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## BULLETIN BIBLIOGRAPHIQUE

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### *Généralités*

Anatol BECK, Michael N. BLEICHER, Donald W. CROWE. — **Excursions into mathematics.** — The millenium edition. — Un vol. broché,  $19 \times 24$ , de xxv, 499 p. — ISBN 1-56881-115-2. — Prix: US\$34.00. — A.K. Peters, Natick, Massachusetts, 2000.

Originally published over three decades ago, *Excursions into mathematics* is one of the most popular mathematical books ever written for a general audience. Taking the reader on short “excursions” into several specific disciplines of mathematics, it explains the concepts in a non-threatening way that makes them interesting and accessible to any reader. Now the classic book is in print, and the *Millenium edition* is updated with new research and solutions to outstanding problems that have been solved since the last edition was printed in 1969, such as the solution to the well-known “four-color problem”.

Roel J. BOSKER, Bert P.M. CREEMERS, Sam STRINGFIELD, (Editors). — **Enhancing educational excellence, equity and efficiency: evidence from evaluations of systems and schools in change.** — Un vol. relié,  $16,5 \times 24,5$ , de x, 259 p. — ISBN 0-7923-6138-5. — Prix: Dfl. 125.00. — Kluwer Academic Publishers, Dordrecht, 1999.

This book brings together research based evidence on the effectiveness of major Australian, Dutch, and UK improvement efforts in education at both primary and secondary level, whilst making comparisons with similar US initiatives. The book addresses several major questions in this new environment. Those questions include: how to combat educational disadvantages, how to integrate pupils with special educational needs in regular education, how to implement educational standards initiatives, how to restructure secondary education, how to implement decentralized policy making, and how to implement a class size reduction initiative? Finally, the authors suggest directions for future research in order to increase our understanding of what works in education and why.

M'hammed BOULAGOUAZ, Jean-Pierre TIGNOL, (Editors). — **Algebra and number theory.** — Proceedings of a conference held in Fez, Morocco. — Lecture notes in pure and applied mathematics, vol. 208. — Un vol. broché,  $18 \times 25,5$ , de x, 286 p. — ISBN 0-8247-0341-3. — Prix: US\$150.00. — Marcel Dekker, New York, 2000.

This book analyzes modules, automorphisms, and the notion of gr-coherence... showcases graded multiplication rings, Dedekind rings, regular and Noetherian V-rings, and semi-local rings... illuminates the relationship between analoid sets and analytic functions... examines new theoretical aspects of cohomology, nonrational fields, graded coalgebras, and decomposition of



orthogonal involutions... highlights Galois groups and the Galois correspondence theorem... investigates generic Abelian crossed products... explores uses of differential modules and the Robba condition, etc.

Alain CONNES, André LICHNEROWICZ, Marcel Paul SCHÜTZENBERGER. — **Triangle de pensées.** — Un vol. broché,  $14 \times 22$ , de 214 p. — ISBN 2-7381-0762-1. — Prix: FF 140.00. — Editions Odile Jacob, Paris, 2000.

Cette discussion entre trois mathématiciens propose la confrontation de trois points de vue sur les mathématiques et de trois pratiques de cette discipline. La discussion s'organise autour de quatre thèmes: la nature des mathématiques; l'application des mathématiques au réel; l'interprétation de la mécanique quantique et son unification avec la relativité; le temps mathématique et le temps humain. A cette occasion, Alain Connes développe la philosophie des mathématiques qu'il avait présentée dans son dialogue avec Jean-Pierre Changeux, *Matière à pensée*. Ce livre est un témoignage unique sur le passage actuel des mathématiques modernes, repliées sur elles-mêmes, aux mathématiques post-modernes, résolument tournées vers le monde.

Daniel FREDON, Jésus EZQUERRA, Michel BRIDIER. — **Mathématiques pour les sciences physiques, 2: rappels de cours, questions de réflexion, exercices d'entraînement.** — Sciences sup. Série TD. — Un vol. broché,  $17 \times 24$ , de VIII, 211 p. — ISBN 2-10-002969-5. — Prix: FF 98.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage s'adresse aux étudiants du premier cycle (DEUG, SM). Il couvre en 11 chapitres et 173 questions et exercices le programme de mathématiques de deuxième année: fonctions de plusieurs variables; champs de vecteurs; fonctions définies par une intégrale; intégrales multiples, curvilignes et de surface; séries numériques; suite et séries de fonctions; séries entières et séries de Fourier; transformations de Laplace.

Estela A. GAVOSTO, Steven G. KRANTZ, William MCCALLUM, (Editors). — **Contemporary issues in mathematics education.** — Mathematical Sciences Research Institute Publications, vol. 36. — Un vol. broché,  $15,5 \times 23,5$ , de xv, 174 p. — ISBN 0-521-65471-8. — Prix: £ 12.95 (relié: £ 35.00). — Cambridge University Press, Cambridge, 1999.

This book is the outcome of an effort to create a dialogue about mathematics education that included mathematicians with a wide variety of views. In a conference held at the Mathematical Sciences Research Institute in Berkeley in 1996, more than one hundred mathematics instructors engaged in meaningful and sometimes spirited discussions about how mathematics can and should be taught. Part I deals with general issues in university mathematics education; Part II presents case studies on particular projects; Part III presents a range of opinions on mathematics education in elementary and secondary schools; and Part IV presents the reports of the working groups.

