Zeitschrift: L'Enseignement Mathématique
Band: 47 (2001)
Heft: 1-2: L'ENSEIGNEMENT MATHÉMATIQUE

Rubrik: BULLETIN BIBLIOGRAPHIQUE

Extrait de *L'Enseignement Mathématique*, t. 47, fasc. 1-2, 2001

BULLETIN BIBLIOGRAPHIQUE

Généralités

Donald C. BENSON. — **The moment of proof: mathematical epiphanies.** — Un vol. broché, 19×23,5, de 331 p. — ISBN 0-19-513919-4. — Prix: £9.99. — Oxford University Press, Oxford, 2001.

In a brilliant introduction to the pleasures of mathematical thinking, Donald Benson acquaints us with the world of mathematical puzzles, answering these and many other fascinating questions. The book is chock-full of intriguing conundrums-including Loyd's fifteen puzzle, the Petersburg paradox, the Chaos game, the Monty Hall problem, the Prisoner's dilemma, and many mathematical curiosities. We are even introduced to Russian peasant multiplication-a bizarre way to multiply numbers that actually works. But most important, Benson takes us step-by-step through these mathematical wonders, leading us to arrive at the solution much the way a working scientist would, and with much the same feeling of surprise.

Erwin R. BERLEKAMP, John H. CONWAY, Richard K. GUY. — **Winning ways for your mathematical plays, vol. 1.** — Second edition. — Un vol. broché, 19×24, de XIX, 276 p. — ISBN 1-56881-130-6. — Prix: US$49.95. — A.K. Peters, Natick, 2001.

Since its original publication a quarter-century ago, the book has set the stage for the mathematical analysis of game theories and has become the definitive work in the area. This second edition features careful corrections and delightful additions, both in the text and in the "Extras" section at the end of each chapter. In this first volume, the authors do the Spade-Work, presenting theories and techniques to "dissect" games of varied structures and formats in order to develop winning strategies. Their focus is on "adding games", including Nim, Hackenbush, and Kayles. The inclusion of many examples helps the reader to put the mathematical analysis to immediate use.

Armand BOREL. — **Œuvres = Collected papers, vol. 4: 1983-1999.** — Un vol. relié, 18×25, de X, 718 p. — ISBN 3-540-67640-6. — Prix: DM 249.00. — Springer, Berlin, 2001.

This volume contains the papers published by A. Borel from 1983 to 1999. About half of them are research papers, written singly or in collaboration, on various topics pertaining mainly to algebraic or Lie groups, homogeneous spaces, arithmetic groups (L^2-spectrum, automorphic forms, cohomology and covolumes), L^2-cohomology of symmetric or locally symmetric spaces, and to the Oppenheim conjecture. Other publications include some surveys, some personal recollections (of D. Montgomery, Harish-Chandra, A. Weil), some considerations on mathematics in general and several articles of a historical nature: on the School of Mathematics at the

Institute for Advanced Study, on N. Bourbaki and on parts of the works of H. Weyl, C. Chevalley, E. Kolchin, J. Leray, A. Weil. The volume concludes with an essay on H. Poincaré and special relativity. Some comments on, and corrections to, a number of papers have been added.

Pascal DUPONT. — **Exercices de mathématiques pour le premier cycle, vol. 1: Algèbre et géométrie.** — Bibliothèque des universités, mathématiques. — Un vol. broché, 18,5×25, de 477 p. — ISBN 2-8041-3465-2. — Prix: BEF 1390.00. — De Boeck Université, Bruxelles, 2000.

Chaque section de l'ouvrage commence par des rappels de théorie présentant l'ensemble des notions et des techniques à mettre en œuvre pour traiter les exercices. Ils sont suivis d'un exemple résolu en détail. La réponse aux différents exercices est fournie en fin de volume. Ce premier volume contient les chapitres algébriques et géométriques : nombres complexes, espaces vectoriels, calcul matriciel, systèmes linéaires, diagonalisation des matrices; calcul vectoriel dans l'espace; systèmes de coordonnées planes et spatiales, droites dans le plan, droites et plans dans l'espace, coniques, quadriques. En outre, le premier volume commence par un chapitre de rappels qui fait le point sur les matières supposées acquises au sortir de l'enseignement secondaire.

Pascal DUPONT. — **Exercices de mathématiques pour le premier cycle, vol. 2: Analyse.** — Bibliothèque des universités, mathématiques. — Un vol broché, 18,5×25, de 513 p. — ISBN 2-8041-3466-0. — Prix: BEF 1390.00. — De Boeck Université, Bruxelles, 2000.

Comme pour le premier volume de cet ouvrage, chaque section commence par des rappels de théorie présentant l'ensemble des notions et des techniques à mettre en œuvre pour traiter les exercices. Ils sont suivis d'un exemple résolu en détail. La réponse aux différents exercices est fournie en fin de volume. Le second volume est consacré à l'analyse mathématique: limites; calcul différentiel à une et à plusieurs variables et ses applications: primitives, intégrales définies, intégrales impropres, intégrales multiples; géométrie différentielle des courbes, champs scalaires et vectoriels, opérateurs différentiels, intégrales curvilignes et de surface; séries numériques, séries de fonctions; équations différentielles du premier et du second ordre.

Björn ENGQUIST, Wilfried SCHMID, (Editors). — **Mathematics unlimited - 2001 and beyond** — Un vol. relié, de 21×25, de XV, 1237 p. — ISBN 3-540-66913-2 — Prix: DM 79.00. — Springer, Berlin, 2001.

This is a book guaranteed to delight the reader. It not only depicts the state of mathematics at the end of the century, but is also full of remarkable insights into its future development as we enter a new millennium. True to its title, the book extends beyond the spectrum of mathematics to include contributions from other related sciences. You will enjoy reading the many stimulating contributions and gain insights into the astounding progress of mathematics and the perspectives for its future. *From the contents:* Antman, S.: Nonlinear continuum physics. — Babuska, I./Tinsley Oden, J.: Computational mechanics: where is it going? — Bailey, D.H./Borwein J.M.: Experimental mathematics: recent developments and future outlook. — Darmon, H.: p-adic L-functions. — Faltings, G.: Diophantine equations. — Farin, G.: SHAPE. — Jorgensen, J./Lang, S.: The heat kernel all over the place. — Klüppelberg, C.: Developments in insurance mathematics. — Koblitz, N.: Cryptography. — Marsden, J./Cendra, H./Ratiu, T.: Geometric mechanics, Lagrangian reduction and nonholonomic systems. — Roy, M.-F.: Four problems in real algebraic geometry. — Serre, D.: Systems of conservation laws: a challenge for the XXIst Century. — Spencer, J.: Discrete probability. — Van der Geer, G.: Error correcting

codes and curves over finite fields. — von Storch, H./von Storch, J.-S., and Müller, P.: Noise in climate models ... and many more.

Daniel FREDON. — **Mathématiques: aide-mémoire.** — Sciences Sup. Série Aide-mémoire. — Un vol. broché, 13×18, de VI, 330 p. — ISBN 2-10-005144-X. — Dunod, Paris, 2001.

Cet aide-mémoire est principalement destiné aux étudiants de 1er cycle universitaire scientifique et aux élèves de classes préparatoires, mais peut aussi s'adresser à un plus large public. Complet, il regroupe sous forme condensée plus de 1000 définitions, formules et résultats du programme d'analyse, d'algèbre et de géométrie; pratique, il permet grâce à sa table des matières et son index de retrouver facilement les éléments utiles à la résolution d'un problème. Des remarques, mises en garde et conseils insérés dans le texte contribuent à faire de cet ouvrage un outil de travail indispensable.

E. HAIRER, G. WANNER. — **L'analyse au fil de l'histoire.** — SCOPOS Bibliothèque, vol. 10. — Un vol. broché, 15,5×23,5, de X, 371 p. — ISBN 3-540-67463-2. — Prix: DM 79.00. — Springer, Berlin, 2001.

Cet ouvrage traite les théorèmes fondamentaux de l'analyse (convergence, continuité, calcul différentiel et intégral à une et plusieurs variables) avec grand soin pédagogique, une centaine de dessins, d'exemples et de contre-exemples. Pour une meilleure compréhension du sujet, il commence avec des calculs anciens de problèmes géométriques et mécaniques, qui ont conduit aux séries infinies, dérivées, intégrales, équations différentielles. Ainsi ce volume nous fait découvrir «l'analyse au fil de l'histoire». Ce texte est truffé de remarques historiques et de commentaires explicitant la motivation profonde des développements. Ce livre sera donc naturellement utile aux étudiants en premier cycle à l'Université et en classes préparatoires, mais aussi aux candidats au concours de recrutement d'enseignants, sans oublier tous ceux qui veulent s'instruire ou enseigner l'analyse.

Naïla HAYEK, Jean-Pierre LECA. — **Mathématiques pour l'économie: analyse-algèbre.** — Eco Sup. Manuel et exercices corrigés. — Un vol. broché, 15,5×24, de VII, 367 p. — ISBN 2-10-003830-3. — Prix: FF 168.00. — Dunod, Paris, 2001.

Loin des débats sans fin sur la légitimité des mathématiques dans les cursus d'économie, les auteurs souhaitent redonner toute sa place à une matière indispensable pour comprendre les modèles formalisés de l'économie. Pour ce faire, quatre grandes étapes jalonnent dans cet ouvrage le chemin de la compréhension: l'écriture (le sens des mots, la définition rigoureuse des objets mathématiques), le raisonnement, la démonstration, le calcul. Pour mieux saisir le sens et concevoir la démarche mathématique, le lecteur trouvera des points méthode tout le long de l'ouvrage, et des exercices corrigés qui lui permettront de s'entraîner.

Siegfried S. HECKER, Gian-Carlo ROTA, (Editors). — **Essays on the future: in honor of Nick Metropolis.** — Un vol. relié, 16×24, de XVI, 276 p. — ISBN 0-8176-3856-3. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2000.

This collection represents a unique undertaking in scientific publishing to honor Nick Metropolis. Nick was the last survivor of the World War II Manhattan Project in Los Alamos, and was an important member of the Los Alamos National Laboratory until his death in 1999. In this volume, some of leading scientists and humanists of our time have contributed essays related to their respective disciplines, exploring various aspects of future developments in science and society, philosophy, national security, nuclear power, pure and applied mathematics, physics and biology, particle physics, computing, and information science.

Günter LUMER, Lutz WEIS, (Editors). — **Evolution equations and their applications in physical and life sciences.** — Proceedings of the Bad Herrenalb (Karlsruhe), Germany, conference. — Pure and applied mathematics, vol. 215. — Un vol. broché, 18×25, de XII, 511 p. — ISBN 0-8247-9010-3. — Prix: US$195.00. — Marcel Dekker, New York, 2001.

With over 2850 references and mathematical expressions, this book covers asymptotics in linear and non linear systems... maximal regularity for parabolic equations... chemical reactor theory... disease transport models... Gaussian estimates... superluminal effects in classical physics... pseudo-differential operators and boundary value problems... Feynman integrals for Liouville evolutions... dispersive waves... blow-up and singular interaction... fractional evolution equations... controllability... vector-valued Orenstein-Uhlenbeck processes... stochastic analysis of dissipative gradient equations... and more.

Jean-Marie MONIER. — **Algèbre 2: cours et 500 exercices corrigés, 2e année MP, PSI, PC, PT.** — 3e édition. — J'intègre. — Un vol. broché, 19,5×27, de XI, 404 p. — ISBN 2-10-004915-1. — Prix: FF 180.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Compléments d'algèbre linéaire: Dualité. Blocs. Suites et séries de matrices. — Réduction des endomorphismes et des matrices carrées (1er niveau): Eléments propres. Polynôme caractéristique. Diagonalisabilité. Polynômes d'endomorphismes, polynômes de matrices. Applications de la diagonalisation. — Réduction (2e niveau): Trigonalisation. Polynômes annulateurs. Décomposition de Dunford. Réduction de Jordan. — Algèbre bilinéaire (1er et 2e niveaux): Formes bilinéaires symétriques, formes quadratiques. Rappels sur les espaces euclidiens. Endomorphismes remarquables d'un espace vectoriel euclidien. Réduction des matrices symétriques réelles. Adjoint. — Algèbre sesquilinéaire: Formes sesquilinéaire. Espaces hermitiens. Adjoint. Endomorphismes remarquables d'un espace hermitien. Réduction des matrices hermitiennes. — Compléments d'algèbre générale: Groupes. Anneaux. — Indications et réponses des exercices

Paul NAHIN. — **Duelling idiots and other probability puzzlers** —Un vol. relié, 14,5×22,5, de XII, 269 p. — ISBN 0-691-00979-1. — Prix: US$24.95. — Princeton University Press, Princeton, N.J., 2000.

Lots of people enjoy math and of those who don't, many appreciate a math problem with a lot of words. This book presents the very best of original probability posers: the entertaining (what are the chances you will win the lottery?), the elucidating (what are the odds it will snow on your birthday in any given year?), the invaluable (how likely is it the underdog will win the World Series?) — all involving serious math in an amusing way. The twenty-one problems challenge us to think creatively about chance, and if one problem seems to hard to crack, just check the detailed — and often surprising — solutions offered at the back of the book.

Claudine RUGET, (Editor). — **Mathématiques en situation: issues de l'épreuve de modélisation de l'agrégation.** — Scopos, vol. 11. — Un vol. broché, 15,5×23,5, de VIII, 186 p. — ISBN 3-540-41279-4. — Prix: DM 49.00. — Springer, Berlin, 2001.

L'ouvrage est un recueil de textes qui ont été proposés lors des sessions 1999 et 2000 aux candidats à l'agrégation de mathématiques, à l'épreuve orale de modélisation. C'est un ouvrage collectif auquel ont participé tous les membres du jury de cette épreuve. Les textes, qui donnent des exemples de mathématiques en situation, se situent dans le champ des thèmes au programme pour les sessions évoquées, «dynamique des populations», «cinétique chimique», «géométrie», «contrôle de qualité, fiabilité». Le but est d'une part d'aider les candidats à l'agrégation de

mathématiques à mieux se préparer, et d'autre part, de fournir un certain nombre d'exemples aux professeurs du Secondaire comme à tous ceux qui ont reçu une formation scientifique.

