

# Equations différentielles ordinaires

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with respect to various families of holomorphic functions. Therefore, there is emphasis on a detailed presentation of holomorphic convexity and pseudoconvexity of Riemann domains over  $\mathbb{C}^n$ . Our interest in this area of complex analysis started directly after our studies when both of us were interested in continuation of holomorphic functions. During the years we got the impression that there is a need to have a source where the main results could be found. We hope this book can serve as such a source. The choice of topics obviously reflects our personal preferences. Most of the results have not yet been published in book form. The text will be of interest both to students and experts.

### *Fonctions spéciales*

George E. ANDREWS, Richard ASKEY, Ranjan ROY. — **Special functions.** — Encyclopedia of mathematics and its applications, vol. 71. — Un vol. broché,  $16,5 \times 23,5$ , de xvi, 661 p. — ISBN 0-521-78988-5 (relié: 0-521-62321-9). — Prix: £22.95 (relié: £60.00). — Cambridge University press, Cambridge, 2001.

This book presents an overview of special functions, focusing primarily on hypergeometric functions and the associated hypergeometric series, including Bessel functions and classical orthogonal polynomials. The basic building block of the functions studied in this book is the gamma function. In addition to relatively new work on gamma and beta functions, such as Selberg's multidimensional integrals, a number of important but relatively unknown nineteenth century results are included. The authors discuss Wilson's beta integral and the associated orthogonal polynomials. Some  $q$ -extensions of beta integrals and of hypergeometric series are presented with Bailey chains employed to derive some results. An introduction to spherical harmonics and applications of special functions to combinatorial problems are included. The book also deals with finite field versions of some beta integrals.

Charles F. DUNKL, Yuan XU. — **Orthogonal polynomials of several variables.** — Encyclopedia of mathematics and its applications, vol. 81. — Un vol. relié,  $16 \times 24$ , de xv, 390 p. — ISBN 0-521-80043-9. — Prix: £55.00. — Cambridge University Press, Cambridge, 2001.

This is the first modern book on orthogonal polynomials of several variables, which are interesting both as objects of study and as tools used in multivariate analysis, including approximations and numerical integration. The book, which is intended both as an introduction to the subject and as a reference, presents the theory in elegant form and with modern concepts and notation. It introduces the general theory and emphasizes the classical types of orthogonal polynomials whose weight functions are supported on standard domains such as the cube, the simplex, the sphere and the ball, or those of Gaussian type, for which fairly explicit formulae exist. The approach is a blend of classical analysis and symmetry-group-theoretic methods.

### *Equations différentielles ordinaires*

Jon H. DAVIS. — **Differential equations with Maple: an interactive approach.** — Un vol. relié,  $16,5 \times 24$ , de xiv, 409 p. + 1 CD-ROM. — ISBN 0-8176-4181-5. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2001.

What this book offers: coverage of all essential topics, including some classical ones not generally found in differential equations courses at this level. Discussion of all standard solutions methods; numerous graphical interpretations of solutions. A careful introduction to MAPLE fundamentals; students become familiar with MAPLE commands to simplify calculations, solve difficult problems, and experience MAPLE's power as a research tool. An

examination of topics that are important, but often inaccessible without the aid of a symbolic computation package such as MAPLE. Ample problems; those requiring MAPLE are indicated within boxes throughout each chapter, while non-MAPLE problems are presented at the end of each chapter. “Harder” Maple programming projects in Part II; MAPLE becomes a research tool and programming vehicle to solve challenging problems. Cross-platform CD-ROM with extensive Maple code; worksheets and additional related material also downloadable from Birkhäuser and author’s websites.

M.R. GROSSINHO, M. RAMOS, C. REBELO, L. SANCHEZ, (Editors). — **Nonlinear analysis and its applications to differential equations**. — Progress in nonlinear differential equations and their applications, vol. 43. — Un vol. relié, 16×24, de XIII, 380 p. — ISBN 0-8176-4188-2. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2001.

The material is largely an outgrowth of autumn school courses and seminars held at the University of Lisbon and has been thoroughly refereed. Several topics in ordinary differential equations and partial differential equations are the focus of key articles, including: periodic solutions of systems with p-Laplacian type operators (J. Mawhin), bifurcation in variational inequalities (K. Schmitt), a geometric approach to dynamical systems in the plane via twist theorems (R. Ortega), asymptotic behavior and periodic solutions for Navier-Stokes equations (E. Feireisl), mechanics on Riemannian manifolds (W. Oliva), techniques of lower and upper solutions for ODEs (C. De Coster and P. Habets). A number of related subjects dealing with properties of solutions, e.g., bifurcations, symmetries, nonlinear oscillations, are treated in other articles.

### *Equations aux dérivées partielles*

J. BILLINGHAM, A.C. KING. — **Wave motion**. — Cambridge texts in applied mathematics. — Un vol broché, 15×23, de IX, 468 p. — ISBN 0-521-63450-4 (relié: 0-521-63257-9). — Prix: £24.95 (relié: £70.00). — Cambridge University Press, Cambridge, 2000.

This introduction to the mathematics of wave phenomena is aimed at advanced undergraduate courses on waves for mathematicians, physicists or engineers. Some more advanced material on linear and nonlinear waves is also included. The authors assume some familiarity with partial differential equations, integral transforms and asymptotic expansions as well as an acquaintance with fluid mechanics, elasticity and electromagnetism. The context and physics that underlie the mathematics are clearly explained at the beginning of each chapter. Worked examples and exercises are supplied throughout, with solutions available to teachers.

Michel CHIPOT. — **Elements of nonlinear analysis**. — Birkhäuser advanced texts, Basler Lehrbücher. — Un vol. relié, 17,5×24, de VI, 256 p. — ISBN 3-7643-6406-8. — Prix: SFr. 78.00. — Birkhäuser, Basel, 2000.

This textbook explores the vast field of nonlinear analysis by emphasizing the underlying ideas rather than the sophisticated refinements of the theory. Two classical examples from physics, namely elasticity and diffusion, serve to motivate the theoretical parts that are then applied to various aspects of elliptic and parabolic problems. In particular, existence, uniqueness, regularity and approximation of solutions for quasilinear and monotone problems are studied, as well as some new aspects of the calculus of variations including Young measures or approximation of minimizing sequences. The book is reasonably self-contained. Wherever possible, original proofs are given that are not to be found elsewhere. The text is geared towards graduate students and non-specialists in nonlinear analysis who wish to become acquainted with the basic ideas of the subject. The study of this book will enable the reader to access the many ramifications of the field.