Sir Harold JEFFREYS, Bertha SWIRLES (Lady JEFFREYS). — **Methods of mathematical physics.** — Third edition. — Cambridge mathematical library. — Un vol. broché,  $15,5 \times 23$ , de VIII, 718 p. — ISBN 0-521-66402-0. — Prix: £ 22.95. — Cambridge University Press, Cambridge, 1999.

This well-known text and reference contains an account of those parts of mathematics that are most frequently needed in physics. As a working rule, it includes methods that have

applications in at least two branches of physics. Particular attention is paid to the conditions under which theorems hold. Examples of the practical use of the methods developed are given in the text; these are taken from a wide range of physics, including dynamics, hydrodynamics, elasticity, electromagnetism, heat conduction, wave motion and quantum theory. Exercises, mostly taken from university examination papers, accompany each chapter.

Wolfgang KRULL. — **Gesammelte Abhandlungen = Collected papers.** — Edited by Paulo Ribenboim. — Un ensemble de deux vol. reliés, 18×24,5, de xiii, 1730 p. — ISBN 3-11-012771-7. — Prix: DM 548.00. — Walter de Gruyter, Berlin, 1999.

From the editor's survey entitled "*Wolfgang Krull - Life, work and influence*": Krull's work on ideal theory, especially the dimension theory of ideals, local rings, integral closure and topics alike, have played a basic supporting role in Zariski's development of algebraic geometry. These matters are the object of many books, for example, by Nagata, Matsumura, Kunz. But the ideal theory which evolved from Prüfer and Lorenzen... has developed into an independent discipline, namely multiplicative ideal theory. Krull's results were further extended by Aubert and are the object of books... Krull's valuations continued to be studied..., while analogue notions of valuations in other algebraic structures than fields, have been investigated... Krull's valuations were used in a fundamental way in the famous papers of Ax and Kochen about Artin's conjecture on the  $p$ -adic fields. This innovative work propelled Krull's valuations to a central role in model theory of fields. Another important occurrence of Krull's valuations is in the algebraic theory of quadratic forms and the abstract Riemann surface of a field... Krull's ideas on infinite algebraic extensions led to another approach to the theory of algebraic numbers. A main role is played by profinite groups, like the absolute Galois groups, as presented in books by Cassels and Fröhlich and Neukirch, for example. Undoubtedly, Krull's influence has been much wider than I can attempt to describe...

Dominique LAHANIER-REUTER. — **Conceptions du hasard et enseignement des probabilités et statistiques.** — Education et formation: recherches scientifiques. — Un vol. broché, 13,5×21,5, de x, 236 p. — ISBN 2-13-050207-5. — Prix: FF 138.00. — Presses Universitaires de France, Paris, 1999.

Les élèves de Première et Terminale ainsi que les étudiants en Sciences Humaines sont souvent confrontés à des difficultés importantes lors des cours de statistique et probabilité. En effet, leurs conceptions du hasard, issues de leurs pratiques quotidiennes, font obstacle à la construction du concept de hasard dans ces disciplines. Cet ouvrage permet d'éclairer ces problèmes et de préciser leur mode de fonctionnement au travers de plusieurs expériences menées dans des classes. Il construit de surcroît une situation d'enseignement et d'apprentissage offrant aux enseignants des moyens concrets, fondés théoriquement, pour déplacer les représentations des élèves et des étudiants.

Pierre MEUNIER. — **Cours de mathématiques: Grandes écoles scientifiques MP-MP\*-PSI-PSI\*.** — Mathématiques. — Un vol. broché, 15×22, de 277 p. — ISBN 2-13-050436-1. — Prix: FF 248.00. — Presses Universitaires de France, Paris, 1999.

Comme son titre l'indique, cet ouvrage est destiné à un «double public»: celui des candidats à l'agrégation interne de mathématiques et celui des élèves en classe de mathématiques spéciales options MP-MP\*. Il expose en sept grands chapitres la totalité du cours de mathématiques nécessaire tant à la préparation de l'agrégation interne qu'à la préparation des grands concours nationaux: ENS, Polytechnique, ENSAE, Mines-Ponts, Ecole Centrale de

Paris... Il peut être utilement complété par un choix de quatorze problèmes couvrant l'ensemble du cours qui est présenté; la solution de chacun d'eux figure dans le recueil intitulé: «Problèmes de mathématiques spéciales» publié chez le même éditeur.

Pierre MEUNIER. — **Problèmes de mathématiques spéciales: agrégation interne classes spéciales MP-MP\*, Grandes écoles scientifiques MP-MP\*-PSI-PSI\***. — Mathématiques. — Un vol. broché, 15×22, de VIII, 281 p. — ISBN 2-13-050435-3. — Prix: FF 288.00. — Presses Universitaires de France, Paris, 1999.

Cet ouvrage de problèmes corrigés de mathématiques spéciales est constitué par quatorze énoncés proposés récemment aux grands concours nationaux: Ecoles Normales Supérieures, Polytechnique, Mines-Ponts et Centrale de Paris; il couvre l'ensemble des nouveaux programmes des classes de Taupe des options MP-MP\* et PSI-PSI\*. Les principaux résultats du cours ont été rappelés en début d'ouvrage afin que l'utilisateur de ce manuel puisse progresser le plus rapidement possible.