Histoire

Anita BURDMAN FEFERMAN. — **From Trotsky to Gödel: the life of Jean van Heijenoort.** — Un vol. broché, 14,5×22,5, de XV, 415 p. — ISBN 1-56881-148-9. — Prix: US$24.95. — A.K. Peters, Natick, Mass., 1993.

This biography relates the story of Jean van Heijenoort who, as a promising French student, delayed his studies to become a follower of and companion to Leon Trotsky in the 1930s. After acting as an involved player in the theatre of world politics during Trotsky's life, van Heijenoort returned to a scholarly life several years after Trotsky's assassination. Throwing himself wholeheartedly into the world of mathematics, he became a professor, first at NYU and then at Columbia and Brandeis universities, and achieved world renown as a historian of mathematical logic.

Jeremy J. GRAY. — **The Hilbert challenge.** — Un vol. relié, 14,5×22,5, de XII, 315 p. — ISBN 0-19-850651-1. — Prix: £20.00. — Oxford University Press, Oxford, 2000.

In 1900, David Hilbert posed a set of 23 unsolved mathematical problems, thus setting an agenda for mathematics that lasted throughout the 20th Century. Some, like Fermat's last theorem, have now been solved; others, such as the Riemann hypothesis, continue to challenge the best mathematical brains of our time. This book addresses the nature of Hilbert and his problems, and their significance for the progress of mathematics in our time. A hundred years on, it is timely to take a fresh look at the problems, the man who set them, and the reasons for their lasting impact on mathematics. The book is written in a clear and lively manner and will appeal both to the general reader with an interest in mathematics and to mathematicians themselves.

A.N. KOLMOGOROV, A.P. YUSHKEVICH, (Editors). — **Mathematics of the 19th century: mathematical logic, algebra, number theory, probability theory.** — Second revised edition. — Un vol. broché, 17×24, de XIV, 308 p. — ISBN 3-7643-6442-4. — Prix: SFr. 58.00. — Birkhäuser, Basel, 2001.

This is the second revised edition of the first volume of the outstanding collection of historical studies of mathematics in the nineteenth century compiled in three volumes by A.N. Kolmogorov and A.P. Yushkevich. Beginning in the second quarter of the nineteenth century mathematics underwent a revolution as crucial and profound in its consequences for the general world outlook as the mathematical revolution in the beginning of the modern area. The main changes included a new statement of the problem of the existence of mathematical objects, particularly in the calculus, and soon thereafter the formation of non-standard structures in geometry, arithmetic and algebra.

George M. PHILLIPS. — **Two millennia of mathematics: from Archimedes to Gauss.** — CMS books in mathematics = Ouvrages de mathématiques de la SMC. — Un vol. relié, 16,5×24, de XII, 223 p. — ISBN 0-387-95022-2. — Prix: DM 98.00. — Springer, New York, 2000.

This book is a collection of interconnected topics in areas of mathematics that particularly interest the author ranging over the two millennia from the work of Archimedes, who died in the year 212 B.C., to the "Werke" of Gauss, who was born in 1777. The book is intended for those who love mathematics, including undergraduate students of mathematics, more experienced

students, and the vast unseen host of amateur mathematicians. It will be a useful source of material for those who teach mathematics. — *Contents:* From Archimedes to Gauss. — Logarithms. — Interpolation. — Continued fractions. — More number theory.

Laurent SCHWARTZ. — **A mathematician grappling with his century**. — Un vol. broché, 17×24, de VIII, 490 p. — ISBN 3-7643-6052-6. — Prix: SFr. 58.00. — Birkhäuser, Basel, 2001.

Laurent Schwartz is one of the most remarkable intellects of the 20th century. His discovery of distributions, one of the most beautiful theories in mathematics, earned him a 1950 Fields Medal. Beyond this formidable achievement, his love for science and for teaching led him to think deeply and lecture broadly to the general public on the significance of science and mathematics to the well-being of the world. At the same time, his commitment to the social good, even at the expense of his beloved research, proved a moral compass throughout his life. The fight for human rights and his major role in the battle against the wars in Algeria and Vietnam were typical of matters close to his heart. The story of his life in the context of his century provides for future generations an inspiring testimonial from an extraordinary mathematician and thinker.

Erhard SCHOLZ, (Editor). — **Hermann Weyl's *Raum - Zeit - Materie* and a general introduction to his scientific work.** — With contributions by Robert Coleman and Herbert Korté, Hubert Goenner, Erhard Scholz, Skúli Sigurdsson, Norbert Straumann. — DMV Seminar, Band 30. — Un vol. broché, 17×24, de VI, 403 p. — ISBN 3-7643-6476-9. — Prix: SFr. 68.00. — Birkhäuser, Basel, 2001.

The contributions in the first part of this volume discuss Weyl's deep involvement in relativity, cosmology and matter theories between the classical unified field theories and quantum physics from the perspective of a creative mind struggling against theories of nature restricted by the view of classical determinism. In the second part of this volume, a broad and detailed introduction is given to Weyl's work in the mathematical and physical interests: real analysis, complex function theory and Riemann surfaces, elementary ergodic theory, foundations of mathematics, differential geometry, general relativity, Lie groups, quantum mechanics, and number theory.

Alain SCHÄRLIG. — **Compter avec des cailloux: le calcul élémentaire sur l'abaque chez les anciens Grecs.** — Un vol. broché, 16×24, de 339 p. — ISBN 2-88074-453-9. — Prix: SFr. 58.00. — Presses polytechniques et universitaires romandes, Lausanne, 2001.

Lorsqu'on n'aime pas calculer par écrit, de nos jours, on utilise une calculette électronique. Les anciens Grecs pouvaient calculer par écrit – l'auteur le montre – mais c'était bien plus ardu que pour nous. Ils avaient donc eux aussi inventé une machine, l'ancêtre de nos calculettes: l'abaque, sur lequel ils représentaient les nombres par des cailloux. Certains de ces abaques étaient en marbre. On en a retrouvé une trentaine. Après avoir ajouté les témoignages littéraires aux indices matériels, et conduit sur ces pièces à conviction une enquête minutieuse, l'auteur signe ici la première étude exhaustive sur la question, et montre comment on peut imaginer que les anciens Grecs s'y prenaient pour compter avec des cailloux.

Reinhard SIEGMUND-SCHULTZE. — **Rockefeller and the internationalization of mathematics between the two World Wars: documents and studies for the social history of mathematics in the 20th century.** — Science networks - Historical studies, vol. 25. — Un vol. relié, 17,5×24, de XIII, 341 p. — ISBN 3-7643-6468-8. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2001.

Philantropies funded by the Rockefeller family have been prominent in the social history of the twentieth century for their involvement in medicine and applied science. This book provides

the first detailed study of their relatively brief but nonetheless influential foray into the field of mathematics. The careers of a generation of pathbreakers in modern mathematics, such as S. Banach, B.L. van der Waerden and André Weil, were decisively affected by their becoming fellows of the Rockefeller-funded International Education Board in the 1920s. To help promote cooperation between physics and mathematics Rockefeller funds supported the erection of the new Mathematical Institute in Göttingen between 1926 and 1929, while the rise of probability and mathematical statistics owes much to the creation of the Institut Henri Poincaré in Paris by American philanthropy at about the same time.

Logique et fondements

John H. CONWAY. — **On numbers and games.** — Second edition. — Un vol. relié, 16×23,5 de XI, 242 p. — ISBN 1-56881-127-6. — Prix: US$39.00. — Natick, Massachusetts, 2001.

ONAG, as the book is known, is one of those rare publications that sprang to life in a moment of creative energy and has remained influential for over a quarter of a century. Originally written to define the relation between the theories of transfinite numbers and mathematical games. By defining numbers as the strengths of positions in certain games, the author arrives at a new class, the surreal numbers, that includes both real numbers and ordinal numbers. These surreal numbers are applied in the author's mathematical analysis of game strategies. The additions to the second edition present recent developments in the area of mathematical game theory, with a concentration on surreal numbers and the additive theory of partizan games.

René CORI and Daniel LASCAR. — **Mathematical logic: a course with exercises, Part 1: propositional calculus, Boolean algebras, predicate calculus.** — Translated by Donald H. Pelletier. — Un vol. broché, 15,5×23,5, de XIX, 338 p. — ISBN 0-19-850048-3. — Prix: £25.00. — Oxford University Press, Oxford, 2000.

This text is based on a course to undergraduates and gives a clear and accessible introduction to mathematical logic. The concept of model provides the underlying theme, giving the text a theoretical coherence whilst still covering a wide area of logic. The first chapter considers propositional calculus; then Boolean algebras follow; Chapter 3 covers predicate calculus and this is followed by completeness theorems. Large numbers of examples appear throughout the text and each chapter concludes with a selection of exercises to reinforce the student's understanding. Answers to the exercises are given in an appendix.

J.P. MAYBERRY. — **The foundations of mathematics in the theory of sets.** — Encyclopedia of mathematics and its applications, vol. 82. — Un vol. relié, 16,5×24, de XX, 424 p. — ISBN 0-521-77034-3. — Prix: £55.00. — Cambridge University Press, Cambridge, 2000.

This book presents a unified approach to the foundations of mathematics in the theory of sets, covering both conventional and finitary (constructive) mathematics. It is based on a philosophical, historical, and mathematical analysis of the relation between the concepts of "natural number" and "set". This leads to an investigation of the logic of quantification over the universe of sets and a discussion of its role in second order logic, as well as in the analysis of proof by induction and definition by recursion. The subject matter of the book falls on the borderline between philosophy and mathematics, and should appeal to both philosophers and mathematicians with an interest in the foundations of mathematics.

Joseph R. SHOENFIELD. — **Mathematical logic.** — Un vol. broché, 16,5×24, de VII, 344 p. — ISBN 1-56881-135-7. — Prix: US$35.00. — A.K. Peters, Natick, Mass., 2000.

This book embodies the author's view that "mathematical logic is not a collection of vaguely related results, but a method of attacking some of the most interesting problems which face the mathematician." The basic concepts are presented in an unusually clear and accessible fashion, in a way that helps and intrigues the working mathematician as much as the philosophically minded student of logic. The author keeps in mind the original purpose of mathematical logic–to build the foundations of this vast edifice of knowledge. Concentrating on the central topics of mathematical logic: proof theory, model theory, recursion theory, axiomatic number theory, and set theory, this book has served as a "rite of passage" for many mature and accomplished researchers.

Analyse combinatoire

Ian ANDERSON. — **A first course in discrete mathematics.** — Springer undergraduate mathematics series. — Un vol. broché, 17,5×23,5, de VIII, 200 p. — ISBN 1-85233-236-0. — Prix: DM 59.00. — Springer, London, 2001.

As well as including standard topics such as binomial coefficients, recurrence, the inclusion-exclusion principle, trees, Hamiltonian and Eulerian graphs, latin squares and finite projective planes, the text also includes material on the ménage problem, magic squares, Catalan and Stirling numbers, and tournament schedules. The final chapter uses Hadamard matrices as the bridge from block designs to the idea of error-correcting codes, finishing with the construction of the perfect Golay code. The book contains many worked examples, and each chapter ends with a large number of exercises, with hints or solutions provided for most of them.

Jørgen BANG-JENSEN and Gregory GUTIN. — **Digraphs: theory, algorithms and applications.** — Springer monographs in mathematics. — Un vol. relié, 16,5×24, de XXII, 754 p. — ISBN 1-85233-268-9. — Prix: DM 189.00. — Springer, London, 2000.

Digraphs is the first book to present a unified and comprehensive survey of the subject. In addition to covering the theoretical aspects, including detailed proofs of many important results, the authors present a number of algorithms and applications. The applications of digraphs and their generalizations include, among other things, recent developments in the Travelling Salesman Problem, genetics, and network connectivity. More than 700 exercises and 180 figures will help readers to study the topic. Detailed indexes ease "navigation" through the book. Many open problems and conjectures will inspire further research.

Ervin GYŐRI, Vera T. SÓS, (Editors). — **Recent trends in combinatorics: the legacy of Paul Erdős.** — Un vol. relié, 18×25,5, de XX, 192 p. — ISBN 0-521-80170-2. — Prix: £35.00. — Cambridge University Press, Cambridge, 2001.

This is a collection of surveys and research papers on recent topics of interest in combinatorics, given at a conference in Mátraháza, Hungary. It is dedicated to Paul Erdős, who attended the conference and who is represented by two articles in the collection, including one, unfinished, which he was writing on the eve of his sudden death. Erdős was one of the greatest mathematicians of his century and often the subject of anecdotes about his somewhat unusual lifestyle. A new preface, written by friends and colleagues, gives a flavour of his life, including many such stories, and also describes the broad outline and importance of his work in combinatorics and other related fields.

W.T. TUTTE. — **Graph theory.** — Encyclopedia of mathematics and its applications. — Cambridge mathematical library. — Un vol. broché, 15,5×23,5, de XXI, 333 p. — ISBN 0-521-79489-7. — Prix: £19.95. — Cambridge University Press, Cambridge, 2001.

Designed for the non-specialist, this book is an invaluable reference tool for those interested in a basic understanding of the subject. Exercises, notes and exhaustive references follow each chapter, making it outstanding as both as text and reference. The author approaches the subject with a lively writing style. The reader will delight to discover that the topics in this book are coherently unified and include some of the deepest and most beautiful developments in graph theory.

Théorie des nombres

Harold DAVENPORT. — **Multiplicative number theory.** — 3rd edition. — Graduate texts in mathematics, vol. 74. — Un vol. relié, 16×24, de XIII, 177 p. — ISBN 0-387-95097-4. — Prix: DM 99.00. — Springer, New York, 2000.

This book thoroughly examines the distribution of prime numbers in arithmetic progressions. It covers many classical results, including Dirichlet's theorem on the existence of prime numbers in arithmetic progressions, the theorem of Siegel, and functional equations of the L-functions and their consequences for the distribution of prime numbers. In addition, a simplified, improved version of the large sieve method is presented. The third edition includes a large number of revisions and corrections as well as a new section with references to more recent work in the field.

