

# CONTEMPORARY MATHEMATICS

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## Mathematical Studies in Nonlinear Wave Propagation

Dominic P. Clemence  
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Editors



American Mathematical Society

# Mathematical Studies In Nonlinear Wave P

**E.E. Rosinger**



## **Mathematical Studies In Nonlinear Wave P:**

Mathematical Studies in Nonlinear Wave Propagation Dominic P. Clemence, Guoqing Tang, 2005 Lively discussions and stimulating research were part of a five day conference on Mathematical Methods in Nonlinear Wave Propagation sponsored by the NSF and CBMS This volume is a collection of lectures and papers stemming from that event Leading experts present dynamical systems and chaos scattering and spectral theory nonlinear wave equations optimal control optical waveguide design and numerical simulation The book is suitable for a diverse audience of mathematical specialists interested in fiber optic communications and other nonlinear phenomena It is also suitable for engineers and other scientists interested in the mathematics of nonlinear wave propagation

Mathematical Studies on Human Disease Dynamics Abba B. Gumel, Carlos Castillo-Chávez, Ronald E. Mickens, Dominic P. Clemence, 2006 This volume contains the proceedings of the AMS SIAM IMS Joint Summer Research Conference on Modeling the Dynamics of Human Diseases Emerging Paradigms and Challenges held in Snowbird Utah July 17-21 2005 The goal of the conference was to bring together leading and upcoming researchers to discuss the latest advances and challenges associated with the modeling of the dynamics of emerging and re emerging diseases and to explore various control strategies The articles included in this book are devoted to some of the significant recent advances trends and challenges associated with the mathematical modeling and analysis of the dynamics and control of some diseases of public health importance In addition to illustrating many of the diverse prevailing epidemiological challenges together with the diversity of mathematical approaches needed to address them this book provides insights on a number of topical modeling issues such as the modeling and control of mosquito borne diseases respiratory diseases animal diseases such as foot and mouth disease cancer and tumor growth modeling influenza HIV HPV rotavirus etc This book also touches upon other important topics such as the use of modeling i

**Quasimolecular Modelling** Donald Greenspan, 1991-11-15 In this book the author has tried to apply a little imagination and thinking to modelling dynamical phenomena from a classical atomic and molecular point of view Nonlinearity is emphasized as are phenomena which are elusive from the continuum mechanics point of view FORTRAN programs are provided in the Appendices

**Hamiltonian Dynamical Systems and Applications** Walter Craig, 2008-02-17 This volume is the collected and extended notes from the lectures on Hamiltonian dynamical systems and their applications that were given at the NATO Advanced Study Institute in Montreal in 2007 Many aspects of the modern theory of the subject were covered at this event including low dimensional problems Applications are also presented to several important areas of research including problems in classical mechanics continuum mechanics and partial differential equations

*Nonlinear PDEs* Guido Schneider, Hannes Uecker, 2017-10-26 This is an introductory textbook about nonlinear dynamics of PDEs with a focus on problems over unbounded domains and modulation equations The presentation is example oriented and new mathematical tools are developed step by step giving insight into some important classes of nonlinear PDEs and nonlinear dynamics phenomena which may occur in PDEs The

book consists of four parts Parts I and II are introductions to finite and infinite dimensional dynamics defined by ODEs and by PDEs over bounded domains respectively including the basics of bifurcation and attractor theory Part III introduces PDEs on the real line including the Korteweg de Vries equation the Nonlinear Schrödinger equation and the Ginzburg Landau equation These examples often occur as simplest possible models namely as amplitude or modulation equations for some real world phenomena such as nonlinear waves and pattern formation Part IV explores in more detail the connections between such complicated physical systems and the reduced models For many models a mathematically rigorous justification by approximation results is given The parts of the book are kept as self contained as possible The book is suitable for self study and there are various possibilities to build one or two semester courses from the book

**Nonlinear Partial Differential Equations in Engineering by W F Ames** W. F. Ames, 1972-07-21 In this book we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems A number of computing techniques are considered such as methods of operator approximation with any given accuracy operator interpolation techniques including a non Lagrange interpolation methods of system representation subject to constraints associated with concepts of causality memory and stationarity methods of system representation with an accuracy that is the best within a given class of models methods of covariance matrix estimation methods for low rank matrix approximations hybrid methods based on a combination of iterative procedures and best operator approximation and methods for information compression and filtering under condition that a filter model should satisfy restrictions associated with causality and different types of memory As a result the book represents a blend of new methods in general computational analysis and specific but also generic techniques for study of systems theory and its particular branches such as optimal filtering and information compression Best operator approximation Non Lagrange interpolation Generic Karhunen Loeve transform Generalised low rank matrix approximation Optimal data compression Optimal nonlinear filtering

*Particle Modeling* Donald Greenspan, 1997-09-23 A reference for the field of particle modelling the study of dynamical behaviour of solids and fluids in response to external forces with the solids and fluids modelled as systems of atoms and molecules