Jean-Marie MONIER. — **Analyse 2: cours et 600 exercices corrigés**. — 3<sup>e</sup> édition. — J'intègre. Série Monier. — Un vol. broché, 19,5×27, de XII, 369 p. — Prix: FF 175.00. — ISBN 2-10-0044397. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Après Analyse 1, le second volume d'analyse pour la 1<sup>re</sup> année de la série Monier fait à son tour l'objet d'une nouvelle édition. Pour plus de clarté et de lisibilité, le format s'agrandit et une nouvelle mise en pages plus «scolaire», en deux couleurs, améliore encore la convivialité de l'ouvrage. Chaque chapitre s'ouvre par une introduction signalant les prérequis et dégagant les objectifs à atteindre. Une nouvelle rubrique intitulée «Du cours aux exercices» regroupe des conseils de méthodologie pour aider l'étudiant dans la résolution des exercices qui suivent. Chaque chapitre se conclut par des exercices aux solutions très détaillées.

Giuseppe PEANO. — **Geometric calculus: according to the Ausdehnungslehre of H. Grassmann**. — Translated by Lloyd C. Kannenberg. — Un vol. relié, 16×24, de xv, 150 p. — ISBN 0-8176-4126-2. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2000.

Despite its uniqueness, *Calcolo Geometrico* has been strangely neglected by historians of mathematics, and even by scholars of Peano. The book has never been reprinted in its entirety, and only two chapters have ever been translated into English. In part, this neglect has been due to Peano's organization of the work. That is, the section on mathematical logic bears no relation to the rest of the book, and the material there was superseded only a year after its publication by Peano's second book. Only in very recent years have the book's unique merits begun to be recognized. Among these merits are Peano's presentation of the essential features of Grassmann's notoriously obscure *Ausdehnungslehre*, a clarification and improvement upon Grassmann's theory of extensive magnitudes, and a dissemination of other hard-to-understand material.

K. PEEVA, H.-J. VOGEL, R. LOZANOV, P. PEEVA, (Editors). — **Elsevier's dictionary of mathematics in English, German, French and Russian**. — Un vol. relié, 17,5×24,5, de 996 p. — ISBN 0-444-82953-9. — Prix: Dfl. 400.00. — Elsevier, Amsterdam, 2000.

This dictionary contains 11652 entries with more than 4750 cross-references. Selection of the terms was based either on their significance or on their frequency of use according to authoritative encyclopedias, dictionaries and textbooks. Included are both modern developments and contemporary changes in terminology as well as recently established terms. The terminology covers all the major branches from elementary to advanced subjects. This work will

provide readers, writers and translators with a guide of the most widely used terms and collocations in the area, and will prove to be a useful tool for all professionals exploring the multilingual scientific terminology.

Walter POPP. — **Fachdidaktik Mathematik: ein entwicklungsgeschichtlicher Ansatz.** — Un vol. broché, 14,5×21, de VIII, 418 p. — ISBN 3-7614-2125-7. — Prix: DM 44.00. — Aulis Verlag Deubner, Köln, 1999.

Walter Popp wirft einen Blick auf die Geschichte. Sein Grundgedanke: wer versteht, wie sich Mathematik entwickelt, kann auch die moderne Mathematik begreifen. Für die klassischen Gebiete der Schulmathematik bietet er Anregungen zur Gestaltung eines Unterrichts, der sich an der historischen Mathematik orientiert.

Jean-Pierre SERRE. — **Œuvres = Collected papers: vol. IV, 1985-1998.** — Un vol. relié, 18×25, de VIII, 657 p. — ISBN 3-540-65683-9. — Prix: DM 249.00. — Springer, Berlin, 2000.

*Adapté de la préface:* Outre les articles, et les exposés de séminaires, on trouvera dans ce volume les résumés des cours de l'auteur au Collège de France. La plupart de ces cours n'ont pas été publiés, et les démonstrations qu'ils contenaient sont restées inédites; pour compenser, l'auteur a reproduit des lettres personnelles (adressées notamment à K. Ribet et M.-F. Vignéras) qui détaillent certaines de ces démonstrations. Des «notes», placées à la fin, complètent le texte (et parfois le corrigent); elles donnent des références à des travaux plus récents.

Eric SOROSINA. — **Système D: analyse, 400 méthodes, 450 exercices corrigés, 1<sup>re</sup> et 2<sup>e</sup> années toutes filières.** — J'intègre. — Révision. Mathématiques. — Un vol. broché, 17×24, de XII, 467 p. — Prix: FF 185.00. — ISBN 2-10-004503-2. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage présente un grand nombre de méthodes classiques ou originales, et d'astuces destinées à assister les étudiants dans la résolution des problèmes qui leur seront posés aux concours. Toutes ces méthodes sont abondamment illustrées par des exercices variés qui permettent de mieux comprendre comment elles s'appliquent. D'une grande rigueur scientifique, entièrement conforme aux programmes, cet ouvrage, rédigé dans un style proche des étudiants, inaugure la série «Système D», qui a pour vocation d'offrir aux élèves des solutions pratiques dans les principales matières (mathématiques, physique, chimie).