Matti JUTILA and Tauno METSÄNKYLÄ, (Editors). — **Number theory: proceedings of the Turku Symposium on Number Theory in Memory of Kustaa Inkeri, May 31-June 4, 1999.** — Un vol. relié, 17,5×24,5, de VIII, 328 p. — ISBN 3-11-016481-7. — Prix: DM 268.00. — Walter de Gruyter, Berlin, 2001.

These proceedings contain 22 refereed research and surveys articles. The subject of the symposium was number theory in a broad sense with an emphasis on recent advances and modern methods. The topics covered in this volume include various questions in elementary number theory, new developments in classical Diophantine problems — in particular of the Fermat and Catalan type, the ABC-conjecture, arithmetic algebraic geometry, elliptic curves, Diophantine approximations, Abelian fields, exponential sums, sieve methods, box splines, the Riemann zeta-function and other Dirichlet series, and the spectral theory of automorphic functions with its arithmetical applications.

H.P.F. SWINNERTON-DYER. — **A brief guide to algebraic number theory.** — London Mathematical Society student texts, vol. 50. — Un vol. broché, 15,5×23, de IX, 146 p. — ISBN 0-521-00423-3. — Prix: £15.95. — Cambridge University Press, Cambridge, 2001.

This is an account of algebraic number theory, a field which has grown to touch many other areas of pure mathematics. It is written primarily for beginning graduate students in pure mathematics, and encompasses everything that most such students are likely to need; others who need the material will also find it accessible. The book covers the two basic methods of approaching algebraic number theory, using ideals and valuations, and includes material on the most usual kinds of algebraic number field, the functional equation of the zeta function and a substantial digression on the classical approach to Fermat's Last Theorem, as well as a comprehensive account of class field theory. Many exercises and an annotated reading list are also included.

Corps et polynômes

Francis BORCEUX, George JANELIDZE. — **Galois theories**. — Cambridge studies in advanced mathematics, vol. 72. — Un vol. relié, 16×23,5, de XIV, 341 p. — ISBN 0-521-80309-8. — Prix : £50.00. — Cambridge University Press, Cambridge, 2001.

Starting from the classical finite dimensional Galois theory of fields, this book develops Galois theory in a much more general context, presenting work by Grothendieck in terms of separable algebras and then proceeding to the infinite dimensional case, which requires considering topological Galois groups. In the core of the book, the authors first formalize the categorical context in which a general Galois theorem holds, and then give some applications, to the topological theory of covering maps and to a Galois theorem for toposes. The book is designed to be accessible to a wide audience: the prerequisites are first courses in algebra and general topology, together with some familiarity with the categorical notions of limit and adjoint functors.

Jean-Pierre ESCOFIER. — **Théorie de Galois : cours et exercices corrigés.** — 2e édition. — Sciences sup, cours 2e cycle. — Un vol. broché, 17×24, de XVI, 238 p. — ISBN 2-10-005312-4. — Prix : FF 165.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Les idées géniales d'Évariste Galois ont profondément influencé le développement de l'algèbre. Les premiers chapitres exposent la théorie à un niveau élémentaire dans le cas fondamental des extensions de degré fini du corps **Q**. Ils détaillent les applications aux racines n-ièmes de l'unité et à la résolubilité des équations par radicaux, problème central des mathématiques d'avant Galois. Les derniers chapitres décrivent la théorie de Galois pour les corps finis et abordent des questions récentes. Pour finir, l'auteur fait le point sur l'algèbre avant 1640, les constructions à la règle et au compas, et évoque la vie dramatique d'Évariste Galois. Ce cours est complété de nombreux exercices corrigés, dont certains montrent de belles applications de la théorie. Dans cette seconde édition entièrement révisée, les exercices ont été réactualisés.

Jean-Pierre ESCOFIER. — **Galois theory**. — Graduate texts in mathematics, vol. 204. — Un vol. relié, 16,5×24,5, de XIV, 280 p. — ISBN 0-387-98765-7. — Prix : DM 119.00. — Springer, New York, 2001.

This book covers the standard basic material-symmetric polynomials, field extensions, normal and Galois extensions, the Galois correspondence, cyclotomic extensions, solvable groups, finite fields, and separable and inseparable extensions. However, it also contains the following original features: a sketch of the early history of the subject, containing a large number of excerpts from original works and a discussion of the problems of notation, discovery, mathematical habits, and disputes of former times; a complete chapter on explicit constructions with ruler and compass; a chapter on the life of Evariste Galois; and a chapter on recent developments that attempts to give an idea of what researchers in Galois theory are working on today. This book is refreshingly different from many books on the same subject already on the market.

Géométrie algébrique

Yves ANDRÉ, Francesco BALDASSARRI. — **De Rham cohomology of differential modules on algebraic varieties.** — Progress in mathematics, vol. 189. — Un vol. relié, 16,5×24, de VII, 214 p. — ISBN 3-7643-6348-7. — Prix : SFr. 98.00. — Birkhäuser, Basel, 2001.

The book offers a systematic treatment of the theory of differential modules algebraic varieties over a field of characteristic 0. Its final purpose is to give a proof of a conjecture of

Baldassarri comparing the algebraic and p-adic analytic de Rham cohomologies of such a module. Along the way, the authors present an algebraic treatment of the theory of regularity and irregularity in several variables, give original elementary proofs of the main results on de Rham cohomology of differential modules, and then develop a new approach to the classical algebraic/analytic comparison theorems (concerning regular modules) which unifies the complex and p-adic situations and avoids resolution of singularities.

Lucian BĂDESCU. — **Algebraic surfaces.** — Translated by Vladimir Maşek. — Universitext. — Un vol. relié, 16,5×24,5, de x, 258 p. — ISBN 0-387-98668-5. — Prix: DM 79.00. — Springer, New York, 2001.

The main aim of this book is to present a completely algebraic approach to the Enriques classification of smooth projective surfaces defined over an algebraically closed field of arbitrary characteristic. This algebraic approach is one of the novelties in comparison to existing textbooks on the subject. In the new edition of this book, two chapters as well as exercises at the end of each chapter have been added. One new chapter deals with various applications of the Zariski decomposition of an effective divisor, and the other discusses some results on surfaces that were found after the publication of the first edition.

Sara BILLEY, V. LAKSHMIBAI. — **Singular loci of Schubert varieties.** — Progress in mathematics, vol. 182. — Un vol. relié, 16×24, de XII, 251 p. — ISBN 0-8176-4092-4. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2000.

Singular Loci of Schubert Varieties is a unique work at the crossroads of representation theory, algebraic geometry, and combinatorics. Over the past 20 years, many research articles have been written on the subject in notable journals. In this work, Billey and Lakshmibai have recreated and restructured the various theories and approaches of those articles and present a clearer understanding of this important subdiscipline of Schubert varieties - namely singular loci. The main focus, therefore, is on the computations for the singular loci of Schubert varieties and corresponding tangent spaces. The methods used include standard monomial theory, the nil Hecke ring, and Kazhdan-Lusztig theory. New results are presented with sufficient examples to emphasize key points. A comprehensive bibliography, index, and tables - the latter not to be found elsewhere in the mathematics literature - round out this concise work.

Carel FABER, Gerard VAN DER GEER, Frans OORT, (Editors). — **Moduli of Abelian varieties.** — Progress in mathematics, vol. 195. — Un vol. relié, 17×24, de XII, 518 p. — ISBN 3-7643-6517-X. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

Abelian varieties and their moduli are a central topic of increasing importance in today's mathematics. Applications range from algebraic geometry and number theory to mathematical physics. The present collection of 17 refereed articles originates form the third "Texel Conference" held in 1999. Leading experts discuss and study the structure of the moduli spaces of Abelian varieties and related spaces, giving an excellent view of the state of the art in this field. The book will appeal to pure mathematicians, especially algebraic geometers and number theorists, but will also be relevant for researchers in mathematical physics.

Jürgen HERZOG, Gaetana RESTUCCIA, (Editors). — **Geometric and combinatorial aspects of commutative algebra.** — Lecture notes in pure and applied mathematics, vol. 217. — Un vol. broché, 17,5×25,5, de XIX, 391 p. — ISBN 0-8247-0567-X. — Prix: US$175.00. — Marcel Dekker, New York, 2001.

Based on lectures presented at the International Conference of Commutative Algebra and Algebraic Geometry held recently in Messina, Italy, this fascinating reference provides the latest

developments and recent advances in commutative algebra, algebraic geometry, and combinatorics — highlighting the theory of projective schemes, the geometry of curves in P^n, determinantal and stable ideals, and free resolutions. With contributions by over 40 leading international mathematicians, the book thoroughly discusses current trends in singularity and tight closure theory... Hilbert functions of squarefree Veronese rings... Gröbner bases as characteristic sets... local monomialization... families of Wronskian correspondences... and more.

Karen E.SMITH, Lauri KAHANPÄÄ, Pekka KEKÄLÄINEN, William TRAVES. — **An invitation to algebraic geometry.** — Universitext. — Un vol relié, 16×24, de XII, 155 p. — ISBN 0-387-98980-3. — Prix: DM 64.00. — Springer, New York, 2000.

The aim of this book is to describe the underlying principles of algebraic geometry, some of its important developments in the twentieth century, and some of the problems that occupy its practitioners today. It is intended for the working or the aspiring mathematician who is unfamiliar with algebraic geometry but wishes to gain an appreciation of its foundations and its goals with a minimum of prerequisites. Few algebraic prerequisites are presumed beyond a basic course in linear algebra.

Arno VAN DEN ESSEN. — **Polynomial automorphisms and the Jacobian conjecture.** — Progress in mathematics, vol. 190. — Un vol. relié, 16×24, de XVIII, 329 p. — ISBN 3-7643-6350-9. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2000.

Motivated by some notorious open problems, such as the Jacobian conjecture and the tame generators problem, the subject of polynomial automorphisms has become a rapidly growing field of interest. This book, the first in the field, collects many of the results scattered throughout the literature. It introduces the reader to a fascinating subject and brings him to the forefront of research in this area. Some of the topics treated are invertibility criteria, face polynomials, the tame generators problem, the cancellation problem, exotic spaces, DNA for polynomial automorphisms, the Abhyankar-Moh theorem, stabilization methods, dynamical systems, the Markus-Yamabe conjecture, group actions, Hilbert's 14th problem, various linearization problems and the Jacobian conjecture. The work is essentially self-contained and aimed at the level of beginning graduate students. Exercises are included at the end of each section. At the end of the book there are appendices to cover used material from algebra, algebraic geometry, D-modules and Gröbner basis theory. A long list of «strong» examples and an extensive bibliography conclude the book.

Anneaux et algèbres

Sorin DĂSCĂLESCU, Constantin NĂSTĂSESCU, Şerban RAIANU. — **Hopf algebras: an introduction.** — Pure and applied mathematics, vol. 235. — Un vol. relié, 15,5×23,5, de IX, 401 p. — ISBN 0-8247-0481-9. — Prix: US$ 150.00. — Marcel Dekker, New York, 2000.

Addressing a wide array of algebraic properties related to Hopf algebras, this introductory reference text summarizes key topics, theories, and relevant features in the field utilizing the easy-to-understand language of category theory... Covering an extensive range of material with clarity and precision, *Hopf Algebras* features in-depth discussions of basic concepts, classes, and theories for algebras, coalgebras, and comodules... the categories, integrals, actions, and coactions of Hopf algebras... special classes of coalgebras such as semiperfect, co-Frobenius, cosemisimple, and pointed algebras... different sets of behavior for dual notions of coalgebras and comodule... the Nichols-Zoeller, Taft-Wilson, and Kac-Zhu theorems... and more.

Mitsuyasu HASHIMOTO. — **Auslander-Buchweitz approximations of equivariant modules.** — London Mathematical Society lecture note series, vol. 282. — Un vol. broché, 15×23, de XVI, 281 p. — ISBN 0-521-79696-2 — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

This book focuses on homological aspects of equivariant modules. It presents a new homological approximation theory in the category of equivariant modules, unifying the Cohen-Macaulay approximations in commutative ring theory and Ringel's theory of delta-good approximations for quasi-hereditary algebras and reductive groups. The book provides a detailed introduction to homological algebra, commutative ring theory and homological theory of comodules of coalgebras over an arbitrary base. It aims to overcome the difficulty of generalising known homological results in representation theory. This book will be of interest to researchers and graduate students in algebra, specialising in commutative ring theory and representation theory.

Henning KRAUSE, Claus Michael RINGEL, (Editors). — **Infinite length modules.** — Trends in mathematics. — Un vol. relié, 17×24, de IX, 439 p. — ISBN 3-7643-6413-0. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2000.

This book is concerned with the role played by modules of infinite length when dealing with problems in the representation theory of groups and algebras, but also in topology and geometry, showing the intriguing interplay between finite and infinite length modules. The volume presents the invited lectures of a conference held in Bielefeld in September 1998, which brought together experts from quite different schools in order to survey surprising relations between algebra, topology and geometry. Some additional reports have been included in order to establish a unified picture. The collection of articles, written by well-known experts from all parts of the world, is conceived as a sort of handbook which provides an easy access to the present state of knowledge and its aim is to stimulate further development.

R.Y. SHARP. — **Steps in commutative algebra.** — Second edition. — London Mathematical Society student texts, vol. 51. — Un vol. broché, 15×23, de XI, 355 p. — ISBN 0-521-64623-5. — Prix: £17.95. — Cambridge University Press, Cambridge, 2000.

This introductory account of commutative algebra is aimed at advanced undergraduates and first year graduate students. Assuming only basic abstract algebra, it provides a good foundation in commutative ring theory, from which the reader can proceed to more advanced works in commutative algebra and algebraic geometry. The style throughout is rigorous but concrete, with exercises and examples given within chapters, and hints provided for the more challenging problems used in the subsequent development. After reminders about basic material on commutative rings, ideals and modules are extensively discussed, with applications including canonical forms for square matrices. The core of the book discusses the fundamental theory of commutative Noetherian rings. Affine algebras over fields, dimension theory and regular local rings are also treated, and for this second edition two further chapters, on regular sequences and Cohen–Macaulay rings, have been added.

