

Ivar Stakgold
Daniel D. Joseph
David H. Sattinger (Eds.)

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Nonlinear problems in the physical sciences and biology: proceedings of a Battelle Summer Institute, Seattle, July 3-28, 1972 Ivar Stackgold, Daniel D. Joseph, David H. Sattinger, 1973 Nonlinear Problems in the Physical Sciences and Biology

Battelle Seattle Research Center, 1973 Eigenvalues of Non-Linear Problems G. Prodi, 2011-06-02 H Amann Nonlinear eigenvalue problems in ordered Banach spaces P C Fife Branching phenomena in fluid dynamics and chemical reaction diffusion theory W Klingenberg The theory of closed geodesics P Rabinowitz Variational methods for nonlinear eigenvalue problems M Reeken Existence of solutions to the Hartree Fock equations R Turner Positive solutions of nonlinear eigenvalue problems

Nonlinear Parabolic and Elliptic Equations C.V. Pao, 2012-12-06 In response to the growing use of reaction diffusion problems in many fields this monograph gives a systematic treatment of a class of nonlinear parabolic and elliptic differential equations and their applications these problems It is an important reference for mathematicians and engineers as well as a practical text for graduate students

Nonlinear Electrodynamics in Biological Systems W. Adey, 2012-12-06 The past half century has seen an extraordinary growth in the fields of cellular and molecular biology From simple morphological concepts of cells as the essential units of living matter there has been an ever sharper focus on functional organization of living systems with emphasis on molecular dynamics Thus life forms have come to be defined increasingly in terms of metabolism growth reproduction and responses to environmental perturbations Since these properties occur in varying degrees in systems below the level of cellular organization there has been a blurring of older models that restricted the concepts of life to cellular systems At the same time a search has begun for elemental aspects of molecular and atomic behavior that might better define properties common to all life forms This search has led to an examination of nonlinear behavior in biological macromolecules whether in response to electrical or chemical stimulation for example or as a means of signaling along a molecular chain or as a means of energy transfer Experimental knowledge in this area has grown rapidly in the past decade and in some respects has outstripped theoretical models adequate to explain these new observations Nevertheless it can be claimed that there is now an impressive body of experiments implicating nonlinear nonequilibrium processes as fundamental steps in sequential operations of biological systems

Bifurcation Theory and Applications Tian Ma, Shouhong Wang, 2005 Provides a comprehensive and intuitive review of existing bifurcation theories New theories for bifurcations from eigenvalues with even multiplicity General recipes for applications

Geometric Theory of Semilinear Parabolic Equations Daniel Henry, 2006-11-15

Differential Equations D. G. de Figueiredo, C. S. Hönig, 2006-11-15

Thermodynamics and Kinetics of Biological Processes Ingolf Lamprecht, A. I. Zotin, 2019-07-08 No detailed description available for Thermodynamics and Kinetics of Biological Processes

Eigenvalues of Non-linear Problems Giovanni

Prodi,1974 **Applied Analysis in Biological and Physical Sciences** Jim M. Cushing,M. Saleem,H. M. Srivastava,Mumtaz Ahmad Khan,M. Merajuddin,2016-12-01 The book contains recent developments and contemporary research in mathematical analysis and in its application to problems arising from the biological and physical sciences The book is of interest to readers who wish to learn of new research in such topics as linear and nonlinear analysis mathematical biology and ecology dynamical systems graph theory variational analysis and inequalities functional analysis differential and difference equations partial differential equations approximation theory and chaos All papers were prepared by participants at the International Conference on Recent Advances in Mathematical Biology Analysis and Applications ICMBA 2015 held during 4-6 June 2015 in Aligarh India A focal theme of the conference was the application of mathematics to the biological sciences and on current research in areas of theoretical mathematical analysis that can be used as sophisticated tools for the study of scientific problems The conference provided researchers academicians and engineers with a platform that encouraged them to exchange their innovative ideas in mathematical analysis and its applications as well as to form interdisciplinary collaborations The content of the book is divided into three parts Part I contains contributions from participants whose topics are related to nonlinear dynamics and its applications in biological sciences Part II has contributions which concern topics on nonlinear analysis and its applications to a variety of problems in science engineering and industry Part III consists of contributions dealing with some problems in applied analysis Analytical and Numerical Approaches to Asymptotic Problems in Analysis O. Axelsson,L.S. Frank,A. van der Sluis,2010-07-03 Analytical and Numerical Approaches to Asymptotic Problems in Analysis *Advances in Chemical Physics, Volume 32* Ilya Prigogine,Stuart A. Rice,2009-09-08 The Advances in Chemical Physics series provides the chemical physics and physical chemistry fields with a forum for critical authoritative evaluations of advances in every area of the discipline Filled with cutting edge research reported in a cohesive manner not found elsewhere in the literature each volume of the Advances in Chemical Physics series serves as the perfect supplement to any advanced graduate class devoted to the study of chemical physics Methods of Bifurcation Theory S.-N. Chow,J. K. Hale,2012-12-06 An alternative title for this book would perhaps be Nonlinear Analysis Bifurcation Theory and Differential Equations Our primary objective is to discuss those aspects of bifurcation theory which are particularly meaningful to differential equations To accomplish this objective and to make the book accessible to a wider we have presented in detail much of the relevant background audience material from nonlinear functional analysis and the qualitative theory of differential equations Since there is no good reference for some of the material its inclusion seemed necessary Two distinct aspects of bifurcation theory are discussed static and dynamic Static bifurcation theory is concerned with the changes that occur in the structure of the set of zeros of a function as parameters in the function are varied If the function is a gradient then variational techniques play an important role and can be employed effectively even for global problems If the function is not a gradient or if more detailed information is desired the general theory is usually local At the