Saul STAHL. — **Real analysis: a historical approach.** — Un vol. relié, 16,5×24, de XIII, 269 p. — ISBN 0-471-31852-3. — Prix: £ 51.95. — John Wiley, New York, 1999.

The book begins with an exciting sampling of classic and famous problems first posed by some of the greatest mathematicians of all time. Archimedes, Fermat, Newton, and Euler are each summoned in turn-illuminating the utility of infinite, power, and trigonometric series in both pure and applied mathematics. Next, the author develops the basic tools of advanced calculus, introducing the various aspects of the completeness of the real number system, sequential continuity and differentiability, as well as uniform convergence. Finally, he presents applications and examples to reinforce concepts and demonstrate the validity of many of the historical methods and results.

Patrice TAUVEL. — **Agrégation de mathématiques: cours d'algèbre.** — Collection Capes/Agreg. — Un livre broché, 17×24, de x, 451 p. — ISBN 2-10-004590-3. — Prix: FF 215.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Dans les 23 chapitres de ce livre sont traités: l'algèbre générale, la théorie des groupes, l'algèbre linéaire, l'arithmétique dans les anneaux et l'algèbre multilinéaire. Afin d'être

autonome, ce cours intègre également des chapitres traitant de questions d'analyse et de topologie. Les résultats sont tous accompagnés de leurs démonstrations, sauf pour quelques points de la théorie des ensembles, faisant de cet ouvrage un outil de travail efficace pour la présentation au concours de l'agrégation de mathématiques. Ce livre peut être utilisé avec profit par les étudiants de licence ou de maîtrise de mathématiques.

Dina TIROSH, (Editor). — **Forms of mathematical knowledge: learning and teaching with understanding.** — Un vol. relié, 16,5×25, de 252 p. — ISBN 0-7923-5995-X. — Prix: Dfl. 190.00. — Kluwer, Dordrecht, 1999.

This book focuses on various types of knowledge that are significant for learning and teaching mathematics. Its first part defines, discusses and contrasts psychological, philosophical and didactical issues related to various types of knowledge involved in the learning of mathematics. Its second part describes ideas about forms of mathematical knowledge that are important for teachers to know and ways of implementing such ideas in preservice and inservice education. The chapters provide a wide overview of current thinking about mathematics learning and teaching which is of interest for researchers in mathematics education and mathematics educators.

Joseph L. WALSH. — **Joseph L. Walsh: selected papers.** — Theodore J. RIVLIN, Edward B. SAFF, (Editors). — Un vol. relié, 16×24, de xxv, 682 p. — ISBN 0-387-98782-7. — Prix: DM 249.00. — Springer, New York, 2000.

*From the preface:* In this volume we present a selection from 281 published papers of Joseph Leonard Walsh (1895-1973), a complete list of which appears after this preface. ... The selected papers have been divided into seven broad sections. The sections are ordered following the evolution of Walsh's work. Appended to these sections are commentaries on Walsh's work and a discussion of subsequent developments influenced by the work. ... One of Walsh's papers has attained an unpredictably remarkable afterlife. The work referred to is "A closed set of normal orthogonal functions", *Amer. J. Math.*, vol. 45, 1923, pp. 5-24, which introduced what are known as "Walsh functions". There exists an immense literature about the theory and applications of these orthogonal functions.

## ***Histoire***

Jeremy GRAY, (Editor). — **The symbolic universe: geometry and physics, 1890-1930.** — Un vol. relié, 16,5×24, de xii, 289 p. — ISBN 0-19-850088-2. — Prix: £55.00. — Oxford University Press, Oxford, 1999.

With the development of the theory of relativity by Albert Einstein, physics underwent a revolution at the end of the nineteenth century. The boundaries of research were extended still further when in 1907-1908 Minkowski applied geometrical ideas to this area of physics. This in turn opened the door to other researchers seeking to use non-Euclidean geometrical methods in relativity, and many notable mathematicians did so, Weyl in particular linking these ideas with broader philosophical issues in mathematics. This volume provides a wide-ranging and detailed survey of this exciting era.

Shen KANGSHEN, John N. CROSSLEY, Anthony W.-C. LUN, (Editors and translators). — **The Nine Chapters on the Mathematical Art: companion and commentary.** — Un vol. relié, 16×24, de xiv, 596 p. — ISBN 0-19-853936-3. — Prix: £110.00. — Oxford University Press, Oxford, and Science Press, Beijing, 1999.

The Nine Chapters on the Mathematical Art is a classic text: the most important mathematical source in China during the past 2000 years, and comparable in significance to Euclid's



Elements in the West. This volume contains the first complete English translation of the Nine Chapters, together with two commentaries written in the 3<sup>rd</sup> century (by Liu Hui) and 7<sup>th</sup> century AD, and a further commentary by the translators. The Nine Chapters contains 246 problems and their solutions which fall into nine categories that are firmly based on practical needs. There are methods for solving problems in areas such as land measurement, construction, agriculture, commerce, and taxation.