Catégories, algèbre homologique, cohomologie des groupes

Amnon NEEMAN. — **Triangulated categories.** — Annals of mathematics studies, vol. 148. — Un vol. broché, 15,5×23,5, de VII, 449 p. — ISBN 0-691-08686-9. — Prix: US$35.00. — Princeton University Press, Princeton, N.J., 2001.

The first two chapters of this book offer a modern, self-contained exposition of the elementary theory of triangulated categories and their quotients. The simple, elegant presentation of

these known results makes these chapters eminently suitable as a text for graduate students. The remainder of the book is devoted to new research, providing, among other material, some remarkable improvements on Brown's classical representability theorem. In addition, the author introduces a class of triangulated categories — the "well generated triangulated categories" — and studies their properties. This exercise is particularly worthwhile in that many examples of triangulated categories are well generated, and the book proves several powerful theorems for this broad class. These chapters will interest researchers in the fields of algebra, algebraic geometry, homotopy theory and mathematical physics.

Théorie des groupes et généralisations

Hyman BASS, Alexander LUBOTZY. — **Tree lattices**. — With appendices by H. Bass, L. Carbone, A. Lubotzky, G. Rosenberg, and J. Tits. — Progress in mathematics, vol. 176. — Un vol. relié, 16,5×24, de XII, 233 p. — ISBN 0-8176-4120-3. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2001.

Group actions on trees furnish a unified geometric way of recasting the chapter of combinatorial group theory dealing with free groups, amalgams, and HNN extensions. Some of the principal examples arise from rank one simple Lie groups over a non-Archimedean local field acting on their Bruhat-Tits trees. In particular this leads to a powerful method for studying lattices in such Lie groups. The book presents a coherent survey of the results on uniform tree lattices, and a (previously unpublished) development of the theory of non-uniform tree lattices. The latter is much more complicated than the uniform case, so a good deal of attention is given to the construction and study of diverse examples. The fundamental technique is the encoding of tree actions in terms of the corresponding quotient 'graphs of groups'.

William M. KANTOR, Akos SERESS, (Editors). — **Groups and computation III: proceedings of the International Conference at the Ohio State University, June 15-19, 1999.** — Ohio State University Mathematical Research Institute publications, vol. 8. — Un vol. relié, 17,5 ×24,5, de VIII, 368 p. — ISBN 3-11-016721-2. — Prix: DM 248.00. — Walter de Gruyter, Berlin, 2001.

This conference was the successor of two workshops on "Groups and Computation" held at DIMACS in 1991 and 1995. There are papers on permutation group algorithms, finitely presented groups, polycyclic groups, and parallel computation, providing a representative sample of the breadth of computation group theory. On the other hand, more than one third of the papers deal with computations in matrix groups, giving an in-depth treatment of the currently most active area of the field. The points of view of the papers range from explicit computations to group-theoretic algorithms to group-theoretic theorems needed for algorithm development.

Kevin P. KNUDSON. — **Homology of linear groups**. — Progress in mathematics, vol. 193. — Un vol. relié, 16,5×24, de XI, 192 p. — ISBN 3-7643-6415-7. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2001.

The text traces the homology theory of linear groups from the fundamental results of Quillen, Suslin, van der Kallen and others to recent results on rank one groups. A chapter on the Friedlander-Milnor conjecture concerning the homology of algebraic groups made discrete is also included. This marks the first time that these results have been collected in a single volume. The book will be of interest to researchers and can be used as a textbook on graduate courses in K-theory and group cohomology.

Mesure et intégration

Washek F. PFEFFER. — **Derivation and integration.** — Cambridge tracts in mathematics, vol. 140. — Un vol. relié, 16×23,5, de XVI, 266 p. — ISBN 0-521-79268-1. — Prix : £45.00. — Cambridge University Press, Cambridge, 2001.

This book is devoted to an invariant multidimensional process of recovering a function from its derivative. It considers additive functions defined on the family of all bounded BV sets that are continuous with respect to a suitable topology. A typical example is the flux of a continuous vector field. A very general Gauss-Green theorem follows from the sufficient conditions for the derivability of the flux. Since the setting is invariant with respect to local lipeomorphisms, a standard argument extends the Gauss-Green theorem to the Stokes theorem on Lipschitz manifolds. In addition, the author proves the Stokes theorem for a class of top-dimensional normal currents – a first step toward solving a difficult open problem of derivation and integration in middle dimensions.

Fonctions d'une variable complexe

Raghavan NARASIMHAN, Yves NIEVERGELT. — **Complex analysis in one variable.** — Second edition. — Un vol. relié, 16,5×24, de XIV, 381 p. — ISBN 0-8176-4164-5. — Prix : SFr. 118.00. — Birkhäuser, Boston, 2001.

This book presents complex analysis in one variable in the context of modern mathematics, with clear connections to several complex variables, de Rham theory, real analysis, and other branches of mathematics. New to this second edition, a collection of over 100 pages worth of exercises, problems, and examples gives students an opportunity to consolidate their command of complex analysis and its relations to other branches of mathematics, including advanced calculus, topology, and real applications.

Théorie du potentiel

David H. ARMITAGE, Stephen J. GARDINER. — **Classical potential theory.** — Springer monographs in mathematics. — Un vol. relié, 16,5×24, de XVI, 333 p. — ISBN 1-85233-618-8. — Prix : DM 159.00. — Springer, London, 2001.

This book covers harmonic and subharmonic functions, maximum principles, polynomial expansions, Green functions, potentials and capacity, the Dirichlet problem and boundary integral representations. The first six chapters deal concretely with the basic theory, and include exercises. The final three chapters are more advanced and treat topological ideas specifically created for potential theory, such as the fine topology, the Martin boundary and minimal thinness. The presentation is largely self-contained and is accessible to graduate students, with the only prerequisites being a reasonable grounding in analysis and several variables calculus, and a first course in measure theory.

Fonctions de plusieurs variables complexes

Marek JARNICKI, Peter PFLUG. — **Extension of holomorphic functions.** — De Gruyter expositions in mathematics, vol. 33. — Un vol. relié, 17,5×24,5, de X, 487 p. — ISBN 3-11-015363-7. — Prix : DM 248.00. — Walter de Gruyter, Berlin, 2000.

From the authors' preface: This monograph is devoted to a systematic exposition of the theory of extension of holomorphic functions, e. g. characterizations of envelopes of holomorphy

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 $\mathbf{C}^n$. 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, 16,5×23,5, 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, 16×24, 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, 16,5×24, 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.

Alexandre T. FILIPPOV. — **The versatile soliton.** — Un vol. relié, 16,5×24, de XIV, 261 p. — ISBN 0-8176-3635-8. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2000.

The soliton, a solitary wave impulse preserving its shape and strikingly similar to a particle, is one of the most fascinating and beautiful phenomena in the physics of nonlinear waves. In this engaging book, the concept of the soliton is traced from the beginning of the last century to modern times, with recent applications in biology, oceanography, solid state physics, electronics, elementary particle physics, and cosmology. To appreciate the deep connections in this book between apparently different and diverse phenomena and ideas, the reader must be able to follow elementary mathematical computations.

K.-H. HOFFMANN, Q. TANG. — **Ginzburg-Landau phase transition theory and superconductivity.** — International series of numerical mathematics, vol. 134. — Un vol. relié, 17,4×24, de XII, 383 p. — ISBN 3-7643-6486-6. — Prix: SFr. 158.00. — Birkhäuser, Basel, 2001.

In this monograph, the authors collect, rearrange and refine recent research results in the complex G-L theory with or without immediate applications to the theory of superconductivity. The purpose is to present as many mathematically sound results as possible on various aspects of the PDE system, including rigorous mathematical analysis, formal asymptotics as well as numerical analysis. The book starts with some physical background material and discussions on the modelling and theoretical studies of physicists that invite further mathematical research. The authors then treat the mathematical scaling in a systematic way and analyze implications on various limit problems. After addressing the mathematical foundation and formal asymptotic analysis of vortex motion they move on to rigorous results on existence, regularity and long-time behavior of solutions, as well as the vortex location and law of motion.

Rafael José IORIO, Jr, Valéria DE MAGALHÃES IORIO. — **Fourier analysis and partial differential equations.** — Cambridge studies in advanced mathematics, vol. 70. — Un vol. relié, 16×23,5, de XI, 411 p. — ISBN 0-521-62116-X. — Prix: £45.00. — Cambridge University press, Cambridge, 2001.

The first part of the book consists of some very classical material, followed by a discussion of the theory of periodic distributions and the periodic Sobolev spaces. The authors then turn to the study of linear and nonlinear equations in the setting provided by periodic distributions. They assume only some familiarity with Banach and Hilbert spaces and the elementary properties of bounded linear operators. After presenting a fairly complete discussion of local and global well-posedness for the nonlinear Schrödinger and the Korteweg-de Vries equations, they turn their attention, in the two final chapters, to the nonperiodic setting, concentrating on problems that do not occur in the periodic case.

Antonino MAUGERI, Dian K. PALAGACHEV, Lubomira G. SOFTOVA. — **Elliptic and parabolic equations with discontinuous coefficients.** — Mathematical research, vol. 109. — Un vol. relié, 17,5×24,5, de 256 p. — ISBN 3-527-40135-0. — Prix: DM 198.00. — Wiley-VCH, Berlin, 2000.

This book unifies the different approaches in studying elliptic and parabolic partial differential equations with discontinuous coefficients. To the enlarging market of researchers in applied sciences, mathematics and physics, it gives concrete answers to questions suggested by non-linear models. Providing an up-to-date survey on the results concerning elliptic and parabolic operators on a high level, the authors serve the reader in doing further research. Being themselves active researchers in the field, the authors describe both on the level of good examples and precise analysis, the crucial role played by such requirements on the coefficients as the Cordes

condition, Campanato's nearness condition, and vanishing mean oscillation condition. They present the newest results on the basic boundary value problems for operators with VMO coefficients and non-linear operators with discontinuous coefficients and state a lot of open problems in the field.

Systèmes dynamiques et théorie ergodique

Steve ALPERN, V.S. PRASAD. — **Typical dynamics of volume preserving homeomorphisms.** — Cambridge tracts in mathematics, vol. 139. — Un vol. relié, 16×23,5, de XIX, 216 p. — ISBN 0-521-58287-3. — Prix : £30.00. — Cambridge University Press, Cambridge, 2000.

This book provides a self-contained introduction to typical properties of homeomorphisms. Examples of properties of homeomorphisms considered include transitivity, chaos and ergodicity. A key idea here is the interrelation between typical properties of volume preserving homeomorphisms and typical properties of volume preserving bijections of the underlying measure space. The authors consider volume preserving homeomorphisms of the unit n-dimensional cube, and they go on to prove fixed point theorems (Conley-Zehnder-Franks). Parts II and III consider further questions, in a leisurely fashion, for compact manifolds and sigma compact manifolds respectively.

Alan F. BEARDON. — **Iteration of rational functions: complex analytic dynamical systems.** — Graduate texts in mathematics, vol. 132. — Un vol. broché, 15,5×23,5, de XVI, 280 p. — ISBN 0-387-95151-2. — Prix : DM 89.00. — Springer, New York, 2000.

This book makes available a comprehensive, detailed, and organized treatment of the foundations of the theory of iteration of rational functions of a complex variable. The material covered extends from the original memoirs of Fatou and Julia to the recent and important results and methods of Sullivan and Shishikura. Many of the details of the proofs have not occurred in print before. The theory of dynamical systems and chaos has recently undergone a rapid growth in popularity, in part due to the spectacular computer graphics of Julia sets, fractals, and the Mandelbrot set. This text focuses on the specialized area of complex analytic dynamics, a subject that dates back to 1916 and is currently a very active area in mathematics.

Andreas JUHL. — **Cohomological theory of dynamical zeta functions.** — Progress in mathematics, vol. 194. — Un vol. relié, 17×24, de X, 709 p. — ISBN 3-7643-6405-X. — Prix : SFr. 198.00. — Birkhäuser, Basel, 2001.

The book treats various aspects of the idea to understand the analytical properties of meromorphic zeta functions on the basis of appropriate analogs of the Lefschetz fixed point formula in which the periodic orbits of the flow take the place of the fixed points. The book describes the present state of the research in a new field on the cutting edge of global analysis, harmonic analysis and dynamical systems. It should be appealing not only to the specialists on zeta functions which will find their object of favourite interest connected in new ways with index theory, geometric quantization methods, foliation theory and representation theory. There are many unsolved problems and the book hopefully promotes further progress the lines indicated here.

Stephen LYNCH. — **Dynamical systems with applications using MAPLE.** — Un vol. broché, 15,5×23,5, de XIII, 398 p. — ISBN 0-8176-4150-5. — Prix : SFr. 98.00. — Birkhäuser, Boston, 2001.

A short tutorial in MAPLE is provided at the beginning of the book to facilitate understanding of the theory and to deal with the numerous examples, diagrams, and exercises. The main

text is divided into two parts: continuous systems using differential equations and discrete dynamical systems. Differential equations are used to model examples taken from various topics such as mechanical systems, interacting species, electronic circuits, chemical reactions, and meteorology. The section on continuous systems ends with a study of limit cycles and the second part of Hilbert's 16th problem. Part II deals with both real and complex dynamical systems.

Alistair I. MEES, (Editor). — **Nonlinear dynamics and statistics.** — Un vol. relié, 16×24, de XXII, 473 p. — ISBN 0-8176-4163-7. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

This book brings together different approaches to nonlinear time series analysis in order to begin a synthesis that will lead to better theory and practice in all the related areas. This book describes the state of the art in nonlinear dynamical reconstruction theory. The chapters are based upon a workshop held at the Isaac Newton Institute, Cambridge University, UK, in late 1998. The book's chapters present theory and methods topics by leading researchers in applied and theoretical nonlinear dynamics, statistics, probability, and systems theory. Professionals, researchers, and advanced graduates in nonlinear dynamics, probability, optimization, and systems theory will find the book a useful resource and guide to current developments in the subject.