same time the theory is constructive and valid when several independent parameters appear in the function In differential equations the equilibrium solutions are the zeros of the vector field Therefore methods in static bifurcation theory are directly applicable

Mathematical Methods in Medical and Biological Sciences Harendra Singh, Hari M Srivastava, 2024-11-05 Mathematical Methods in Medical and Biological Sciences presents mathematical methods for computational models arising in the medical and biological sciences The book presents several real life medical and biological models such as infectious and non infectious diseases that can be modeled mathematically to accomplish profound research in virtual environments when the cost of laboratory expenses is relatively high It focuses on mathematical techniques that provide global solutions for models arising in medical and biological sciences by considering their long term benefits In addition the book provides leading edge developments and insights for a range of applications including epidemiological modeling of pandemic dynamics viral infection developments cancer developments blood oxygen dynamics HIV infection spread reaction diffusion models polio infection spread and chaos modeling with fractional order derivatives Presents the mathematical treatment of a wide range of real life medical and biological models including both infectious and non infectious diseases Provides in depth analysis of the spread of Covid 19 polio and HIV including discussion of computational methods and applications Includes computational modeling methods along with their practical applications providing the basis for further exploration and research in epidemiology and applied biomedical sciences

Growth Patterns in Physical Sciences and Biology Jaun-Manuel Garcia-Ruiz, Enrique Louis, P. Meakin, Leonard M. Sander, 2012-12-06 During the past decade interest in the formation of complex disorderly patterns far from equilibrium has grown rapidly This interest has been stimulated by the development of new approaches based primarily on fractal geometry to the quantitative description of complex structures increased understanding of non linear phenomena and the introduction of a variety of models such as the diffusion limited aggregation model that provide paradigms for non equilibrium growth phenomena Advances in computer technology have played a crucial role in both the experimental and theoretical aspects of this enterprise Substantial progress has been made towards the development of comprehensive understanding of non equilibrium growth phenomena but most of our current understanding is based on simple computer models Pattern formation processes are important in almost all areas of science and technology and clearly pattern growth pervades biology Very often remarkably similar patterns are found in quite diverse systems In some case dielectric breakdown electrodeposition fluid fluid displacement in porous media dissolution patterns and random dendritic growth for example the underlying causes of this similarity is quite well understood In other cases vascular trees nerve cells and river networks for example we do not yet know if a fundamental relationship exists between the mechanisms leading the formation of these structures

Mathematics Applied to Deterministic Problems in the Natural Sciences C. C. Lin, L. A. Segel, 1988-01-01 Addresses the construction analysis and interpretation of mathematical models that shed light on significant problems in the

physical sciences The authors case studies approach leads to excitement in teaching realistic problems The many problems and exercises reinforce test and extend the reader s understanding This reprint volume may be used as an upper level undergraduate or graduate textbook as well as a reference for researchers working on fluid mechanics elasticity perturbation methods dimensional analysis numerical analysis continuum mechanics and differential equations **From Chemical to Biological Organization** Mario Markus, Stefan C. Müller, Gregoire Nicolis, 2012-12-06 Open nonlinear systems are capable of self organization in space and time This realization constitutes a major breakthrough of modern science and is currently at the origin of explosive developments in chemistry physics and biology Observations and numerical computations of nonlinear systems surprise us by their inexhaustible and sometimes nonintuitive variety of structures with different shapes and functions But as well as variety one finds on closer inspection that nonlinear phenomena share universal aspects of pattern formation in time and space These similarities make it possible to bridge the gap between inanimate and living matter at various levels of complexity in both theory and experiment This book is an account of different approaches to the study of this pattern formation The universality of kinetic thermodynamic and dimensional approaches is documented through their application to purely mathematical physical and chemical systems as well as to systems in nature biochemical cellular multicellular physiological neurophysiological ecological and economic systems Hints given throughout the book allow the reader to discover how to make use of the principles and methods in different fields of research including those not treated explicitly in the book

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