## ***Logique et fondements***

Marat M. ARSLANOV, Steffen LEMPP, (Editors). — **Recursion theory and complexity.** — Proceedings of the Kazan '97 Workshop, Kazan, Russia, July 14-19, 1997. — De Gruyter series in logic and its applications, vol. 2. — Un vol. relié, 17,5×24,5, de VIII, 239 p. — ISBN 3-11-016587-2. — Prix: DM 228.00. — Walter de Gruyter, Berlin, 1999.

Recursion theory, the study of computability, is an area of mathematical logic that has traditionally been particularly strong in the United States and the former Soviet Union. This was the first workshop ever to bring together about 50 international experts in the field from these two countries and Western Europe. The volume features 14 research papers by participants on topics discussed at the workshop as well as a list of the open problems presented at the workshop. Many of the papers focus particularly on applications of recursion theory to other areas of mathematics, such as algebra, analysis, model theory, and proof theory.

Samuel R. BUS, Peter HÁJEK, Pavel PUDLÁK, (Editors). — **Logic colloquium.** — Proceedings of the Annual European Meeting of the Association for Symbolic Logic, held in Prague, Czech Republic, August 9-15, 1998. — Lecture notes in logic, No. 13. — Un vol. relié, 17×25, de xv, 541 p. — ISBN 1-56881-113-6. — Prix: US\$85.00 — A.K. Peters, Natick, Massachusetts, 2000.

This volume contains the proceedings of the meeting with papers covering current research from all areas of mathematical logic, including proof theory, set theory, model theory, computability theory and philosophy. Logic Colloquium '98 includes twelve articles on proof theory; a survey of fuzzy logic; nine articles on set theory; four articles on computability theory, including a historical article based on H. Rogers' 1965 agenda for recursive function theory; four articles on model theory; and two articles on belief theories. A number of these articles deal with theoretical computer science.

Edward R. GRIFFOR, (Editor). — **Handbook of computability theory.** — Studies in logic and the foundations of mathematics, vol. 140. — Un vol. relié, 15,5×23, de XII, 727 p. — ISBN 0-444-89822-4. — Prix: Dfl. 295.00. — Elsevier, Amsterdam, 1999.

The chapters of this volume all have their own level of presentation. The topics have been chosen based on the active research interest associated with them. Since the interest in some topics is older than that in others, some presentations contain fundamental definitions and basic results while others relate very little of the elementary theory behind them and aim directly toward an exposition of advanced results. Presentations of the latter sort are in some cases restricted to a short survey of recent results (due to the complexity of the methods and proofs themselves). Hence the variation in level of presentation from chapter to chapter only reflects the conceptual situation itself. One example of this is the collective efforts to develop an acceptable theory of computation on the real numbers. The last two decades has seen at least two new definitions of effective operations on the real numbers.

Michael HUTH, Mark RYAN. — **Logic in computer science: modelling and reasoning about systems.** — Un vol. broché, 17×25, de xviii, 387 p. — ISBN 0-521-65602-8. — Prix: £60.00. — Cambridge University Press, Cambridge, 2000.

Recent years have seen the development of powerful tools for verifying hardware and software systems. Students need a basic formal training that allows them to gain sufficient proficiency in using logic-based verification methods. This book addresses these needs by providing a sound basis in logic and an introduction to the logical frameworks used in modelling, specifying and verifying computer systems. It provides a simple and clear presentation, covering propositional and predicate logic and some specialized logics used for reasoning about the correctness of computer systems. The authors introduce a carefully chosen core of essential terminology: further technicalities are introduced only where they are required by the applications.

W. Hugh WOODIN. — **The axiom of determinacy, forcing axioms, and the nonstationary ideal.** — De Gruyter series in logic and its applications, vol. 1. — Un vol. relié, 18×24,5, de vi, 934 p. — ISBN 3-11-015708-X. — Prix: DM 298.00. — Walter de Gruyter, Berlin, 1999.

This volume presents a detailed account of a new method for obtaining models of set theory, using models of determinacy. The primary application is the identification of a canonical model of set theory in which the continuum hypothesis is false. Such models have been sought for in the 35 years since Cohen's discovery of the method of forcing. The new model belongs to a large class of similarly obtained models. The basic machinery for the analysis of these models is developed in some detail through the study of the canonical model of several of the related models. A number of applications in combinatorial set theory are discussed. This is a research monograph, the results being presented have not been published elsewhere.

## ***Théorie des ensembles***

András HAJNAL, Peter HAMBURGER. — **Set theory.** — Translated by Attila Máté. — London Mathematical Society student texts, vol. 48. — Un vol. broché, 15×23, de viii, 316 p. — ISBN 0-521-59667-X. — Prix: £16.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1999.

This is a classic introduction to set theory in three segments. The first part gives a general introduction to set theory, suitable for undergraduates; complete proofs are given and no background in logic is required. Exercises are included, and the more difficult ones are supplied with hints. An appendix to the first part gives a more formal foundation to axiomatic set theory, supplementing the intuitive introduction given in the first part. The final part gives an introduction to modern tools of combinatorial set theory. This part contains enough material for a graduate course of one or two semesters. The subjects discussed include stationary sets, ( $\Delta$ -systems, partition relations, set mappings, measurable and real-valued measurable cardinals. Two sections give an introduction to modern results on exponentiation of singular cardinals, and certain deeper aspects of the topics are developed in advanced problems.