Anthony N. MICHEL, Kaining WANG, Bo HU. — **Qualitative theory of dynamical systems: the role of stability preserving mappings.** — Second edition, revised and expanded. — Pure and applied mathematics, vol. 239. — Un vol. relié, 15,5×23,5, de XV, 707 p. — ISBN 0-8247-0526-2. — Prix: US$ 195.00. — Marcel Dekker, New York, 2001.

This reference/text illuminates the most important results of the Lyapunov and Lagrange stability theory for a general class of dynamical systems by developing topics in a metric space independently of equations, inequalities, or inclusions; applies the general theory to specific classes of equations; and presents new and expanded data on the stability analysis of hybrid dynamical systems and dynamical systems with discontinuous dynamics. The second edition includes detailed case studies of single- and multirate digital feedback control systems... pulse width-modulated feedback control systems... variable structure systems with applications to recurrent artificial neural networks... linear systems under state saturation constraints... switched systems... systems with impulsive dynamics... and more.

Equations aux différences finies, équations fonctionnelles

David L. JAGERMAN. — **Difference equations with applications to queues.** — Pure and applied mathematics, vol. 233. — Un vol. relié, 16×23,5, de XI, 246 p. — ISBN 0-8247-0388-X. — Prix: US$ 135.00. — Marcel Dekker, New York, 2000.

This monograph presents a theory of difference and functional equations with continuous argument based on a generalization of the Riemann integral introduced by N. E. Nörlund, allowing differentiation with respect to the independent variable and permitting greater flexibility in constructing solutions and approximations, solving the nonlinear first order equation by a variety of methods, including an adaptation of the Lie-Gröbner theory. *Difference Equations with Applications to Queues* shows that the homogeneous sum admits exponential eigenfunctions with explicitly defined eigenvalues; illustrates the value of representations for practical computations; studies the linear difference equation with polynomial coefficients; obtains a singular perturbation solution for the processor-sharing queue; extends the Euler–Maclaurin representation for the Nörlund sum to the complex plane; gives a theory of the differential–difference equation pioneered by C. Truesdell; ... and more!

Analyse de Fourier, analyse harmonique abstraite

Juha HEINONEN. — **Lectures on analysis on metric spaces.** — Universitext. — Un vol. relié, 16,5×24, de X, 140 p. — ISBN 0-387-95104-0. — Prix: DM 79.00. — Springer, New York, 2001.

The purpose of this book is to communicate some of the recent work in the area while preparing the reader to study more substantial, related articles. The material can be roughly divided into three different types: classical, standard but sometimes with a new twist, and recent. The author first studies basic covering theorems and their applications to analysis in metric measure spaces. This is followed by a discussion on Sobolev spaces emphasizing principles that are valid in larger contexts. The last few sections of the book present a basic theory of quasisymmetric maps between metric spaces. Much of the material is relatively recent and appears for the first time in book format.

Massimo A. PICARDELLO. — **Harmonic analysis and integral geometry. —** Chapman & Hall/CRC research notes in mathematics, vol. 422. — Un vol. broché, 15,5×23,5. — ISBN 1-58488-183-6. — Prix: £49.99. — Chapman & Hall/CRC, Boca Raton, 2001.

Comprising a selection of expository and research papers, this book grew from presentations offered at July 1998 Summer University of Safi, Morocco – an annual, advanced research school and congress. It presents important recent advances in the fields of Radon transforms, integral geometry, and harmonic analysis on Lie groups and symmetric spaces. Several articles are devoted to the new theory of Radon transforms on trees.

Analyse fonctionnelle

José M. GRACIA-BONDÍA, Joseph C. VÁRILLY, Héctor FIGUEROA. — **Elements of noncommutative geometry.** — Birkhäuser advanced texts. — Un vol. relié, 16,5×24, de XVI, 685 p. — ISBN 0-8176-4124-6. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2001.

Noncommutative geometry deals with the unification of mathematics under the aegis of the quantum apparatus, that is, the theory of operators and C*-algebras. In recent years noncommutative geometry has been a rich topic of research with discoveries leading to an increasing number of applications in mathematics and theoretical physics. Very little has appeared in book form since Alain Connes' work in the early 90s to deal with this subject. *Elements of Noncommutative Geometry* fills an important gap in the literature. Rich in proofs, examples and exercises, the book is an introduction to the language and techniques of noncommutative geometry at a level suitable for graduates students, and also provides sufficient detail to be useful to physicists and mathematicians wishing to enter this rapidly growing field.

Roland HAGEN, Steffen ROCH, Bernd SILBERMANN. — **C*-algebras and numerical analysis.** — Pure and applied mathematics, vol. 236. — Un vol. relié, 16×23,5, de 376 p. — ISBN 0-8247-0460-6. — Prix: US$ 165.00. — Marcel Dekker, New York, 2000.

This book examines the relationship between C*-algebras and numerical analysis; discusses fractality — covering asymptotic properties of approximation operators such as stability, regularizability, behavior of condition numbers, eigenvalues, pseudoeigenvalues, singular values, and Rayleigh quotients; and describes Fredholmness — focusing on algebras that arise from concrete approximation methods. *C*-Algebras and Numerical Analysis*; presents Arveson's results culminating in a generalization of the Szegö limit theorem; introduces kernel and cokernel dimension for approximation sequences; outlines the lifting theorem and the structure of fractal lifting homomorphisms; studies piecewise continuous and quasicontinuous coefficients; details polynomial collocation and finite sections of band dominated operators; considers spectra,

pseudospectra, numerical ranges and their limiting sets; spotlights Moore-Penrose inverses and regularization of matrices and operators; surveys finite sections of Toeplitz operators, ... and more!

Théorie des opérateurs

Ravi P. AGARWAL, Maria MEEHAN, Donal O'REGAN. — **Fixed point theory and applications.** — Cambridge tracts in mathematics, vol. 141. — Un vol. relié, 16×23,5, de x, 170 p. — ISBN 0-521-80250-4. — Prix: £37.50. — Cambridge University Press, Cambridge, 2001.

This book provides a clear exposition of the flourishing field of fixed point theory. Starting from the basics of Banach's contraction theorem, most of the main results and techniques are developed: fixed point results are established for several classes of maps and the three main approaches to establishing continuation principles are presented. The theory is applied to many areas of current interest in analysis. Topological considerations play a crucial role, including a final chapter on the relationship with degree theory. The very extensive bibliography and close to 100 exercises mean that it can be used both as text and as a comprehensive reference work, currently the only one of its type.

D. ALPAY, V. VINNIKOV, (Editors). — **Operator theory, system theory and related topics: the Moshe Livšic anniversary volume.** — Operator theory advances and applications, vol. 123. — Un vol. relié, 17,5×24, de x, 567 p. — ISBN 3-7643-6523-4. — Prix: SFr. 228.00. — Birkhäuser, Basel, 2001.

The present selection of refereed papers is dedicated to Moshe Livšic on the occasion of his eightieth anniversary. It covers many areas of operator theory and its applications, reflecting the breadth and the profound impact of his work. In particular, some of his most recent ideas on 2D-systems are presented. Other contributions cover important avenues of modern operator theory in such fields as interpolation theory (also in the so-called nonstationary setting), direct and inverse problems for the string equation and for nonselfadjoint differential operators, operator models and function theory. The volume will appeal to a wide audience of pure and applied mathematicians, electrical engineers and theoretical physicists.

H. BART, I. GOHBERG, A.C.M. RAN, (Editors). — **Operator theory and analysis: the M.A. Kaashoek Anniversary Volume.** — Workshop in Amsterdam, November 12-14, 1997. — Operator theory, vol. 122. — Un vol. relié, 17,5×24, de XXXIX, 433 p. — ISBN 3-7643-6499-8. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2001.

The workshop focused on areas in mathematical and functional analysis where the ideas and results of M.A. Kaashoek played an important role. The papers of this volume cover a wide range of topics centered around factorization of matrix valued functions, interpolation theory, and spectral theory. Other papers deal with canonical systems of differential equations, operators in indefinite inner product spaces, and the effect of small delays on stability and control of partial differential equations. The book starts with biographical material and a list of publications of M.A. Kaashoek.

J. ELSCHNER, I. GOHBERG, B. SILBERMANN, (Editors). — **Problems and methods in mathematical physics: the Siegfried Prössdorf Memorial Volume.** — Proceedings of the 11th Conference on Problems and Methods in Mathematical Physics (TMP), Chemnitz (Germany), March 25-28, 1999. — Operator theory: advances and applications, vol. 121. — Un vol. relié, 17,5×24, de VIII, 523 p. — ISBN 3-7643-6477-7. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2001.

The main part of the book comprises original research papers. The topics range from integral and pseudodifferential equations, boundary value problems, operator theory, boundary element

and wavelet methods, approximation theory and inverse problems to various concrete problems and applications in physics and engineering, and reflect Prössdorf's broad spectrum of research activities. The volume also contains articles describing the life and achievements of Siegfried Prössdorf and includes a list of his publications. The book is addressed to a wide audience in the mathematical and engineering sciences.

Juan GIL, Daniel GRIESER, Matthias LESCH, (Editors). — **Approaches to singular analysis: a volume of advances in partial differential equations.** — Operator theory advances and applications, vol. 125. — Un vol. relié, 17,5×24, de VI, 256 p. — ISBN 3-7643-6518-8. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2001.

The purpose of this publication is to present, in one book, various approaches to analytic problems that arise in the context of singular spaces. It is based on the Workshop "Approaches to Singular Analysis" which was held at the Humboldt University Berlin in April 1999. The book contains articles by workshop participants as well as invited contributions. The former are expanded versions of talks given at the workshop; they offer introductions to various pseudodifferential calculi and discussions of relations between them. In addition, a limited number of invited papers from mathematicians who have made significant contributions to this field are included.

Calcul des variations

John CAGNOL, Michael P. POLIS, Jean-Paul ZOLÉSIO, (Editors). — **Shape optimization and optimal design: proceedings of the IFIP Conference.** — Lecture notes in pure and applied mathematics, vol. 216. — Un vol. broché, 18×26, de 442 p. — ISBN 0-8247-0556-4. — Prix: US$ 185.00. — Marcel Dekker, New York, 2001.

Based on selected papers presented at the 19th International Federation for Information Processing WG 7.2 and 7.4 Conference, held recently in Cambridge, England, and written by more than 25 specialists in various disciplines, this book illustrates boundary controllability of thermoelastic plates... shape derivative computations using a combinatorial strength approach to differential and intrinsic tangential differential calculus... Eulerian derivatives for noncylindrical functionals... shape gradients in singular geometries, such as cracks... effective quasioptimal control methods for nonstationary Navier-Stokes equations... sharp functional techniques in steady viscous flows... novel analyses of oxygen sensor models... and more.

Géométrie

Roger FENN. — **Geometry.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de XII, 313 p. — ISBN 1-85233-058-9. — Prix: DM 59.00. — Springer, London, 2000.

Geometry is probably the most accessible branch of mathematics, and can provide an easy route to understanding some of the more complex ideas that mathematics can present. This book is intended to introduce readers to the major geometrical topics taught at undergraduate level, in a manner that is both accessible and rigorous. The author uses world measurement as a synonym for geometry — hence the importance of numbers, coordinates and their manipulation — and has included over 300 exercises, with answers to most of them. The text includes such topics as: Coordinates. — Euclidean plane geometry. — Complex numbers. — Solid geometry. — Conics and quadratic surfaces. — Spherical geometry. — Quaternions.

Géométrie différentielle

Christian BÄR. — **Elementare Differentialgeometrie.** — De Gruyter Lehrbuch. — Un vol. broché, 15,5×23, de XII, 281 p. — ISBN 3-11-015519-2. — Prix: DM 48.00. — Walter de Gruyter, Berlin, 2001.

Das Buch bietet eine Einführung in die Differentialgeometrie von Kurven und Flächen. Nach einem historisch motivierten Kapitel über axiomatische euklidische Geometrie wird die Kurventheorie bis zum Studium der Totalkrümmung verknoteter Raumkurven entwickelt. Der grösste Teil des Buches widmet sich anschliessend der Flächentheorie. Verschiedene Krümmungsbegriffe werden eingeführt und die wichtigsten Klassen von Flächen, z.B. Minimalflächen, behandelt. Viele Ergebnisse und Konzepte der inneren Geometrie von Flächen, wie etwa Geodätische, Parallelverschiebung oder Jacobi-Felder, können unverändert in die riemannsche Geometrie übernommen werden. Das Buch führt bis zum Satz von Gauss-Bonnet, der die Krümmung der Fläche mit ihrer Euler-Poincaré-Charakteristik in Verbindung bringt.

Andrew PRESSLEY. — **Elementary differential geometry.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de IX, 332 p. — ISBN 1-85233-152-6. — Prix: DM 59.00. — Springer, London, 2000.

Curves and surfaces are objects that everyone can see, and many of the questions that can be asked about them are natural and easily understood. Differential geometry is concerned with the precise mathematical formulation of some of these questions, and with trying to answer them using calculus techniques. It is a subject that contains some of the most beautiful and profound results in mathematics, yet many of them are accessible to higher level undergraduates. *Elementary Differential Geometry* presents the main results in the differential geometry of curves and surfaces while keeping the prerequisites to an absolute minimum. Nothing more than first courses in linear algebra and multivariate calculus are required, and the most direct and straightforward approach is used at all times. Numerous diagrams illustrate both the ideas in the text and the examples of curves and surfaces discussed there.

Topologie algébrique

Yves FÉLIX, Stephen HALPERIN, Jean-Claude THOMAS. — **Rational homotopy theory.** — Graduate texts in mathematics, vol. 205. — Un vol. relié, 16,5×24,5, de XXXII, 535 p. — ISBN 0-387-95068-0. — Prix: DM 119.00. — Springer, New York, 2001.

The three main objectives of this book are: to provide a coherent, self-contained, and user-friendly introduction to the tools and techniques of rational homotopy theory; to provide an account of the main structural theorems with proofs that are often new or much simpler than the original versions in the literature; to illustrate both the use of the mathematical technology and the consequences of the theorems in a rich variety of examples. It should be emphasized that this book is about topological spaces and that examples and applications given throughout the book are largely drawn from topology. The reader should have a basic knowledge of the fundamental group and singular homology.

