most recent developments in complex analysis related to PDE techniques and differential geometry. CR structures and the Bergman kernel are discussed in several articles. Some authors pursue the implications of these and other topics in diverse fields, ranging from algebraic geometry to theoretical physics.

Michael SCHNEIDER, Yum-Tong SIU, (Editors). — **Several complex variables.** — Mathematical Sciences Research Institute Publications, vol. 37. — Un vol. relié, 16,5×24, de XII, 564 p. — ISBN 0-521-77086-6. — Prix : £40.00. — Cambridge University Press, Cambridge, 1999.

Several complex variables is a central area of mathematics with strong interactions with partial differential equations, algebraic geometry, number theory, and differential geometry. The 1995-96 MSRI program on several complex variables emphasized these interactions and concentrated on developments and problems of current interest that capitalize on this interplay of ideas and techniques. The collection provides a remarkably clear and complete picture of the status of research in these overlapping areas and will provide a basis for significant continued contributions from researchers. Several of the articles are expository or have extensive expository sections, making this an excellent introduction for students to the use of techniques from these other areas in several complex variables.

Equations différentielles ordinaires

Ravi P. AGARWAL, Donal O'REGAN and Patricia J.Y. WONG. — **Positive solutions of differential, difference and integral equations.** — Un vol. relié, 16,5×24,5, de XI, 416 p. — ISBN 0-7923-5510-5. — Prix : Dfl. 350.00. — Kluwer Academic Publishers, Dordrecht, 1999.

In analysing nonlinear phenomena many mathematical models give rise to problems for which only nonnegative solutions make sense. In the last few years this discipline has grown dramatically. This state-of-art volume offers the authors' recent work, reflecting some of the major advances in the field as well as the diversity of the subject. This volume will be of interest to graduate students and researchers in mathematical analysis and its applications, whose work involves ordinary differential equations, finite differences and integral equations.

S. ALBEVERIO and P. KURASOV. — **Singular perturbations of differential operators: solvable Schrödinger type operators.** — London Mathematical Society lecture note series, vol. 271. — Un vol. broché, 15×23, de XIV, 429 p. — ISBN 0-521-77912-X. — Prix : £29.95. — Cambridge University Press, Cambridge, 2000.

Differential (and more general self-adjoint) operators involving singular interactions arise naturally in a range of topics such as classical and quantum physics, chemistry and electronics. This book presents a systematic mathematical study of these operators, with particular emphasis on spectral and scattering problems. Suitable for researchers in analysis or mathematical physics, this book could also be used as a text for an advanced course on the applications of analysis.

Equations aux dérivées partielles

Demetrios CHRISTODOULOU. — **The action principle and partial differential equations.** — Annals of mathematics studies, vol. 146. —Un vol. broché, 15×23,5, de VIII, 319 p. — ISBN 0-691-04967-2. — Prix : US$24.00, (relié: US$89.50). — Princeton University Press, Princeton N.J., 2000.

This book introduces new methods in the theory of partial differential equations derivable from a Lagrangian. These methods constitute, in part, an extension to partial differential

equations of the methods of symplectic geometry and Hamilton-Jacobi theory for Lagrangian systems of ordinary differential equations. A distinguishing characteristic of this approach is that one considers, at once, entire families of solutions of the Euler-Lagrange equations, rather than restricting attention to single solution at a time. The second part of the book develops a general theory of integral identities, the theory of "compatible currents", which extends the work of E. Noether. Finally, the third part introduces a new general definition of hyperbolicity, based on a quadratic form associated with the Lagrangian, which overcomes the obstacles arising from singularities of the characteristic variety that were encountered in previous approaches. The last chapter is devoted to the electrodynamics of nonlinear continuous media.

Bernard DACOROGNA, Paolo MARCELLINI. — **Implicit partial differential equations.** — Progress in nonlinear differential equations and their applications, vol. 37. — Un vol. relié, 16×24, de XII, 273 p. — ISBN 0-8176-4121-1. — Prix: SFr. 108.00. — Birkhäuser, Boston, 1999.

This book is devoted to a large class of partial differential equations and systems which are nonlinear in the highest derivatives. The authors present a new functional analytic method based on the Baire category theorem for handling the existence of almost everywhere solutions of these equations. Comparison with other methods is discussed: essentially that of viscosity solutions, but also briefly that of convex integration. Results obtained by this new method have important applications to the calculus of variations, geometry, nonlinear elasticity, problems of phase transitions and optimal design.

Martin FLUCHER. — **Variational problems with concentration.** — Progress in nonlinear differential equations and their applications, vol. 36. — Un vol. relié, 16×24, de VIII, 163 p. — ISBN 3-7643-6136-0. — Prix: SFr. 128.00. — Birkhäuser, Basel, 1999.