M. HOLZ, K. STEFFENS, E. WEITZ. — **Introduction to cardinal arithmetic.** — Birkhäuser advanced texts. Basler Lehrbücher. — Un vol. relié, 17×24, de vi, 304 p. — ISBN 3-7643-6124-7. — Prix: SFr. 88.00. — Birkhäuser, Basel, 1999.

This book is an introduction to modern cardinal arithmetic in the frame of the axioms of Zermelo-Fraenkel set theory together with the axiom of choice. A first part describes the

classical theory developed by Bernstein, Cantor, Hausdorff, König and Tarski between 1870 and 1930. Next, the development in the seventies led by Galvin, Hajnal and Silver is characterized. The third part presents the fundamental investigations in pcf theory which have been worked out by Shelah to answer the questions left open in the seventies. This is the first self-contained introduction to cardinal arithmetic which also includes pcf theory.

## *Analyse combinatoire*

R. BALAKRISHNAN, K. RANGANATHAN. — **A textbook of graph theory.** — Universitext. — Un vol. relié, 16,5×24,5, de xi, 227 p. — ISBN 0-387-98859-9. — Prix: DM 109.00. — Springer, New York, 2000.

This book aims to provide a solid background in the basic topics of graph theory. It covers Dirac's theorem on  $k$ -connected graphs, Harary-Nash-Williams' theorem on the hamiltonicity of line graphs, Toida-McKee's characterization of Eulerian graphs, the Tutte matrix of a graph, Fournier's proof of Kuratowski's theorem on planar graphs, the proof of the nonhamiltonicity of the Tutte graph on 46 vertices, and a concrete application of triangulated graphs. The book does not presuppose deep knowledge of any branch of mathematics, but requires only the basics of mathematics. It can be used in an advanced undergraduate course or a beginning graduate course in graph theory.

T. BETH, D. JUNGnickel, H. LENZ. — **Design theory.** — Second edition. — Encyclopedia of mathematics and its applications, vol. 69 et vol. 78. — 2 vol. reliés, 16×24, de xix, xix, 1100 p. (2 vol.). — ISBN 0-521-44432-2 (vol. 1), 0-521-77231-1 (vol. 2). — Prix: £60.00 chaque vol. — Cambridge University Press, Cambridge, 1999.

Since the first edition there has been extensive development of the theory and this book has been thoroughly rewritten and extended during that time. In particular, the growing importance of discrete mathematics to many parts of engineering and science have made designs a useful tool for applications, and this fact has been acknowledged here with the inclusion of an additional chapter on applications. It is suitable for advanced courses and as a reference work, not only for researchers in discrete mathematics or finite algebra, but also for those working in computer and communications engineering and other mathematically oriented disciplines. Exercises are included throughout, and the book concludes with an extensive and updated bibliography of well over 1800 items.

Louis J. BILLERA, Anders BJÖRNER, Curtis GREENE, Rodica E. SIMION, Richard P. STANLEY, (Editors). — **New perspectives in algebraic combinatorics.** — Mathematical Sciences Research Institute Publications, vol. 38. — Un vol. relié, 16,5×24, de ix, 345 p. — ISBN 0-521-77087-4. — Prix: £32.50. — Cambridge University Press, Cambridge, 1999.

The rich combinatorial problems arising from the study of various algebraic structures are the subject of this book, which represents work done or presented at seminars during the 1996-97 program on combinatorics at the Mathematical Sciences Research Institute. It contains contributions on matroid bundles, combinatorial representation theory, lattice points in polyhedra, bilinear forms, combinatorial differential topology and geometry, Macdonald polynomials and geometry, enumeration of matchings, the generalized Baues problem, and Littlewood-Richardson semigroups.



Anders BJÖRNER, Michel LAS VERGNAS, Bernd STURMFELS, Neil WHITE, Günter M. ZIEGLER. — **Oriented matroids**. — Second edition. — Encyclopedia of mathematics and its applications, vol. 46. — Un vol. broché, 15,5×23,5, de xii, 548 p. — ISBN 0-521-77750-X. — Prix: £30.00. — Cambridge University Press, Cambridge, 1999.

Oriented matroids are a very natural mathematical concept which presents itself in many different guises and which has connections and applications to many different areas. These include discrete and computational geometry, combinatorics, convexity, topology, algebraic geometry, operations research, computer science and theoretical chemistry. This is the first comprehensive, accessible account of the subject. For the second edition, the authors have expanded the bibliography greatly to ensure that it remains comprehensive and up-to-date, and they have also added an appendix surveying research since the work was first published.

David M. BRESSOUD. — **Proofs and confirmations: the story of the alternating sign matrix conjecture**. — Spectrum series. — Un vol. broché, 15,5×23, de xv, 274 p. — ISBN 0-521-66646-5. — Prix: £17.95. — Cambridge University Press, Cambridge, 1999.

This is an introduction to recent developments in algebraic combinatorics and an illustration of how research in mathematics actually progresses. The author recounts the story of the search for and discovery of a proof of a formula conjectured in the early 1980s: the number of  $n \times n$  alternating sign matrices, objects that generalize permutation matrices. Although it was soon apparent that the conjecture must be true, the proof was elusive. Researchers became drawn to this problem, making connections to aspects of the invariant theory of Jacobi, Sylvester, Cayley, MacMahon, Schur, and Young, to partitions and plane partitions, to symmetric functions, to hypergeometric and basic hypergeometric series, and, finally, to the six-vertex model of statistical mechanics. All these threads are brought together in Zeilberger's 1995 proof of the original conjecture.