John MCCLEARY. — **A user's guide to spectral sequences.** — Second edition. — Cambridge studies in advanced mathematics, vol. 58. — Un vol. broché, 15,5×23, de XV, 561 p. — ISBN 0-521-56759-9 (relié: 0-521-56141-8). — Prix: £21.95 (relié: £60.00). — Cambridge University Press, Cambridge 2001.

Spectral sequences are among the most elegant, powerful, and complicated methods of computation in mathematics. This book describes some of the most important examples of spectral

sequences and some of their most spectacular applications. The first third of the book treats the algebraic foundations for this sort of homological algebra, starting from informal calculations, to give the novice a familiarity with the range of applications possible. The heart of the book is an exposition of the classical examples from homotopy theory, with chapters on the Leray-Serre spectral sequence, the Eilenberg-Moore spectral sequence, the Adams spectral sequence. The last part of the book treats applications throughout mathematics, including the theory of knots and links, algebraic geometry, differential geometry and algebra.

Topologie des variétés, analyse globale et analyse des variétés

C.K. ANAND, P. BAIRD, E. LOUBEAU and J.C. WOOD. — **Harmonic morphisms, harmonic maps, and related topics.** — Chapman & Hall/CRC research notes in mathematics, vol. 413. — Un vol. broché, 15,5×23,5, de 309 p. — ISBN 1-58488-032-5. — Prix : £39.99. — Chapman & Hall/CRC, Boca Raton, 2000.

This volume reports the proceedings of the conference in the city of Brest and forms the first work primarily devoted to harmonic morphisms, bringing together contributions from the founders of the subject, leading specialists, and experts in other related fields. Starting with "The beginnings of harmonic morphisms", which provides the essential background, the first section includes papers on the stability of harmonic morphisms, global properties, harmonic polynomial morphisms, Bochner technique, f-structures, symplectic harmonic morphisms, and discrete harmonic morphisms. The second section addresses the wider domain of harmonic maps and contains some of the most recent results on harmonic maps and surfaces. The final section highlights the rapidly developing subject of constant mean curvature surfaces.

Sylvain CAPPELL, Andrew RANICKI and Jonathan ROSENBERG, (Editors). — **Surveys on surgery theory, vol. 2: papers dedicated to C.T.C. Wall.** — Annals of mathematics studies, vol. 149. — Un vol. broché, 15,5×23,5, de VII, 449 p. — ISBN 0-691-08815-2. — Prix : US$35.00. — Princeton University Press, Princeton, N.J., 2001.

The sixtieth birthday of C.T.C. Wall led the editors of this volume to reflect on the extraordinary accomplishments of surgery theory as well as its current enormously varied interactions with algebra, analysis, and geometry. Workers in many of these areas have often lamented the lack of a single source surveying surgery theory and its applications. Because no person could write such a survey, the editors asked a variety of experts to report on the areas of current interest. The topics covered include current applications of surgery, Wall's finiteness obstruction, algebraic surgery, automorphisms and embeddings of manifolds, surgery theoretic methods for the study of group actions and stratified spaces, metrics of positive scalar curvature, and surgery in dimension four. In addition to the editors, contributors are S. Ferry, M. Weiss, B. Williams, T. Goodwillie, J. Klein, S. Weinberger, B. Hughes, S. Stolz, R. Kirby, L. Taylor, and F. Quinn.

Klaus JÄNICH. — **Vector analysis**. — Translated by Leslie Kay. — Undergraduate texts in mathematics. — Un vol. relié, 18,5×24, de XIV, 281 p. — ISBN 0-387-98649-9. — Prix : DM 69.00. — Springer, New York, 2001.

Classical vector analysis deals with vector fields, the gradient, divergence, and curl operators, line, surface, and volume integrals, and the integral theorems of Gauss, Green, and Stokes. Modern vector analysis distils these into the Cartan calculus and a general form of Stokes' theorem. This essentially modern text carefully develops vector analysis on manifolds, reinterprets it from the classical viewpoint (and with the classical notation) for three-dimensional Euclidean space, and then goes on to introduce de Rham cohomology and Hodge theory. The material is accessible to an undergraduate student with calculus, linear algebra, and some topology as prerequisites.

Michael KAPOVICH. — **Hyperbolic manifolds and discrete groups.** — Progress in mathematics, vol. 183. — Un vol. relié, 16×24, de XXV, 476 p. — ISBN 0-8176-3904-7. — Prix: SFr. 138.00. — Birkhäuser, Boston, 2001.

This work is at the crossroads of several branches of mathematics, including hyperbolic geometry, discrete groups, 3-dimensional topology, geometric group theory and complex analysis. The main focus throughout the text is on the "Big Monster", that is, on Thurston's hyperbolization theorem, which has completely changed the landscape of 3-dimensional topology and Kleinian group theory. *Topics and features:* First complete proof of Thurston's hyperbolization theorem in the generic case; Presentation of a number of open problems and conjectures; Diverse mathematical topics laid out in systematic fashion, including an extended treatment of the theory of Kleinian groups and group actions on trees; Extensive bibliography of related literature.

Leonid POLTEROVICH. — **The geometry of the group of symplectic diffeomorphisms.** — Lectures in mathematics, ETH Zürich. — Un vol. broché, 17×24, de XII, 132 p. — ISBN 3-7643-6432-7. — Prix: SFr. 34.00. — Birkhäuser, Basel, 2001.

In the past decade this new geometry has been intensively studied in the framework of symplectic topology with the use of modern techniques such as Gromov's theory of pseudo-holomorphic curves, Floer homology and the Guillemin-Sternberg-Lerman theory of symplectic connections. Furthermore, it opens up the intriguing prospect of using an alternative geometric intuition in dynamics. This book provides an essentially self-contained introduction to these developments and includes recent results on diameter, geodesics and growth of one-parameter subgroups in Hofer's geometry, as well as applications to dynamics and ergodic theory. It is addressed to researchers and students from the graduate level onwards.

Gang TIAN. — **Canonical metrics in Kähler geometry.** — Lectures in mathematics, ETH Zürich. — Un vol. broché, 17×24, de 100 p. — ISBN 3-7643-6194-8. — Prix: SFr. 32.00. — Birkhäuser, Basel, 2000.

There has been fundamental progress in complex differential geometry in the last two decades. For one, the uniformization theory of canonical Kähler metrics has been established in higher dimensions, and many applications have been found, including the use of Calabi-Yau spaces in superstring theory. The aim of this monograph is to give an essentially self-contained introduction to the theory of canonical Kähler metrics on complex manifolds. It also presents the reader with some advanced topics in complex differential geometry not easily found elsewhere. The topics include Calabi-Futaki invariants, extremal Kähler metrics, the Calabi-Yau theorem on existence of Kähler Ricci-flat metrics, and recent progress on Kähler-Einstein metrics with positive scalar curvature. Applications of Kähler-Einstein metrics to the uniformization theory are also discussed.

Vladimir TURAEV. — **Introduction to combinatorial torsions: notes taken by Felix Schlenk.** — Lectures in mathematics ETH Zürich. — Un vol. broché, 17×24, de VIII, 123 p. — ISBN 3-7643-6403-3. — Prix: SFr. 32.00. — Birkhäuser, Basel, 2001.

The first two chapters of this book cover algebraic foundations of the theory of torsions and various topological constructions of torsions due to K. Reidemeister, J.H.C. Whitehead, J. Milnor and the author. We also discuss connections between the torsions and the Alexander polynomials of links and 3-manifolds. The third chapter of the book deals with so-called refined torsions and the related additional structures on manifolds, specifically homological orientations and Euler structures. As an application, we give a construction of the multivariable Conway

polynomial of links in homology 3-spheres. At the end of the book, the author describe the recent results of G. Meng, C.H. Taubes and the author on the connections between the refined torsions and the Seiberg-Witten invariant of 3-manifolds.

Probabilités et processus stochastiques

Marek CAPIŃSKI, Tomasz ZASTAWNIAK. — **Probability through problems.** — Problem books in mathematics. — Un vol. relié, 16,5×24, de VIII, 257 p. — ISBN 0-387-95063-X. — Prix: DM 109.00. — Springer, New York, 2001.

This book of problems has been designed to accompany an undergraduate course in probability. The only prerequisite are basic algebra and calculus. Each chapter is divided into three parts: problems, hints, and solutions. To make the book self-contained, all problem sections include expository material. Definitions and statements of important results are interlaced with relevant problems. The problems have been selected to motivate abstract definitions by concrete examples and to lead in manageable steps toward general results, as well as to provide exercises based on the issues and techniques introduced in each chapter. The book is intended as a challenge to involve students as active participants in the course.

Michael DEMUTH, Jan A. VAN CASTEREN. — **Stochastic spectral theory for selfadjoint Feller operators: a functional integration approach.** — Probability and its applications. — Un vol. relié, 16×24, de XII, 463 p. — ISBN 3-7643-5887-4. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2000.

A beautiful interplay between probability theory (Markov processes, martingale theory) on the one hand and operator and spectral theory on the other yields a uniform treatment of several kinds of Hamiltonians such as the Laplace operator, relativistic Hamiltonian, Laplace-Beltrami operator, and generators of Ornstein-Uhlenbeck processes. For such operators regular and singular perturbations of order zero and their spectral properties are investigated. A complete treatment of the Feynman-Kac formula is given. The theory is applied to such topics as compactness or trace class properties of differences of Feynman-Kac semigroups, preservation of absolutely continuous and/or essential spectra and completeness of scattering systems.

Evarist GINÉ, David M. MASON, Jon A. WELLNER, (Editors). — **High dimensional probability II.** — Un vol. relié, 16×24, de X, 510 p. — ISBN 0-8176-4160-2. — Prix: SFr. 198.00. — Birkhäuser, Boston, 2000.

High dimensional probability is a rapidly growing field. Many new ideas, results, and directions in this evolving subject are explored in this volume, an outgrowth of the Second International Conference on High Dimensional Probability, held at the University of Washington, Seattle. The notion of high dimensional probability, as represented by these papers, encompasses a wide range of topics in both statistics and probability theory, centering around the development and application of powerful methods in the areas of probability on Banach spaces, Gaussian process theory, and strong and distributional approximation. Considered as a whole, this work provides researchers and graduate students with a fine introduction to the strength and applicability of these methods. Topics covered include: exponential and moment inequalities for a variety of processes, estimates for Gaussian processes, limit theorems for sums of independent random vectors and empirical processes, strong approximation and embedding in arbitrary dimensions, multidimensional distribution theory, statistical function estimation, multivariate statistics.

Takeyuki HIDA, Rajeeva L. KARANDIKAR, Hiroshi KUNITA, Balram S. RAJPUT, Shinzo WATANABE, Jie XIONG, (Editors). — **Stochastics in finite and infinite dimensions: in honor of Gopinath Kallianpur.** — Trends in mathematics. — Un vol. relié, 16,5×24, de XXXIV, 410 p. — ISBN 0-8176-4137-8. — Prix: SFr. 198.00. — Birkhäuser, Boston, 2001.

During the last fifty years, Gopinath Kallianpur has made extensive significant contributions to diverse areas of probability and statistics, including stochastic finance, Fisher consistent estimation, non-linear prediction and filtering problems, zero-one laws for Gaussian processes and reproducing kernel Hilbert space theory, and stochastic differential equations in infinite dimensions. To honor Kallianpur's pioneering work and scholarly achievements, a number of leading experts have written research articles highlighting progress and new directions of research in these and related areas. This commemorative volume, dedicated to Kallianpur on the occasion of his seventy-fifth birthday, will pay tribute to his multi-faceted achievements and to the deep insight and inspiration he has so graciously offered his students and colleagues throughout his career.

N. LIMNIOS, M. NIKULIN, (Editors). — **Recent advances in reliability theory: methodology, practice, and inference.** — Statistics for industry and technology. — Un vol. relié, 18,5×26, de XXV, 514 p. — ISBN 0-8176-4135-1. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2000.

This book presents thirty-one extensive and carefully edited chapters providing an up-to-date survey of new models and methods for reliability analysis and applications in science, engineering, and technology. The chapters contain broad coverage of the latest developments and innovative techniques in a wide range of theoretical and numerical issues in the field of statistical and probabilistic methods in reliability. The book is organized into eight thematic parts: General approach; probability models and related issues; asymptotic analysis; statistical models and data analysis; software reliability; statistical inference and asymptotic methods in statistics.

Rolando REBOLLEDO, (Editor). — **Stochastic analysis and mathematical physics: ANESTOC'98.** — Proceedings of the Third International Workshop. — Trends in mathematics. — Un vol. relié, 16,5×24, de VIII, 166 p. — ISBN 0-8176-4185-8. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2000.

This work highlights emergent research in the area of quantum probability. Several papers present a qualitative analysis of quantum dynamical semigroups and new results on q-deformed oscillator algebras, while others stress the application of classical stochastic processes in quantum modeling. All of the contributions have been thoroughly refereed and are an outgrowth of an International Workshop in Stochastic Analysis and Mathematical Physics. The book targets an audience of mathematical physicists as well as specialists in probability theory, stochastic analysis, and operator algebras.

Philippe ROBERT. — **Réseaux et files d'attente: méthodes probabilistes.** — Mathématiques & applications, vol. 35. — Un vol. broché, 15,5×23,5, de XII, 368 p. — ISBN 3-540-67872-7. — Prix: SFr. 104.00. — Springer, Paris, 2000.

Ce livre présente une catégorie de modèles probabilistes regroupés sous le nom de réseaux ou systèmes de files d'attente. Ces modèles interviennent dans de nombreuses applications, comme les réseaux de télécommunication ou les réseaux informatiques. Sur le plan théorique ils sont à la source d'une large classe de problèmes: marches aléatoires et diffusions réfléchies, processus ponctuels, etc. Ce livre présente les techniques probabilistes qui permettent d'étudier

le comportement qualitatif de ces modèles: existence de régimes stationnaires, caractérisation du comportement à l'équilibre, étude asymptotique du comportement transitoire (événements rares) et des régimes critiques (saturation)...

