

Systemes dynamiques et theorie ergodique

Objektyp: **Chapter**

Zeitschrift: **L'Enseignement Mathématique**

Band (Jahr): **48 (2002)**

Heft 3-4: **L'ENSEIGNEMENT MATHÉMATIQUE**

PDF erstellt am: **14.09.2024**

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(particularly important for numerical analysis schemes), parabolic equations, variational methods, and continuity methods. This book develops the main methods for obtaining estimates for solutions of elliptic equations: Sobolev space theory, weak and strong solutions, Schauder estimates, and Moser iteration. Connections between elliptic, parabolic, and hyperbolic equations are explored, as well as the connection with Brownian motion and semigroups. This book can be utilized for a one-year course on partial differential equations.

C. ROGERS, W.K. SCHIEF. — **Bäcklund and Darboux transformations: geometry and modern applications in soliton theory.** — Cambridge texts in applied mathematics. — Un vol. broché, 15×22,5, de xvii, 413 p. — ISBN 0-521-01288-0. — Prix: £24.95. — Cambridge University Press, Cambridge, 2002.

The authors explore the extensive body of literature from the nineteenth and early twentieth centuries by eminent geometers on transformations of privileged classes of surfaces which leave key geometric properties unchanged. Prominent amongst these are Bäcklund-Darboux transformations with their remarkable associated nonlinear superposition principles and importance in soliton theory. It is with these transformations and the links they afford between the classical differential geometry of surfaces and the nonlinear equations of soliton theory that the present text is concerned. In this geometric context, solitonic equations arise out of the Gauss-Mainardi-Codazzi equations for various types of surfaces that admit invariance under Bäcklund-Darboux transformations.

Hermann SOHR. — **The Navier-Stokes equations: an elementary functional analytic approach.** — Birkhäuser advanced texts. — Un vol. relié, 17×24, de x, 367 p. — ISBN 3-7643-6545-5. — Prix: SFr. 74.00. — Birkhäuser, Basel, 2001.

The primary objective of this monograph is to develop an elementary and self-contained approach to the mathematical theory of a viscous, incompressible fluid in a domain of the Euclidean space, described by the equations of Navier-Stokes. Moreover, the theory is presented for completely general domains, in particular, for arbitrary unbounded, nonsmooth domains. Therefore, restriction was necessary to space dimensions two and three, which are also the most significant from a physical point of view. For mathematical generality, however, the linearized theory is expounded for general dimensions higher than one. Although the functional analytic approach developed here is, in principle, known to specialists, the present book fills a gap in the literature by providing a systematic treatment of a subject that has been documented until now only in fragments.

Systemes dynamiques et théorie ergodique

J.M. BLACKLEDGE, A.K. EVANS, M.J. TURNER, (Editors). — **Fractal geometry: mathematical methods, algorithms, applications.** — Horwood Publishing series in mathematics and applications. — Un vol. relié, 16×24, de xii, 232 p. — ISBN 1-904275-00-1. — Prix: £40.00. — Horwood Publishing, Chichester, published on behalf of The Institute of Mathematics and its Applications, 2002.

International authorities from Canada, Denmark, England, Germany, Russia and South Africa focus on up-to-date research on fractal geometry and the best practices in software, theoretical mathematical algorithms, and analysis. — *Contents*: Chaotic dynamics in a simple aeromechanical system. — Random walks with fluctuating step number, scale invariant behaviour, and self-organised criticality. — Fractional integrals, singular measures and epsilon

functions. — Diffusion on fractals: efficient algorithms to compute the random walk dimension. — Why study financial time series? — Analysis of the limitations of fractal dimension texture segmentation for image characterisation. — Fractals basins of attraction in the inversion of gravity and magnetic data. — Properties of fractal compression and use in texture mapping. — Fractal time and nested detectors. — Deterministic chaos in digital cryptography. — The making of fractal geometry in digital imaging.

Janet Whalen KAMMEYER, Daniel J. RUDOLPH. — **Restricted orbit equivalence for actions of discrete amenable groups.** — Cambridge tracts in mathematics, vol. 146. — Un vol. relié, 15,5×23,5, de VI, 201 p. — ISBN 0-521-80795-6. — Prix: £35.00. — Cambridge University Press, Cambridge, 2002.

This monograph offers a broad investigative tool in ergodic theory and measurable dynamics. The motivation for this work is that one may measure how similar two dynamical systems are by asking how much the time structure of orbits of one system must be distorted for it to become the other. Different restrictions on the allowed distortion will lead to different restricted orbit equivalence theories. These include Ornstein's isomorphism theory, the Kakutani equivalence theory and a host of others. By putting such restrictions in an axiomatic framework, a general approach is developed that encompasses all these examples simultaneously and gives insight into how to seek further applications. The work is placed in the context of discrete amenable group actions where time is not required to be one-dimensional, making the results applicable to a much wider range of problems and examples.

Gabriel A. LOSA, Danilo MERLINI, Theo F. NONNENMACHER, Ewald R. WEIBEL, (Editors). — **Fractals in biology and medicine, vol. 3.** — Mathematics and biosciences in interaction. — Un vol. relié, 24×16,5, de VIII, 362 p. — ISBN 3-7643-6474-2. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2002.

This volume contains oral and poster presentations given at the third International Symposium on Fractals in Biology and Medicine held in Centro Seminariale Monte Verità, Ascona, Switzerland, from March 8-11, 2000. This *Volume III* in the MBI series highlights the growing power and efficacy of the fractal geometry in understanding how to analyze living phenomena and complex shapes. Many biological objects, previously considered as hopelessly far from any quantitative description, are now being investigated by means of fractal methods. Researchers currently used fractals both as theoretical tools, to shed light on living systems' self-organization and evolution, and as useful techniques, capable of quantitatively analyzing physiological and pathological cell states and ultrastructures.

E. SALINELLI, F. TOMARELLI. — **Modelli dinamici discreti.** — Unitext. — Un vol. broché, 15,5×23,5, de XIII, 353 p. — ISBN 88-470-0187-0. — Prix: €25.00. — Springer, Milano, 2002.

All'esame di un'ampia serie di esempi, modelli e motivazioni tratti dalla biologia, demografia, ingegneria ed economia, segue la presentazione degli strumenti per lo studio di sistemi dinamici scalari e non lineari, con particolare attenzione all'analisi della stabilità. Si studiano in dettaglio le equazioni alle differenze lineari e si fornisce una introduzione elementare alle trasformate discrete Z e DFT. Un capitolo è dedicato allo studio di biforcazioni e dinamiche caotiche. I sistemi dinamici vettoriali ad un passo e le applicazioni alle catene di Markov sono oggetto di due capitoli. L'aspetto innovativo della presentazione è quello di unificare il punto di vista modellistico con quello delle varie discipline che sviluppano metodi e tecniche: analisi matematica, algebra lineare, analisi numerica, teoria dei sistemi, calcolo delle probabilità.