Mat 2310 Differential Equations 4 Semester Hours

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ALINA MIDDLETON

Economic Model Predictive Control Elsevier Orbital Mechanics for Engineering Students, Second Edition, provides an introduction to the basic concepts of space mechanics. These include vector kinematics in three dimensions; Newton's laws of motion and gravitation; relative motion; the vector-based solution of the classical two-body problem; derivation of Kepler's equations; orbits in three dimensions; preliminary orbit determination; and orbital maneuvers. The book also covers relative motion and the two-impulse rendezvous problem; interplanetary mission design using patched conics; rigid-body dynamics used to characterize the attitude of a space vehicle; satellite attitude dynamics; and the characteristics and design of multi-stage launch vehicles. Each chapter begins with an outline of key concepts and concludes with problems that are based on the material covered. This text is written for undergraduates who are studying orbital mechanics for the first time and have completed courses in physics, dynamics, and mathematics, including differential equations and applied linear algebra. Graduate students, researchers, and experienced practitioners will also find useful review materials in the book. NEW: Reorganized and

improved discusions of coordinate systems, new discussion on perturbations and quarternions NEW: Increased coverage of attitude dynamics, including new Matlab algorithms and examples in chapter 10 New examples and homework problems

Scientific and Technical Aerospace Reports

Birkhäuser

This book is an unique integrated treatise, on the concepts of fractional calculus as models with applications in hydrology, soil science and geomechanics. The models are primarily fractional partial differential equations (fPDEs), and in limited cases, fractional differential equations (fDEs). It develops and applies relevant fPDEs and fDEs mainly to water flow and solute transport in porous media and overland, and in some cases, to concurrent flow and energy transfer. It is an integrated resource with theory and applications for those interested in hydrology, hydraulics and fluid mechanics. The self-contained book summaries the fundamentals for porous media and essential mathematics with extensive references supporting the development of the model and applications.

Partial Differential Equations in Anisotropic Musielak-Orlicz Spaces Springer Science & Business Media

Nonlinear resonance analysis is a unique mathematical tool that can be used to study

resonances in relation to, but independently of, any single area of application. This is the first book to present the theory of nonlinear resonances as a new scientific field, with its own theory, computational methods, applications and open questions. The book includes several worked examples, mostly taken from fluid dynamics, to explain the concepts discussed. Each chapter demonstrates how nonlinear resonance analysis can be applied to real systems, including large-scale phenomena in the Earth's atmosphere and novel wave turbulent regimes, and explains a range of laboratory experiments. The book also contains a detailed description of the latest computer software in the field. It is suitable for graduate students and researchers in nonlinear science and wave turbulence, along with fluid mechanics and number theory. Colour versions of a selection of the figures are available at www.cambridge.org/9780521763608.

Fractional Calculus for Hydrology, Soil Science and Geomechanics

Springer

This book is the second of two volumes that contain the proceedings of the Workshop on Nonlinear Partial Differential Equations, held from May 28-June 1, 2012, at the University of Perugia in honor of Patrizia Pucci's 60th birthday. The workshop brought together leading experts and researchers in nonlinear partial differential equations to

promote research and to stimulate interactions among the participants. The workshop program testified to the wide ranging influence of Patrizia Pucci on the field of nonlinear analysis and partial differential equations. In her own work, Patrizia Pucci has been a seminal influence in many important areas: the maximum principle, qualitative analysis of solutions to many classes of nonlinear PDEs (Kirchhoff problems, polyharmonic systems), mountain pass theorem in the critical case, critical exponents, variational identities, as well as various degenerate or singular phenomena in mathematical physics. This same breadth is reflected in the mathematical papers included in this volume. The companion volume (Contemporary Mathematics, Volume 594) is devoted to evolution problems in nonlinear partial differential equations.

Computer Algebra in Scientific Computing

American Mathematical Soc.

