

1. Record Nr.	UNINA9911099688703321
Autore	Cox David
Titolo	Ideals, Varieties, and Algorithms : An Introduction to Computational Algebraic Geometry and Commutative Algebra / / by David Cox, John Little, DONAL OSHEA
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Edizione	[2nd ed. 1997.]
Descrizione fisica	1 online resource (XIII, 538 p. 44 illus.)
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Formato	Materiale a stampa
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	1. Geometry, Algebra, and Algorithms -- 2. Groebner Bases -- 3. Elimination Theory -- 4. The Algebra-Geometry Dictionary -- 5. Polynomial and Rational Functions on a Variety -- 6. Robotics and Automatic Geometric Theorem Proving -- 7. Invariant Theory of Finite Groups -- 8. Projective Algebraic Geometry -- 9. The Dimension of a Variety -- Appendix A. Some Concepts from Algebra -- §1 Fields and Rings -- §2. Groups -- §3. Determinants -- Appendix B. Pseudocode -- §1. Inputs, Outputs, Variables, and Constants -- §2. Assignment Statements -- §3. Looping Structures -- §4. Branching Structures -- Appendix C. Computer Algebra Systems -- §1. AXIOM -- §2. Maple -- §3. Mathematica -- §4. REDUCE -- §5. Other Systems -- Appendix D. Independent Projects -- §1. General Comments -- §2. Suggested Projects -- References.
Sommario/riassunto	Algebraic Geometry is the study of systems of polynomial equations in one or more variables, asking such questions as: Does the system have finitely many solutions, and if so how can one find them? And if there are infinitely many solutions, how can they be described and manipulated? The solutions of a system of polynomial equations form a geometric object called a variety; the corresponding algebraic object is an ideal. There is a close relationship between ideals and varieties

which reveals the intimate link between algebra and geometry. Written at a level appropriate to undergraduates, this book covers such topics as the Hilbert Basis Theorem, the Nullstellensatz, invariant theory, projective geometry, and dimension theory. The algorithms to answer questions such as those posed above are an important part of algebraic geometry. This book bases its discussion of algorithms on a generalization of the division algorithm for polynomials in one variable that was only discovered in the 1960's. Although the algorithmic roots of algebraic geometry are old, the computational aspects were neglected earlier in this century. This has changed in recent years, and new algorithms, coupled with the power of fast computers, have let to some interesting applications, for example in robotics and in geometric theorem proving. In preparing a new edition of Ideals, Varieties and Algorithms the authors present an improved proof of the Buchberger Criterion as well as a proof of Bezout's Theorem. Appendix C contains a new section on Axiom and an update about Maple , Mathematica and REDUCE.

2. Record Nr.	UNINA9911018897403321
Titolo	Simultaneous mass transfer and chemical reactions in engineering science // Bertram K.C. Chan
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2023
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Soggetti	Mass transfer -- Mathematical models Chemical reactions -- Mathematical models Mass transfer -- Computer simulation Chemical reactions -- Computer simulation
Lingua di pubblicazione	Inglese
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Nota di bibliografia	Includes bibliographical references and index.
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Sommario/riassunto

Simultaneous Mass Transfer and Chemical Reactions in Engineering Science A comprehensive look at the basic science of diffusional process and mass transfer Mass transfer as a principle is an essential part of numerous unit operations in biomolecular, chemical, and process engineering; crystallization, distillation, and membrane separation processes, for example, use this important method. Given this significance - particularly in engineering design where these processes occur - understanding the design and analysis of such unit operations must begin with a basic understanding of how simultaneous mass transfer and the chemical reactions that influence these occurrences. It is also vital to be aware of the most up-to-date technologies for analyzing and predicting the phenomena. Given the significance of this process, Simultaneous Mass Transfer and Chemical Reactions in Engineering Science is an important resource as it introduces the reader to the complex subject of simultaneous mass transfer with biochemical and chemical reactions and gives them the tools to develop an applicable design. Analyzing the systems of simultaneous mass transfer and reactions is at the core of this book, as all known design approaches are carefully examined and compared. The volume also provides the reader with a working knowledge of the latest technologies - with a special focus on the open-sourced computer programming language R - and how these tools are an essential resource in quantitative assessment in analysis models. Simultaneous Mass Transfer and Chemical Reactions in Engineering Science provides a working knowledge of the latest information on simultaneous mass transfer and reactions by focusing on the analysis of this process, as well as discussing the existence and distinctive quality of the solutions to the Simultaneous Mass Transfer and