The subject of this research monograph is semilinear Dirichlet problems and similar equations involving the p-Laplacian. First it is shown that in the low-energy limit the Dirichlet energy concentrates at a single point in the domain. This behavior is typical of a large class of nonlinearities known as zero mass case. The sound analysis of the zero mass case is novel and complementary to the majority of research articles dealing with the positive mass case. To the reader's benefit, the presentation is self-contained and new techniques are explained in detail. Bernoulli's free-boundary problem and the plasma problem are the principal applications to which the theory is applied. The author derives several numerical methods approximating the concentration point and the free boundary.

T. MIWA, M. JIMBO, E. DATE. — **Solitons: differential equations, symmetries and infinite dimensional algebras.** — Translated by Miles Reid. — Cambridge tracts in mathematics, vol. 135. — Un vol. relié, 16×23,5, de IX, 108 p. — ISBN 0-521-56161-2. — Prix: £25.00. — Cambridge University Press, Cambridge, 2000.

The goal of this book is to investigate the high degree of symmetry that lies hidden in integrable systems. To that end, differential equations arising from classical mechanics, such as the KdV equation and the KP equations, are used here by the authors to introduce the notion of an infinite dimensional transformation group acting on spaces of integrable systems. The work of M. Sato on the algebraic structure of completely integrable systems is discussed, together with developments of these ideas in the work of M. Kashiwara. This book should be accessible to anyone with a knowledge of differential and integral calculus and elementary complex analysis, and it will be a valuable resource to the novice and expert alike.

Denis SERRE. — **Systems of conservation laws 2: geometric structures, oscillations, and initial-boundary value problems.** — Translated by I.N. Sneddon. — Un vol. relié, 18×25,5, de XI, 269 p. — ISBN 0-521-63330-3. — Prix: £45.00. — Cambridge University Press, Cambridge, 2000.

This book sets up the foundations of the modern theory of conservation laws describing the physical models and mathematical methods, leading to the Glimm scheme. The author studies in detail viscous approximations, paying special attention to viscous profiles of shock waves. The maximum principle is considered from the viewpoint of numerical schemes and also in terms of viscous approximation, whose convergence is studied using the technique of compensated compactness. Small waves are studied using geometrical optics methods. Finally, the initial-boundary problem is considered in depth. Throughout the presentation is reasonably self-contained, with large numbers of exercises and full discussion of all the ideas.

Systèmes dynamiques et théorie ergodique

S. MOROSAWA, Y. NISHIMURA, M. TANIGUCHI, T. UEDA. — **Holomorphic dynamics.** — Cambridge studies in advanced mathematics, vol. 66. — Un vol. relié, 16×23,5, de XI, 338 p. — ISBN 0-521-66258-3. — Prix: £45.00. — Cambridge University Press, Cambridge, 2000.

This is a comprehensive introduction to holomorphic dynamics, that is the dynamics induced by the iteration of various analytic maps in complex number spaces. This has been the focus of much attention in recent years, with, for example, the discovery of the Mandelbrot set, and work on chaotic behavior of quadratic maps. The treatment is mathematically unified, emphasizing the substantial role played by classical complex analysis in understanding holomorphic dynamics as well as giving an up-to-date coverage of the modern theory. The authors cover entire functions, Kleinian groups and polynomial automorphisms of several complex variables such as complex Hénon maps, as well as the case of rational functions.

Analyse de Fourier, analyse harmonique abstraite

George BACHMAN, Lawrence NARICI, Edward BECKENSTEIN. — **Fourier and wavelet analysis.** — Universitext. — Un vol. relié, 16,5×24,5, de IX, 505 p. — ISBN 0-387-98899-8. — Prix: DM 119.00. — Springer, New York, 2000.

This book is intended as an introduction to classical Fourier analysis, Fourier series, and the Fourier transform. The topics are developed slowly for the reader who has never seen them before, with a preference for clarity of exposition in stating and proving results. More recent developments, such as the discrete and fast Fourier transforms and wavelets, are covered in the last two chapters. The first three, short, chapters present requisite background material, and these could be read as a short course in functional analysis. The text includes many historical notes to place the material in a cultural and mathematical context.

J.C. VAN DEN BERG. — **Wavelets in physics.** — Un vol. relié, 18,5×25,5 de XXII, 453 p. — Prix: £60.00. — ISBN 0-521-59311-5. — Cambridge University Press, Cambridge, 1999.

This book surveys the application of the recently developed technique of the wavelet transform to a wide range of physical fields, including astrophysics, turbulence, meteorology, plasma physics, atomic and solid state physics, multifractals occurring in physics, biophysics and mathematical physics. New wavelets are being invented regularly, and the researcher can now pick and choose from a steadily growing stock. Each type of wavelet supplies its own kind of "mathematical microscope", the magnification of which can be adjusted at will. The book shows how this new tool can be used not only to refine and speed up previously existing methods, but also to explore new territory.