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Kapitel: Analyse de Fourier, analyse harmonique abstraite

that the main features of analytic microlocal analysis are derived from a single and elementary a priori estimate. Various exercises illustrate the chief results of each chapter while introducing the reader to further developments of the theory. Applications to the study of the Schrödinger operator are also discussed, to further the understanding of new notions or general results by placing them in the context of quantum mechanics.

Graeme W. MILTON. — **The theory of composites.** — Cambridge monographs on applied and computational mathematics, vol. 6. — Un vol. relié, 25×18, de XXVIII, 719 p. — ISBN 0-521-78125-6. — Prix : £60.00. — Cambridge University Press, Cambridge, 2002.

The theory of composite materials is mathematically the study of partial differential equations with rapid oscillations in their coefficients. An explosion of ideas in the last four decades has dramatically increased our understanding of the relationship between the properties of the constituent materials, the underlying microstructure of a composite, and the overall effective moduli that govern the macroscopic behavior. This renaissance has been fueled by the technological need for improving our knowledge base of composites, by the advance of the underlying mathematical theory of homogenization, by the discovery of new variational principles, by the recognition of how important the subject is to solving structural optimization problems, and by the realization of the connection with the mathematical problem of quasiconvexification. This book surveys these exciting developments at the frontier of mathematics and presents many new results.

Systèmes dynamiques et théorie ergodique

Arno BERGER. — **Chaos and chance : an introduction to stochastic aspects of dynamics.** — De Gruyter textbook. — Un vol. relié, 18×25, de X, 245 p. — ISBN 3-11-016991-6. — Prix : € 49.95. — Walter de Gruyter, Berlin, 2001.

The book introduces the topologically oriented approach by discussing bifurcations, full and transient chaos, and symbolic dynamics. The statistical point of view is taken via ergodic and mixing properties, entropy, and a thorough discussion of the Frobenius-Perron operator. Markov chains serve as a means of bringing together both viewpoints, and basic concepts of the general dynamics of measures are presented as a concluding outlook. Theory is developed along a host of illustrative examples, with a few prominent examples like billiards serving as navigation beacons throughout. It is also by a number of challenging exercises that the interplay of chaos and chance will be experienced hands-on.

Équations aux différences finies, équations fonctionnelles

B.G. PACHPATTE. — **Inequalities for finite difference equations.** — Pure and applied mathematics, vol. 247. — Un vol. relié, 16×24, de VIII, 514 p. — ISBN 0-8247-0657-9. — Prix : US$ 195.00. — Marcel Dekker, New York, 2002.

Featuring more than 200 references, *Inequalities for Finite Difference Equations* introduces a variety of new finite difference inequalities... discusses perturbations... describes applications to various types of finite difference and sum-difference equations... focuses on stability of finite difference systems... considers inequalities involving iterated sums... examines basic multidimensional finite difference inequalities... identifies bounds on the solutions of difference equations... and more.

Analyse de Fourier, analyse harmonique abstraite

Lokenath DEBNATH. — **Wavelet transforms and their applications.** — Un vol. relié, 17×24, de XV, 565 p. — ISBN 0-8176-4204-8. — Prix : SFr. 158.00. — Birkhäuser, Boston, 2002.

This book presents a systematic exposition of the basic ideas and results of wavelet transforms and their applications in time-frequency signal analysis and turbulence. Wavelets allow

complex information such as music, speech, images and patterns to be decomposed into elementary forms and subsequently reconstructed with high precision. With an increased demand for mathematical tools to provide theory and applications for science and engineering, the interest in wavelet analysis is intense and pervasive in all disciplines. The major emphasis here is on the logical development of fundamental ideas and the systematic treatment of wavelet analysis and its applications to a wide variety of problems as encountered in various interdisciplinary areas.

Anton DEITMAR. — **A first course in harmonic analysis.** — Universitext. — Un vol. relié, 16×24, de XI, 151 p. — ISBN 0-387-95375-2. — Prix: € 44.95. — Springer, New York, 2002.

In contrast to other books on the topic, this work is entirely based on the Riemann integral and metric spaces instead of the more demanding Lebesgue integral and abstract topology. Nevertheless, almost all proofs are given in full and all central concepts are presented clearly. The first aim of this book is to provide an introduction to Fourier analysis, leading up to the Poisson summation formula. The second aim is to make the reader aware of the fact that both principal incarnations of Fourier theory, the Fourier series and the Fourier transform, are special cases of a more general theory arising in the context of locally compact Abelian groups. The third goal of this book is to introduce the reader to the techniques used in harmonic analysis of noncommutative groups. These techniques are explained in the context of matrix groups as a principal example.

Palle E.T. JORGENSEN. — **Ruelle operators: functions which are harmonic with respect to a transfer operator.** — Memoirs of the American Mathematical Society, no. 720. — Un vol. broché, 18×26, de VIII, 60 p. — ISBN 0-8218-2688-3. — Prix: £28.00. — American Mathematical Society, Providence RI, distributed by Oxford University Press, Oxford, 2001.

Contents: Introduction. – A discrete $ax+b$ group. – Proof of Theorem. – Wavelet filters. – Cocycle equivalence of filter functions. – The transfer operator of Keane. – A representation theorem for R-harmonic functions. – Signed solutions to $R(f)=f$. – Bibliography.

Analyse fonctionnelle

William ARVESON. — **A short course on spectral theory.** — Graduate texts in mathematics, vol. 209. — Un vol. relié, 16×24, de X, 135 p. — ISBN 0-387-95300-0. — Prix: € 49.95. — Springer, New York, 2002.

This book presents the basic tools of modern analysis within the context of the fundamental problem of operator theory: to calculate spectra of specific operators on infinite dimensional spaces, especially operators on Hilbert spaces. The tools are diverse, and they provide the basis for more refined methods that allow one to approach problems that go well beyond the computation of spectra: the mathematical foundations of quantum physics, noncommutative K-theory, and the classification of simple C*-algebras being three areas of current research activity which require mastery of the material presented here.

Ward CHENEY. — **Analysis for applied mathematics.** — Graduate texts in mathematics, vol. 208. — Un vol. relié, 16×24, de VIII, 444 p. — ISBN 0-387-95279-9. — Prix: € 54.95. — Springer, New York, 2001.

The book begins with a gentle introduction to normed linear spaces and Hilbert spaces, taking the reader as far as the Spectral Theorem for compact normal operators on a Hilbert space. Next, the book treats various practical methods for solving problems that arise in applied mathematics, such as differential equations, boundary value problems, and integral equations. To prepare the reader for work in the modern theory of partial differential equations, the subject of distributions is taken up next. A chapter on the Fourier transform and its applications follows,