## *Ordre, treillis*

A.M.W. GLASS. — **Partially ordered groups**. — Series in algebra, vol. 7. — Un vol. relié, 16×23, de xiii, 307 p. — ISBN 9810234937. — Prix: £18.00. — World Scientific, Singapore, 1999.

Recently the theory of partially ordered groups has been used by analysts, algebraists, topologists and model theorists. This book presents the most important results and topics in the theory with proofs that rely on (and interplay with) other areas of mathematics. It concludes with a list of some unsolved problems for the reader to tackle. In stressing both the special techniques of the discipline and the overlap with other areas of pure mathematics, the book should be of interest to a wide audience in diverse areas of mathematics. — *Contents*: Definition and examples. — Basic properties. — Values, primes, and polars. — Abelian and normal-valued lattice-ordered groups. — Archimedean function groups. — Soluble right partially ordered groups and generalisations. — Permutations. — Applications. — Completions. — Varieties of lattice-ordered groups. — Unsolved problems.

## *Théorie des nombres*

V.I. BERNIK, M.M. DODSON. — **Metric Diophantine approximation on manifolds**. — Cambridge tracts in mathematics, vol. 137. — Un vol. relié, de ix, 172 p. — ISBN 0-521-43275-8. — Prix: £27.50. — Cambridge University Press, Cambridge, 1999.

This book is concerned with Diophantine approximation on smooth manifolds embedded in Euclidean space, and its aim is to develop a coherent body of theory comparable with that

which already exists for classical Diophantine approximation. In particular this book deals with Khintchine-type theorems and with the Hausdorff dimension of the associated null sets. After setting out the necessary background material, the authors give a full discussion of Hausdorff dimension and its uses in Diophantine approximation. The authors go on to consider briefly the  $p$ -adic case, and they conclude with a chapter on some applications of metric Diophantine approximation.

Henri COHEN. — **Advanced topics in computational number theory.** — Graduate texts in mathematics, vol. 193. — Un vol. relié,  $16 \times 24$ , de xv, 578 p. — ISBN 0-387-98727-4. — Prix: DM 119.00. — Springer, New York, 2000.

This book addresses a number of specific topics in computational number theory centered on class field theory and relative extensions of number fields. Most of the material is new from the algorithmic standpoint. — *Contents*: Fundamental results and algorithms in Dedekind domains. — Basic relative number field algorithms. — The fundamental theorem of global class field theory. — Computational class field theory. — Computing defining polynomials using Kummer theory. — Computing defining polynomials using analytic methods. — Variations on class and unit groups. — Cubic number fields. — Number field table constructions. — Appendices: Theoretical results, electronic information, tables.

H. DAVENPORT. — **The higher arithmetic: an introduction to the theory of numbers.** — Seventh edition. — Un vol. broché,  $15 \times 23$ , de 241 p. — ISBN 0-521-63446-6. — Prix: £16.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1999.

This book is an introduction to the theory of numbers which is suitable for a very wide class of readers. On the one hand, no extensive mathematical knowledge is required of the reader; in fact, a good high-school training in mathematics would be sufficient. On the other hand, the author discusses subjects of real mathematical interest and treats them in a very readable way, so that a person of considerable mathematical maturity would find much enjoyable and profitable reading in this work. Now into its seventh edition and with additional material on computers and number theory, the author introduces concepts and theorems in a way that does not require the reader to have an in depth knowledge of the theory of numbers but also touches upon matters of deep mathematical significance.

Midhat GAZALÉ. — **Number: from Ahmes to Cantor.** — Un vol. relié,  $16 \times 24$ , de xv, 297 p. — ISBN 0-691-00515-X. — Prix: US\$29.95. — Princeton University Press, Princeton, New Jersey, 2000.

In his successor and companion volume to *Gnomon: from pharaohs to fractals* the author takes us on a journey from the ancient worlds of the Egyptians, the Mesopotamians, the Mayas, the Greeks, the Hindus, up to the Arab invasion of Europe and the Renaissance. Our guide introduces us to some of the most fascinating and ingenious characters in mathematical history, from Ahmes the Egyptian scribe through the modern era of Georg Cantor. As he deftly blends together history, mathematics, and even some computer science in his characteristically compelling style, we discover the fundamental notions underlying the acquisition and recording of “number”, and what “number” really means.

Alexander REZNIKOV, Norbert SCHAPPACHER, (Editors). — **Regulators in analysis, geometry and number theory.** — Progress in mathematics, vol. 171. — Un vol. relié,  $16,5 \times 24$ , de xv, 324 p. — ISBN 0-8176-4115-7. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

The focus in this book is on the theory of regulators and secondary invariants, with articles written and refereed by experts in their respective fields. A short historical and mathematical

overview of the theory of regulators from its number theoretic origins, and its connections to analysis, topology, differential geometry, and algebra, is presented by the editors in the introduction, with key topics noted as follows: hyperbolic volume and the Borel regulator, the Chern-Simons invariant, the Bloch-Beilinson regulator, polylogarithms (classical and elliptic), and analytic torsion. This work is an outgrowth of a conference held at the Hebrew University in Jerusalem on *Regulators in Analysis, Geometry and Number Theory*.