Statistique

John J. BENEDETTO, Paulo J.S.G. FERREIRA, (Editors). — **Modern sampling theory: mathematics and applications.** — Un vol. relié, 16,5×24, de XVI, 417 p. — ISBN 0-8176-4023-1. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2001.

Sampling is a fundamental topic in the engineering and physical sciences. This book focuses on recent mathematical methods and theoretical developments, as well as some current central applications of the Classical Sampling Theorem. The Classical Sampling Theorem, which originated in the 19th century, is often associated with the names of Shannon, Kotelnikov, and Whittaker; and one of the features of this book is an English translation of the pioneering work in the 1930s by Kotelnikov, a Russian engineer. Following a technical overview and Kotelnikov's article, the book includes a wide and coherent range of mathematical ideas essential for modern sampling techniques.

Karlheinz GRÖCHENIG. — **Foundations of time-frequency analysis.** — Applied and numerical harmonic analysis. — Un vol. relié, 16×24, de XV, 359 p. — ISBN 0-8176-4022-3. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

For many years time frequency analysis has been pursued mainly in engineering, but recently, and with the development of wavelet theory, it has emerged as a thriving field of applied mathematics. This book presents the first systematic introduction to time-frequency analysis understood as a central area of applied harmonic analysis, while at the same time honoring its interdisciplinary origins. Important principles are (a) classical Fourier analysis as a tool that is central in modern mathematics, (b) the mathematical structures based on the operations of translation and modulations (i.e. the Heisenberg group), (c) the many forms of the uncertainty principle, and (d) the omnipresence of Gaussian functions, both in the methodology of proofs and in important statements.

Cheng HSIAO, Kimio MORIMUNE, James L. POWELL, (Editors). — **Nonlinear statistical modeling.** — Proceedings of the Thirteenth International Symposium in Economic Theory and Econometrics: Essays in Honor of Takeshi Amemiya. — International Symposia in Economic Theory and Econometrics. — Un vol. relié, 16,5×23,5, de XVIII, 452 p. — ISBN 0-521-66246-X. — Prix: £55.00. — Cambridge University Press, Cambridge, 2001.

This collection brings together important contributions by leading econometricians on parametric approaches to qualitative and sample selection models, nonparametric and semi-parametric approaches to qualitative and sample selection models, and nonlinear estimation of cross-sectional and time series models. The advances achieved here can important bearing on the choice of methods and analytical techniques in applied research. This collection is dedicated to Professor Takeshi Amemiya in honor of his path-breaking contributions to econometrics and statistics.

Donald B. PERCIVAL, Andrew T. WALDEN. — **Wavelet methods for time series analysis.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×25, de XXV, 594 p. — ISBN 0-521-64068-7. — Prix: £40.00. — Cambridge University Press, Cambridge, 2000.

Data in the form of time series are routinely collected in science, engineering, and other areas such as finance and economics. This is an introduction to wavelet analysis 'from the

ground level and up', and to wavelet-based statistical analysis of time series. It focuses on practical discrete time techniques, with detailed descriptions of the theory and algorithms needed to understand and implement the discrete wavelet transforms. Numerous examples illustrate the techniques on actual time series. The many embedded exercises – with full solutions provided in the appendix – allow use of the book for self-guided study; additional exercises can be used in a classroom setting. A Web site gives access to the time series and wavelets used in the book, as well as information on accessing software in S-Plus and other languages. This book will be welcomed by all students and researchers wishing to use wavelet methods to analyse time series.

B.G. QUINN, E.J. HANNAN. — **The estimation and tracking of frequency**. — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18,5×26, de XI, 266 p. — ISBN 0-521-80446-9. — Prix: £37.50. — Cambridge University Press, Cambridge, 2001.

Many electronic and acoustic signals can be modelled as sums of sinusoids and noise. However, the amplitudes, phases and frequencies of the sinusoids are often unknown and must be estimated in order to characterise the periodicity or near-periodicity of the signal. The problem of tracking slow frequency changes over time of a very noisy sinusoid is also considered. Rigorous analyses are presented via asymptotic or large sample theory, together with physical insight. The book focuses on achieving extremely accurate estimates when the signal to noise ratio is low but he sample size is large. Each chapter begins with a detailed overview, and many applications are given. Matlab code for the estimation techniques is also included. The book will thus serve as an excellent introduction and reference for researchers analysing such signals.

Imme VAN DEN BERG. — **Principles of infinitesimal stochastic and financial analysis.** — Un vol. relié, 16×22,5, de XII, 136 p. — ISBN 981-01-4358-8. — Prix: £21.00. — World Scientific, Singapore, 2000.

The setting of this book is the discrete-time version of the Black-Scholes model, namely the Cox–Ross–Rubinstein model. The book gives a complete description of its background, which is now only the theory of finite stochastic processes. The novelty lies in the fact that orders of magnitude — in the sense of nonstandard analysis — are imposed on the parameters of the model. This not only makes the model more economically sound (such as rapid fluctuations of the market being represented by infinitesimal trading periods), but also leads to a significant simplification: the fundamental results of Black–Scholes theory are derived in full generality and with mathematical rigour, now at graduate level. The material has been repeatedly taught in a third-year course to econometricians.

Analyse numérique

Kai BORRE. — **Plane networks and their applications.** — Un vol. relié, 16×24, de X, 170 p. — ISBN 0-8176-4193-9. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2001.

Key features include: Examination of classical mathematical tools for analyzing discrete networks is followed by a new well-developed theory, which is the continuous analogue of a discrete network. — Transition from the discrete to the continuous case described via finite elements: Ch. 3 involves an analysis of linear operators, variational calculus, boundary value problems for PDEs, and Green's functions; Green's functions are the continuous analogue of the discrete error covariance functions, and form the basis all types of error prediction. — Techniques applied to levelling and other observation types of networks in one and two dimensions. — Three different applications of the continuous theory. — Practical problems, supported by MATLAB files, underscore the continuous theory; additional material can be downloaded from the author's website at www.kom.auc.dk/~borre/network.

P.G. CIARLET, J.L. LIONS, (Editors). — **Handbook of numerical analysis, vol. 7: Solution of equations in R^n (part 3). Techniques of scientific computing (part 3).** — Un vol. relié, 17,5×24,5, de X, 1020 p. — ISBN 0-444-50350-1. — Prix: Dfl. 350.00. — Elsevier, Amsterdam, 2000.

This series of volumes covers all the major aspects of Numerical Analysis, serving as the basic reference work on the subject. Each volume concentrates on one to three particular topics. Each article, written by an expert, is an in-depth survey, reflecting the most recent trends in the field, and is essentially self-contained. *Contents:* Gaussian elimination for the solution of linear systems of equations by G. Meurant. — The analysis of multigrid methods by J.H. Bramble and X. Zhang. — Wavelet methods in numerical analysis by A. Cohen. — Finite volume methods by R. Eymard, T. Gallouët and R. Herbin.

Franck JEDRZEJEWSKI. — **Introduction aux méthodes numériques.** — Un vol. broché, 15×23,5, de 269 p. — ISBN 2-287-59711-5. — Prix: DM 79.00. — Springer, Paris, 2001.

L'originalité de ce livre est de réunir en un seul volume l'ensemble des techniques numériques enseignées dans les Grandes Ecoles et certaines formations universitaires. Il présente sur de nombreux exemples le déroulement séquentiel des algorithmes et est, par conséquent, d'une lecture facile. Les concepts premiers du calcul numérique, les notions de stabilité, de convergence et d'optimisation algorithmiques sont introduits dès les premiers chapitres. Les méthodes d'approximation et les techniques d'analyse numérique matricielle, qui forment les chapitres suivants, sont accompagnées d'exemples et d'exercices qui permettent une meilleure compréhension du texte. L'étude des équations différentielles ordinaires introduit plusieurs concepts mathématiques importants. Les derniers chapitres sont consacrés aux équations aux dérivées partielles et aux méthodes d'éléments finis. Ils traitent de la résolution numérique des équations linéaires et non-linéaires de mécanique et de physique mathématique, qui demeurent les problèmes qui préoccupent le plus les ingénieurs d'aujourd'hui.

Alexander A. SAMARSKII. — **The theory of difference schemes**. — Monographs and textbooks in pure and applied mathematics, vol. 240. — Un vol. relié, 16×23,5 de XVII, 761 p. — ISBN 0-8247-0468-1. — Prix: US$225.00. — Marcel Dekker, New York, 2001.

Illustrated with helpful examples of practical implementations of general stability theory for improving accuracy, the book summarizes basic concepts such as approximation, stability, convergence, and operator equations... demonstrates applications of a priori estimates for establishing convergence and expressing stability of two- and three-layer schemes with initial data... describes homogeneous difference schemes in the class of discontinuous coefficients... covers a variety of elliptic equations, including the Dirichlet problem and Poisson's equations... treats difference schemes as operator and operator-difference equations without structural constraints and as nonstationary equations with constant coefficients... and much more.

Informatique

Gerald FARIN, Dianne HANSFORD. — **The essentials of CAGD.** — Un vol. relié, 19×24,5, de XII, 229 p. — ISBN 1-56881-123-3. — Prix: US$48.00. — A.K. Peters, Natick, Mass., 2000.

Putting the G into CAGD, the authors provide a much-needed practical and basic introduction to computer-aided geometric design. This book will help readers understand and use the elements of computer-aided geometric design, curves and surfaces, without the mathematical baggage that is necessary only for more advanced work. Though only minimal background in mathematics is needed to understand the book's concepts, the book covers an amazing array of

topics such as Bézier and B-spline curves and their corresponding surfaces, subdivision surfaces, and NURBS (Non-Uniform Rational B-Splines). Also included are techniques such as interpolation and least squares methods.

Gil KALAI, Günter M. ZIEGLER, (Editors). — **Polytopes: combinatorics and computation.** — DMV Seminar, Bd. 29. — Un vol. broché, 17×24, de 232 p. — ISBN 3-7643-6351-7. — Prix: SFr. 48.00. — Birkhäuser, Basel, 2000.

Questions that arose from linear programming and combinatorial optimization have been a driving force for modern polytope theory, such as the diameter questions motivated by the desire to understand the complexity of the simplex algorithm, or the need to study facets for use in cutting plane procedures. In addition, algorithms now provide the means to computationally study polytopes, to compute their parameters such as flag vectors, graphs and volumes, and to construct examples of large complexity. The papers of this volume thus display a wide panorama of connections of polytope theory with other fields. Areas such as discrete and computational geometry, linear and combinatorial optimization, and scientific computing have contributed a combination of questions, ideas, results, algorithms and, finally, computer programs. The volume grew out of a DMV Seminar on "Polytopes and Optimization", held in Oberwolfach in November 1997, and represents lectures and presentations from that workshop as well as additional invited papers.

Manfred KERBER, Michael KOHLHASE, (Editors). — **Symbolic computation and automated reasoning: the Calculemus-2000 Symposium.** — Un vol. relié, 16×24, de XI, 270 p. — ISBN 1-56881-145-4. — Prix: US$60.00. — A.K. Peters, Natick, Mass., 2001.

Computer algebra and automated reasoning systems are two powerful tools that support complex tasks such as the design of large software and hardware systems. Inspired by the ideas of Gottfried Wilhelm Leibnitz, one of the first inventors of mechanical calculators, whose dictum "calculemus" expressed his dream of establishing an algorithm that would resolve any disputes by objective reasoning, the Calculemus 2000 Symposium was organized with the goal to further integrate these tools in optimizing the handling of complex tasks. This volume presents the papers given at the 8th Symposium on the Integration of Symbolic Computation and Mechanized Reasoning, held August 6-7, 2000 in St. Andrews, Scotland.

Donald E. KNUTH. — **Arithmetik.** — Aus dem Englischen übersetzt von Rüdiger Loos. — Un vol. relié, XIII, 538 p. — ISBN 3-540-66745-8. — Prix: DM 69.00. — Springer, Berlin, 2001.

Das Buch *Arithmetik* ist eine Übersetzung des vierten Kapitels der legendären Werkreihe *The Art of Computer Programming* von Donald E. Knuth in der neuesten Fassung. Es handelt sich um eine umfangreiche Einführung in die Computeralgebra, die den neuesten Stand der Forschung berücksichtigt. Donald E. Knuth versteht es, die Algorithmen didaktisch sehr geschickt und ohne Kompromisse bei der Strenge aufzubereiten. Das Buch enthält außerdem Hunderte von Aufgaben verschiedener Schwierigkeitsgrade mit Lösungen. Der Übersetzer, Prof. Dr. R. Loos, lehrt an der Universität Tübingen. — Inhalt: Arithmetische Algorithmen. — Arithmetik von Ganzzahlen. — Arithmetik von Gleitpunktzahlen. — Polynominale Arithmetik. — Potenzreihen.

Vladimir ROVENSKI. — **Geometry of curves and surfaces with Maple.** — Un vol. relié, 18 ×26, de X, 310 p. — ISBN 3-8176-4074-6. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2000.

This concise text on geometry with computer modeling presents some elementary methods for analytical modeling and visualization of curves and surfaces. The author systematically

examines such powerful tools as 2-D and 3-D animation of geometrical images, transformations, shadows, and colors, and then further studies more complex problems in differential geometry. Well-illustrated with more than 350 figures — reproducible using the Maple programs in the book — the work is devoted to three main areas: curves, surfaces, and polyhedra. Pedagogical benefits can be found in the large number of Maple programs, some of which are analogous to C++ programs, including those for splines and fractals. To avoid tedious typing, readers will be able to download many of the programs from the Birkhäuser web site.

Guillermo SAPIRO. — **Geometric partial differential equations and image analysis.** — Un vol. relié, 16×23,5, de XXV, 384 p. — ISBN 0-521-79075-1. — Prix: £40.00. — Cambridge University Press, Cambridge, 2001.