**Selected Water Resources Abstracts**, 1988

**Fifth International Conference on Mathematical and Numerical Aspects of Wave Propagation** Alfredo

Bermúdez, 2000-01-01 This conference was held in Santiago de Compostela Spain July 10-14 2000 This volume contains papers presented at the conference covering a broad range of topics in theoretical and applied wave propagation in the general areas of acoustics electromagnetism and elasticity Both direct and inverse problems are well represented This volume along with the three previous ones presents a state of the art primer for research in wave propagation The conference is conducted by the Institut National de Recherche en Informatique et en Automatique with the cooperation of SIAM

**Mathematics of Complexity and Dynamical Systems** Robert A. Meyers, 2011-10-05 Mathematics of Complexity and Dynamical Systems is an authoritative reference to the basic tools and concepts of complexity systems theory and

dynamical systems from the perspective of pure and applied mathematics Complex systems are systems that comprise many interacting parts with the ability to generate a new quality of collective behavior through self organization e g the spontaneous formation of temporal spatial or functional structures These systems are often characterized by extreme sensitivity to initial conditions as well as emergent behavior that are not readily predictable or even completely deterministic The more than 100 entries in this wide ranging single source work provide a comprehensive explication of the theory and applications of mathematical complexity covering ergodic theory fractals and multifractals dynamical systems perturbation theory solitons systems and control theory and related topics Mathematics of Complexity and Dynamical Systems is an essential reference for all those interested in mathematical complexity from undergraduate and graduate students up through professional researchers

**Scientific and Technical Aerospace Reports** ,1994 Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database

*Grants and Awards for the Fiscal Year Ended ...* National Science Foundation (U.S.),

*Proceedings of the International Congress of Mathematicians* Rajendra Bhatia,Arup Pal,2010 ICM 2010 proceedings comprise a four volume set containing articles based on plenary lectures and invited section lectures the Abel and Noether lectures as well as contributions based on lectures delivered by the recipients of the Fields Medal the Nevanlinna and Chern Prizes The first volume will also contain the speeches at the opening and closing ceremonies and other highlights of the Congress

*Council for African American Researchers in the Mathematical Sciences: Volume III* Council for African American Researchers in the Mathematical Sciences,2001 This volume presents research and expository papers presented at the third and fifth meetings of the Council for African American Researchers in the Mathematical Sciences

CAARMS The CAARMS is a group dedicated to organizing an annual conference that showcases the current research primarily but not exclusively of African Americans in the mathematical sciences including mathematics operations research statistics and computer science Held annually since 1995 significant numbers of researchers have presented their current work in hour long technical presentations and graduate students have presented their work in organized poster sessions The events create an ideal forum for mentoring and networking where attendees can meet researchers and graduate students interested in the same fields For volumes based on previous CAARMS proceedings see African Americans in Mathematics II Volume 252 in the AMS series Contemporary Mathematics and African Americans in Mathematics Volume 34 in the AMS series DIMACS

**U.S. Government Research Reports** ,1960

**Council for African American Researchers in the Mathematical Sciences: Volume IV** Gaston M. N'Guerekata,Asamoah Nkwanta,Council for African American Researchers in the Mathematical Sciences,2001 Since the first conference in 1995 significant numbers of researchers have presented their current work in technical talks and graduate students have presented their work in organized poster sessions

BOOK

JACKET Non-Linear Partial Differential Equations E.E. Rosinger,1990-11-22 A massive transition of interest from solving

linear partial differential equations to solving nonlinear ones has taken place during the last two or three decades. The availability of better computers has often made numerical experimentations progress faster than the theoretical understanding of nonlinear partial differential equations. The three most important nonlinear phenomena observed so far both experimentally and numerically and studied theoretically in connection with such equations have been the solitons, shock waves and turbulence or chaotical processes. In many ways these phenomena have presented increasing difficulties in the mentioned order. In particular the latter two phenomena necessarily lead to nonclassical or generalized solutions for nonlinear partial differential equations.

*Bilinear Estimates in the Presence of a Large Potential and a Critical NLS in 3D*  
Fabio Pusateri, Avy Soffer, 2024-08-19 [View the abstract](#)

**Nonlinear Oscillations of Hamiltonian PDEs**  
Massimiliano Berti, 2007-10-01

Many partial differential equations (PDEs) that arise in physics can be viewed as infinite dimensional Hamiltonian systems. This monograph presents recent existence results of nonlinear oscillations of Hamiltonian PDEs particularly of periodic solutions for completely resonant nonlinear wave equations. The text serves as an introduction to research in this fascinating and rapidly growing field. Graduate students and researchers interested in variational techniques and nonlinear analysis applied to Hamiltonian PDEs will find inspiration in the book.

*Far East Journal of Mathematical Sciences*, 2007

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