Chemical Reactions in Engineering Science readers will also find: A theoretical basis of each design model that is carefully stated, compared, and assessed Carefully developed and established Existence and Uniqueness Theorems for a general design model Comprehensive coverage of how the programming language R may be used to analyze models Numerous examples and case studies that provide a working knowledge of simultaneous mass transfer and reactions Simultaneous Mass Transfer and Chemical Reactions in Engineering Science is a useful reference for students in chemical engineering, biotechnology, or chemistry, as well as professional process and chemical engineers.

3. Record Nr.	UNINA9911150462003321
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Nota di contenuto	Contents; Acknowledgments; 1. Theme and Contents of this Book; 2. Processes in Closed and Open Systems; 2.1 Introduction; 2.2 Thermodynamics of general systems; 2.3 Chemical reactions; 2.4 Autocatalysis in closed and open systems; 2.4.1 Autocatalysis in closed

systems; 2.4.2 Autocatalysis in the flow reactor; 3. Dynamics of Molecular Evolution; 3.1 Introduction; 3.2 Selection and evolution; 3.3 Template induced autocatalysis; 3.3.1 Autocatalytic oligomerization; 3.3.2 Biopolymer replication; 3.3.3 Replication and selection; 3.3.4 Replication and mutation; 3.3.5 Error thresholds; 3.4 Replicator equations 3.4.1 Schlogl model; 3.4.2 Fisher's selection equation; 3.4.3 Symbioses and hypercycles; 3.5 Unlimited growth and selection; 4. Relaxation Oscillations; 4.1 Introduction; 4.2 Self-exciting relaxation oscillations; 4.2.1 van der Pol equation; 4.2.2 Stoker-Haag equation; 4.3 Current induced neuron oscillations; 4.4 Bistability and complex structure of harmonically forced relaxation oscillations; 5. Order and Chaos; 5.1 Introduction; 5.2 One dimensional maps; 5.2.1 Formation of a period window; 5.2.2 Stability of a period window; 5.2.3 Topology of one dimensional maps; 5.3 Lorenz equations; 5.4 Low dimensional autocatalytic networks; 5.5 Chua equations; 6. Reaction Diffusion Dynamics; 6.1 Introduction; 6.2 Pulse front solutions of Fisher and related equations; 6.3 Diffusion driven spatial inhomogeneities; 6.4 Turing mechanism of chemical pattern formation; 7. Solitons; 7.1 Introduction; 7.2 One dimensional lattice dynamics; 7.2.1 Korteweg-de Vries equation; 7.2.2 sine-Gordon equation; 7.3 Burgers equation; 8. Neuron Pulse Propagation; 8.1 Introduction; 8.2 Properties of a neural pulse; 8.3 FitzHugh-Nagumo equations; 8.4 Hodgkin-Huxley equations; 8.5 An overview; 9. Time Reversal, Dissipation and Conservation; 9.1 Introduction; 9.2 Irreversibility and diffusion; 9.2.1 Theory of random walk; 9.2.2 Langevin equation and equilibrium fluctuations; 9.2.3 Newtonian mechanics and asymptotic irreversibility; 9.3 Reversibility and time recurrence; 9.3.1 A linear synchronous system; 9.3.2 Recurrence in nonlinear Hamiltonian systems: Fermi-Pasta-Ulam Model; 9.4 Complex dynamics and chaos in Newtonian dynamics: Henon-Heiles equations; Bibliography; Index

Sommario/riassunto

This book aims to provide mathematical analyses of nonlinear differential equations, which have proved pivotal to understanding many phenomena in physics, chemistry and biology. Topics of focus are autocatalysis and dynamics of molecular evolution, relaxation oscillations, deterministic chaos, reaction diffusion driven chemical pattern formation, solitons and neuron dynamics. Included is a discussion of processes from the viewpoints of reversibility, reflected by conservative classical mechanics, and irreversibility introduced by the dissipative role of diffusion. Each chapter presents the su