This book provides an introduction to the use of geometric partial differential equations in image processing and computer vision. This research area brings a number of new concepts into the field, providing a very fundamental and formal approach to image processing. State-of-the-art practical results in a large number of real problems are achieved with the techniques described in this book. Applications covered include image segmentation, shape analysis, image enhancement, and tracking. This book will be a useful resource for researchers and practitioners. It is intended to provide information for people investigating new solutions to image processing problems as well as for people searching for existing advanced solutions.

Mécanique des fluides, acoustique

G.K. BATCHELOR, H.K. MOFFATT, M.G. WORSTER, (Editors). — **Perspectives in fluid dynamics: a collective introduction to current research.** — Un vol. relié, de 18×25, de XII, 631 p. — ISBN 0-521-78061-6. — Prix: £100.00. — Cambridge University Press, Cambridge, 2000.

Conventional textbooks cannot hope to give graduate students more than an inkling of what topics are currently being researched, or how to make a choice between them. This book aims to rectify matters, at least in part. It consists of eleven chapters that each introduces a different branch of the subject. Though not exhaustive, the coverage is broad: thin-film flows, Saffman-Taylor fingering, flows in arteries and veins, convective and absolute instabilities, turbulence, natural convection, magnetohydrodynamics, solidification, geological fluid mechanics, oceanography and atmospheric dynamics are all introduced and reviewed by established authorities. Thus the book will not only be suitable for graduate-level courses but also for specialists seeking introductions to other areas.

Giovanni P. GALDI, John G. HEYWOOD, Rolf RANNACHER, (Editors). — **Fundamental directions in mathematical fluid mechanics.** — Advances in mathematical fluid mechanics. — Un vol. relié, 17,5×24, de VIII, 293 p. — ISBN 3-7643-6414-9. — Prix: SFr. 118.00. — Birkhäuser, Basel, 2000.

This set of six papers, written by eminent experts in the field, is concerned with that part of fluid mechanics that seeks its foundation in the rigorous mathematical treatment of the Navier-Stokes equations. While some of the contributions are expository, others primarily present new results within a wider context and fuller exposition than is usual for research papers. The book is meant to introduce researchers and advanced students to the research level on some of the most important topics of the field.

Roy JACKSON. — **The dynamics of fluidized particles.** — Cambridge monographs on mechanics. — Un vol. relié, 16×23,5, de XII, 339 p. — ISBN 0-521-78122-1. — Prix: £42.50. — Cambridge University Press, Cambridge, 2000.

Recent years have seen major progress in the development of equations to describe the motion of fluid-particle mixtures and their application to a limited range of problems. With rapid advances in numerical methods and computing power we are now presented with new opportunities to use direct integration of these equations in the solution of complex practical problems. In this book the author formulates these equations carefully and fully describes the important existing applications that serve to test their ability to predict salient phenomena. This account will be of value to both novices and established researchers in the field, and also to people interested in applying the equations to practical engineering problems.

Ansgar JÜNGEL. — **Quasi-hydrodynamic semiconductor equations**. — Progress in nonlinear differential equations and their applications, vol. 41. — Un vol. relié, 16×24, de X, 293 p. — ISBN 3-7643-6349-5. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

In this book a hierarchy of macroscopic models for semiconductor devices is presented. Three classes of models are studied in detail: isentropic drift-diffusion equations, energy-transport models, and quantum hydrodynamic equations. The derivation of each of the models is shown, including physical discussions. Furthermore, the corresponding mathematical problems are analyzed, using modern techniques for nonlinear partial differential equations. The equations are discretized employing mixed finite-element methods. Also, numerical simulations for modern semiconductor devices are performed, showing the particular features of the models. Modern analytical techniques have been used and further developed, such as positive solution methods, local energy methods for free-boundary problems and entropy methods.

Economie, recherche opérationnelle, jeux

Claus HILLERMEIER. — **Nonlinear multiobjective optimization: a generalized homotopy approach**. — International series of numerical mathematics, vol. 135. — Un vol. relié, 17×24, de 135 p. — ISBN 3-7643-6498-X. — Prix: SFr. 78.00. — Birkhäuser, Basel, 2001.

The present work, after providing a survey of the state of the art in multiobjective optimization, gives new insight into this important mathematical field by consequently taking up the viewpoint of differential geometry. This approach, unprecedented in the literature, very naturally results in a generalized homotopy method for multiobjective optimization which is theoretically well-founded and numerically efficient. The power of the new method is demonstrated by solving two real-life problems of industrial optimization. The book presents recent results obtained by the author.

Mahmut PARLAR. — **Interactive operations research with Maple: methods and models.** — Un vol. relié, 16×24, de XIV, 468 p. — ISBN 0-8176-4165-3. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2000.

Detailed is Maple's treatment of some of the mathematical techniques used in OR modeling: e.g., algebra and calculus, ordinary and partial differential equations, linear algebra, transform methods, and probability theory. A number of examples of OR techniques and applications are presented, such as linear and nonlinear programming, dynamic programming, stochastic processes, inventory models, queuing systems, and simulation. Throughout the text Maple statements used in the solutions of problems are clearly explained. At the same time, technical background material is presented in a rigorous mathematical manner to reach the OR novice and

professional. Numerous end-of-chapter exercises, a good bibliography and overall index at the end of the book are also included, as well as Maple worksheets that are easily downloadable from this website or from the author's website at www.business.mcmaster.ca/msis/profs/parlar, or from the Birkhäuser site.

Systèmes, contrôle optimal

Goong CHEN, Irena LASIECKA, Jianxin ZHOU, (Editors). — **Control of nonlinear distributed parameter systems.** — Lecture notes in pure and applied mathematics, vol. 218. — Un vol. broché, 18×25,5, de XII, 357 p. — ISBN 0-8247-0564-5. — Prix: US$150.00. — Marcel Dekker, New York, 2001.

This book investigates control laws, stability and optimization, and feedback syntheses for systems defined by partial differential equations... chronicles advances in "smart" materials, developing methodology for nonlinear distributed parameter systems (DPS), and in dynamical systems... illuminates the effects of chaotic behavior on linear wave equations... articulates the theory and method for attaining dual control of nonconvex DPS... explains how to achieve bilinear control for semilinear parabolic equations... details modeling, synthesis, and simulation techniques for static buckling and optional control of beams, rods, and nonlinear infinite dimensional systems... and much more.

Panagiotis D. CHRISTOFIDES. — **Nonlinear and robust control of PDE systems: methods and applications to transport-reaction processes.** — Systems & control. — Un vol. relié, 16×24, de XV, 248 p. — ISBN 0-8176-4156-4. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

Beginning with an introduction to control of PDE systems, the book discusses nonlinear and robust control of hyperbolic and parabolic PDEs with fixed spatial domains, and parabolic PDEs with time-dependent spatial domains. The synthesis of the controllers is performed by using geometric and Lyapunov-based control techniques. The book includes comparisons of the methods followed for controller synthesis with other approaches and discussions of practical implementation issues that can help researchers and engineers understand the development and application of the methods in greater depth.

Fritz COLONIUS, Uwe HELMKE, Dieter PRÄTZEL-WOLTERS, Fabian WIRTH, (Editors). — **Advances in mathematical systems theory. —** A volume in honor of Diederich Hinrichsen. — Systems & control: foundations & applications. — Un vol. relié, 16×24, de XXX, 296 p. — ISBN 0-8176-4162-9. — Prix: SFr. 168.00. — Birkhäuser, Boston, 2000.

The new edited book focuses on the contemporary developments and results in mathematical systems theory and control. The book includes invited peer-reviewed, authoritative expositions and surveys of these fields, presented by leading international researchers. A key theme of the book is the stability and robustness of linear and nonlinear systems using the concepts of stability radii and spectral value sets. Chapters survey recent advances in linear and nonlinear systems theory, including parameterization problems and behaviors of linear systems. In addition, the volume examines controllability and stabilization of infinite-dimensional systems (allowing for hysteresis nonlinearities) with functional analytic and algebraic approaches.

Zoran GAJIĆ, Myo-Taeg LIM. — **Optimal control of singularly perturbed linear systems and applications: high-accuracy techniques.** — Control engineering series. — Un vol. relié, 16×24, de XIV, 309 p. — ISBN 0-8247-8976-8. — Prix: US$150.00. — Marcel Dekker, New York, 2001.

Constructing a unique method applicable to a number of challenging real-world control systems, this book reveals how to achieve high accuracy using slow-fast time scales for determinis-

tic and stochastic, continuous- and discrete-time, linear-quadratic optimal control, and filtering problems... illustrates high-gain feedback and cheap control engineering problems, sampled data systems, and H optimization with helpful case studies... demonstrates theoretical results from examples in the aerospace, chemical, electrical, and automotive industries... simplifies hardware implementation of optimal controllers and filters...considers the eigenvector approach for the algebraic Riccati equations... identifies unsolved discrete-time domain and finite horizon optimization problems for future research... and more.

Harry G. KWATNY, Gilmer L. BLANKENSHIP. — **Nonlinear control and analytical mechanics: a computational approach.** — Control engineering. — Un vol. relié, 16,5×24, de XV, 317 p. + 1 CD-ROM. — ISBN 0-8176-4147-5. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2000.

This book features an integrated treatment of nonlinear control and analytical mechanics and a set of symbolic computing software tools for modeling and control systems design. The integrated approach provides a rich set of models and control design examples that are of contemporary and practical interest to engineers. By simultaneously considering both mechanics and control, the engineer achieves a better appreciation of the underlying geometric ideas and constructions that are common to both. This book highlights and utilizes the computational infrastructure common to both modern analytical mechanics and nonlinear control. To achieve the full benefits of the concepts now available, symbolic, as well as numerical, computing techniques must be exploited.

Marcio S. DE QUEIROZ, Darren M. DAWSON, Siddharth P. NAGARKATTI, Fumin ZHANG. — **Lyapunov-based control of mechanical systems.** — Control engineering. — Un vol. relié, 16×24, de XIII, 316 p. — ISBN 0-8176-4086-X. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This is a text/reference on advanced nonlinear controllers for mechanical systems that are based on Lyapunov-type design and stability analysis methodology. The presentation illustrates, in a unified framework, how recent Lyapunov-based techniques can be used to solve a variety of nonlinear control problems for mechanical systems. The foundations of the Lyapunov-based approach are established in a thorough manner, including necessary math background materials. In the first portion of the book, solutions are provided to some tracking problems for rigid mechanical systems, i.e., systems modeled by ordinary differential equations. The second portion addresses problems of setpoint/vibration control of flexible mechanical systems, i.e., systems modeled by partial differential equations. By covering theory and applications, the book addresses both ODE-based and PDE-based mechanical systems and presents results for many useful real-time experiments and computer simulations.

Information, communication, circuits

D.R. HANKERSON, D.G. HOFFMAN, D.A. LEONARD, C.C. LINDNER, K.T. PHELPHS, C.A. RODGER, J.R. WALL. — **Coding theory and cryptography: the essentials.** — Second edition, revised and expanded. — Pure and applied mathematics, vol. 234. — Un vol. relié, 16×23,5, de X, 350 p. — ISBN 0-8247-0465-7. — Prix: US$85.00. — Marcel Dekker, New York, 2000.

This highly successful textbook, proven by the authors in a popular two-quarter course, presents coding theory, construction, encoding, and decoding of specific code families in an "easy-to-use" manner appropriate for students with only a basic background in mathematics—offering revised and updated material on the Berlekamp-Massey decoding algorithm and convolutional

codes. The revised edition includes an extensive new section on cryptography, designed for an introductory course on the subject. Containing data on number theory, encryption schemes, and cyclic codes, the second edition of *Coding Theory and Cryptography: the Essentials* introduces the mathematics as it is needed; contains many exercises, with solutions; provides a concise and self-contained introduction to modern cryptography, with an emphasis on public-key methods; spends considerable time on two of the most applicable codes, Reed-Solomon and convolutional codes, that are used by NASA, ... and more!

Gareth A. JONES, J. Mary JONES. — **Information and coding theory.** — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de XI, 210 p. — ISBN 1-85233-622-6. — Prix: DM 59.00. — Springer, London, 2000.

This book provides an elementary introduction to information theory and coding theory – two related aspects of the problem of how to transmit information efficiently and accurately. The first part of the book focuses on information theory, covering uniquely decodable and instantaneous codes, Huffman coding, entropy, information channels, and Shannon's fundamental theorem. In the second part, on coding theory, linear algebra is used to construct examples of such codes, such as the Hamming, Hadamard, Golay and Reed-Muller codes. The book emphasises carefully explained proofs and worked examples; exercises (with solutions) are integrated into the text as part of the learning process. Only some basic probability theory and linear algebra, together with a little calculus (as covered in most first-year university syllabuses), is assumed, making it suitable for second- and third-year undergraduates in mathematics, electronics and computer science.

Kwok-Yan LAM, Igor SHPARLINSKI, Huaxiong WANG, Chaoping XING, (Editors). — **Cryptography and computational number theory**. — Progress in computer science and applied logic, vol. 20. — Un vol. relié, 16×24, de VIII, 378 p. — ISBN 3-7643-6510-2. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2001.

The rapid development of cryptography and computational number theory was the subject of the CCNT Workshop in Singapore in November 1999. The present volume comprises a selection of refereed papers originating from this event, presenting either a survey of some area, or original and new results. They concern many different aspects of the field such as theory, techniques, applications and practical experience. It provides a state-of-the-art report on some number theoretical issues of significance to cryptography.

Armen H. ZEMANIAN. — **Pristine transfinite graphs and permissive electrical networks.** — Un vol. relié, 16,5×24, de XI, 183 p. — ISBN 0-8176-4194-7. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

A transfinite graph or electrical network of the first rank is obtained conceptually by connecting conventionally infinite graphs and networks together at their infinite extremities. This process can be repeated to obtain a hierarchy of transfiniteness whose ranks increase through the countable ordinals. This idea, which is of recent origin, has enriched the theories of graphs and networks with radically new constructs and research problems. This book provides a more accessible introduction to the subject that, though sacrificing some generality, captures the essential ideas of transfiniteness for graphs and networks. Thus, for example, some results concerning discrete potentials and random walks on transfinite networks can now be presented more concisely. On the other hand, the simplifications enable the development of many new results that were previously unavailable.