesting linear and nonlinear models from diverse disciplines, such as biology, ecology, and environment. It utilizes difference equations, matrix algebra, and Markov chains as the main mathematical tools. It is an ideal book for students of mathematical biology, theoretical ecology, bioeconomics, forensic science, applied mathematics, and environmental science"--

"This book focuses on mathematical models in biology and utilizes difference equations, matrix algebra, and Markov chains as the main mathematical tools. In addition, Maple, a computer algebra system, as well as cooperative learning initiatives are integrated"--