This monograph offers the reader a treatment of the theory of evolution PDEs with nonstandard growth conditions. This class includes parabolic and hyperbolic equations with variable or anisotropic nonlinear structure. We develop methods for the study of such equations and present a detailed account of recent results. An overview of other approaches to the study of PDEs of this kind is provided. The presentation is focused on the issues of existence

and uniqueness of solutions in appropriate function spaces and on the study of the specific qualitative properties of solutions, such as localization in space and time, extinction in a finite time and blow-up, or nonexistence of global in time solutions. Special attention is paid to the study of the properties intrinsic to solutions of equations with nonstandard growth.
Paperbacks in Print
Princeton University Press
This book is dedicated to the qualitative theory of the stochastic one-dimensional Burgers equation with small viscosity under periodic boundary conditions and to interpreting the obtained results in terms of one-dimensional turbulence in a fictitious one-dimensional fluid described by the Burgers equation. The properties of one-dimensional turbulence which we rigorously derive are then compared with the heuristic Kolmogorov theory of hydrodynamical turbulence, known as the K41 theory. It is shown, in particular, that these properties imply natural one-dimensional analogues of three principal laws of the K41 theory: the size of the Kolmogorov inner scale, the 2/3 2/3-law, and the Kolmogorov–Obukhov law. The first part of the book deals with the stochastic Burgers equation, including the inviscid limit for the equation, its asymptotic in time behavior, and a theory of generalised L 1 L1-solutions. This section makes a self-consistent introduction to stochastic

PDEs. The relative simplicity of the model allows us to present in a light form many of the main ideas from the general theory of this field. The second part, dedicated to the relation of one-dimensional turbulence with the K41 theory, could serve for a mathematical reader as a rigorous introduction to the literature on hydrodynamical turbulence, all of which is written on a physical level of rigor.
Nuclear Science Abstracts
Springer Nature

Solomon Lefschetz pioneered the field of topology--the study of the properties of many-sided figures and their ability to deform, twist, and stretch without changing their shape. According to Lefschetz, "If it's just turning the crank, it's algebra, but if it's got an idea in it, it's topology." The very word topology comes from the title of an earlier Lefschetz monograph published in 1920. In Topics in Topology Lefschetz developed a more in-depth introduction to the

field, providing authoritative explanations of what would today be considered the basic tools of algebraic topology. Lefschetz moved to the United States from France in 1905 at the age of twenty-one to find employment opportunities not available to him as a Jew in France. He worked at Westinghouse Electric Company in Pittsburgh and there suffered a horrible laboratory accident, losing both hands and forearms. He continued to work for Westinghouse, teaching

mathematics, and went on to earn a Ph.D. and to pursue an academic career in mathematics. When he joined the mathematics faculty at Princeton University, he became one of its first Jewish faculty members in any discipline. He was immensely popular, and his memory continues to elicit admiring anecdotes. Editor of Princeton University Press's Annals of Mathematics from 1928 to 1958, Lefschetz built it into a world-class scholarly journal. He published another book, Lectures on Differential Equations, with Princeton in 1946.

Reviews in Partial Differential Equations, 1980-86, as Printed in Mathematical Reviews American Mathematical Soc.

The scientific literature on the Hardy-Leray inequality, also known as the uncertainty principle, is very extensive and scattered. The Hardy-Leray potential shows an extreme spectral behavior and a peculiar influence on diffusion problems, both stationary and evolutionary. In this book, a big part of the scattered knowledge about these different behaviors is collected in a unified and comprehensive presentation.

Problems of Information Transmission Cambridge University Press

Now in its eighth edition, Higher Engineering Mathematics has helped thousands of students succeed in their exams. Theory is kept to a minimum, with the emphasis firmly placed on problem-solving skills, making this a thoroughly

practical introduction to the advanced engineering mathematics that students need to master. The extensive and thorough topic coverage makes this an ideal text for upper-level vocational courses and for undergraduate degree courses. It is also supported by a fully updated companion website with resources for both students and lecturers. It has full solutions to all 2,000 further questions contained in the 277 practice exercises.

Encyclopaedia Britannica
Routledge
Following a longstanding tradition of the Les Houches Summer Schools, this book uses a pedagogically presented and accessible style to treat 2D and 3D turbulence from the experimental, theoretical and computational points of view.

Recent Trends in Nonlinear Partial Differential Equations
CRC Press
This book provides a detailed study of nonlinear partial differential equations satisfying certain nonstandard growth conditions which simultaneously extend polynomial, inhomogeneous and fully anisotropic growth. The common property of the many different kinds of equations considered is that the growth conditions of the highest order operators lead to a formulation of the equations in Musielak–Orlicz spaces. This high level of generality, understood as full anisotropy and

inhomogeneity, requires new proof concepts and a generalization of the formalism, calling for an extended functional analytic framework. This theory is established in the first part of the book, which serves as an introduction to the subject, but is also an important ingredient of the whole story. The second part uses these theoretical tools for various types of PDEs, including abstract and parabolic equations but also PDEs arising from fluid and solid mechanics. For connoisseurs, there is a short chapter on homogenization of elliptic PDEs. The book will be of interest to researchers working in PDEs and in functional analysis.

Annual ISA Conference Proceedings Springer Nature

This book presents the proceedings of Positivity VII, held from 22-26 July 2013, in Leiden, the Netherlands. Positivity is the mathematical field concerned with ordered structures and their applications in the broadest sense of the word. A biyearly series of conferences is devoted to presenting the latest developments in this lively and growing discipline. The lectures at the conference covered a broad spectrum of topics, ranging from order-theoretic approaches to stochastic processes, positive solutions of evolution equations and positive operators on vector lattices, to order structures in the context of algebras of operators on Hilbert spaces. The contributions in the book reflect this variety and

appeal to university researchers in functional analysis, operator theory, measure and integration theory and operator algebras. Positivity VII was also the Zaanen Centennial Conference to mark the 100th birth year of Adriaan Cornelis Zaanen, who held the chair of Analysis in Leiden for more than 25 years and was one of the leaders in the field during his lifetime.

New trends in turbulence. Turbulence: nouveaux aspects Walter de Gruyter GmbH & Co KG These five volumes bring together a wealth of bibliographic information in the area of numerical analysis. Containing over 17,600 reviews of articles, books, and conference proceedings, these volumes represent all the numerical analysis entries that appeared in Mathematical Reviews between 1980 and 1986. Author and key indexes appear at the end of volume 5.

Magnetic Field Computation with R-functions Springer NSA is a comprehensive collection of international nuclear science and technology literature for the period 1948 through 1976, pre-dating the prestigious INIS database, which began in 1970. NSA existed as a printed product (Volumes 1-33) initially, created by DOE's predecessor, the U.S. Atomic Energy Commission (AEC). NSA includes citations to scientific and technical reports from the AEC, the U.S. Energy Research and Development Administration and its

contractors, plus other agencies and international organizations, universities, and industrial and research organizations. References to books, conference proceedings, papers, patents, dissertations, engineering drawings, and journal articles from worldwide sources are also included. Abstracts and full text are provided if available.

Reviews in Operator Theory, 1980-86

This book presents general methods for the design of economic model predictive control (EMPC) systems for broad classes of nonlinear systems that address key theoretical and practical considerations including recursive feasibility, closed-loop stability, closed-loop performance, and computational efficiency. Specifically, the book proposes: Lyapunov-based EMPC methods for nonlinear systems; two-tier EMPC architectures that are highly computationally efficient; and EMPC schemes handling explicitly uncertainty, time-varying cost functions, time-delays and multiple-time-scale dynamics. The proposed methods employ a variety of tools ranging from nonlinear systems analysis, through Lyapunov-based control techniques to nonlinear dynamic optimization. The applicability and performance of the proposed methods are demonstrated through a number of chemical process examples. The book presents state-of-the-art methods for the design of economic model

predictive control systems for chemical processes.In addition to being mathematically rigorous, these methods accommodate key practical issues, for example, direct optimization of process economics, time-varying economic cost functions and computational efficiency. Numerous comments and remarks providing fundamental understanding of the merging of process economics and feedback control into a single framework are included. A control engineer can easily tailor the many detailed examples of industrial relevance given within the text to a specific application. The authors present a rich collection of new research topics and references to significant recent work making Economic Model Predictive Control an important source of information and inspiration for academics and graduate students researching the area and for process engineers interested in applying its ideas.

International Catalogue of Scientific Literature [1901-14].

In this text the new results on simulation and implementation of magnetic hysteresis to the numerical analysis of the electromagnetic field problems are summarized.

Reviews in Numerical Analysis, 1980-86

This book constitutes the refereed proceedings of the 22nd International Workshop on Computer Algebra in Scientific Computing, CASC 2020, held in Linz, Austria, in

September 2020. The conference was held virtually due to the COVID-19 pandemic. The 34 full papers presented together with 2 invited talks were carefully reviewed and selected from 41 submissions. They deal with cutting-edge research in all major disciplines of computer algebra. The papers cover topics such as polynomial algebra, symbolic and symbolic-numerical computation, applications of symbolic computation for investigating and solving ordinary differential equations, applications of CAS in the investigation and solution of celestial mechanics problems, and in mechanics, physics, and robotics.

Ordered Structures and Applications

Monthly Index of Russian Accessions

One-Dimensional Turbulence and the Stochastic Burgers Equation