James J. TATTERSALL. — **Elementary number theory in nine chapters.** — Un vol. broché, 15×23, de VIII, 407 p. — ISBN 0-521-58531-7. — Prix: £16.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1999.

This book is intended to serve as a one-semester introductory course in number theory. Throughout the book a historical perspective has been adopted and emphasis is given to some of the subject's applied aspects; in particular the field of cryptography is highlighted. At the heart of the book are the major number theoretic accomplishments of Euclid, Fermat, Gauss, Legendre, and Euler, and to fully illustrate the properties of numbers and concepts developed in the text, a wealth of exercises has been included. It is assumed that the reader will have "pencil in hand" and ready access to a computer.

### *Corps et polynômes*

Juan J. MORALES RUIZ. — **Differential Galois theory and non-integrability of Hamiltonian systems.** — Progress in mathematics, vol. 179. — Un vol. relié, 16×24, de xiv, 165 p. — ISBN 3-7643-6078-X. — Prix: SFr. 88.00. — Birkhäuser, Basel, 1999.

This book is devoted to the relation between two different concepts of integrability: the complete integrability of complex analytical Hamiltonian systems and the integrability of complex analytical linear differential equations. The connection of these two integrability notions is given by the variational equation (i.e. linearized equation) along a particular integral curve of the Hamiltonian system. The underlying heuristic idea, which motivated the main results presented in this monograph, is that a necessary condition for the integrability of a Hamiltonian system is the integrability of the variational equation along any of its particular integral curves. The necessary background on differential Galois theory and Hamiltonian systems is included, and several new problems and conjectures which open new lines of research are proposed.

### *Géométrie algébrique*

H. FLENNER, L. O'CARROLL, W. VOGEL. — **Joins and intersections.** — Springer monographs in mathematics. — Un livre relié, 16×24, de vi, 307 p. — ISBN 3-540-66319-3. — Prix: DM 149.00. — Springer, Berlin, 1999.

The central topic of the book is refined intersection theory and its applications, the basic tool of investigation being the Stückrad-Vogel intersection algorithm, based on join construction. This algorithm is used to present a general version of Bézout's theorem, in classical and refined form. Connections with the intersection theory of Fulton-MacPherson are treated, using work of van Gastel employing Segre classes. Bertini theorems and connectedness theorems form another major theme, as do various measures of multiplicity. The hope is that the book will inform algebraists of important methods from algebraic geometry and widen the interest of geometers in recent relevant advances in commutative algebra.

## ***Algèbre linéaire et multilinéaire, théorie des matrices***

Camille DEBIÈVE, Yves FÉLIX. — **Algèbre linéaire pour HEC et ingénieurs commerciaux.** — Bibliothèque des Universités. — Un vol. broché,  $18 \times 25$ , de xi, 202 p. — ISBN 2-8041-3441-5. — Prix: FB 765.00. — De Boeck Université, Bruxelles, 2000.

Outil de base pour la modélisation mathématique des phénomènes économiques, l'algèbre linéaire est présentée, dans cet ouvrage, avec rigueur, précision et intuition géométrique. Sont exposés les résultats les plus fondamentaux de la théorie: le calcul matriciel comme outil de modélisation: systèmes d'équations, applications linéaires, formes quadratiques; la détermination et l'utilisation des invariants associés à une matrice: rang, déterminant, valeurs propres et vecteurs propres; la détermination du genre d'une forme quadratique; la géométrie des applications linéaires. Destiné avant tout à un public économique, l'ouvrage allie intuition géométrique et formalisation algébrique et développe les concepts en fonction de leurs utilisations et applications ultérieures.

Kaddour NAJIM, Enso IKONEN. — **Outils mathématiques pour le génie des procédés: cours et exercices corrigés.** — Sciences sup. — Un vol. broché,  $17 \times 24$ , de vi, 223 p. — ISBN 2-10-004591-1. — Prix: FF 150.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage s'adresse principalement aux élèves-ingénieurs et aux étudiants de 1<sup>er</sup> et 2<sup>e</sup> cycles en génie des procédés et génie industriel. Il traite en trois chapitres du calcul matriciel, du calcul différentiel et du calcul opérationnel. Chaque chapitre se termine par de nombreux exercices avec leurs corrigés. De nombreux exemples, empruntés au génie des procédés, aideront les étudiants à mieux comprendre les notions théoriques présentées dans ce livre. Cela leur permettra d'analyser avec un œil critique les modèles mathématiques qu'ils seront amenés à développer.

## ***Anneaux et algèbres***

P.M. COHN. — **An introduction to ring theory.** — Springer undergraduate mathematics series. — Un vol. broché,  $17 \times 23,5$ , de x, 229 p. — ISBN 1-85233-106-9. — Prix: DM 49.00. — Springer, London, 2000.

Most parts of algebra have undergone great changes and advances this century, perhaps none more so than ring theory. In this volume, Paul Cohn provides a clear and structured introduction to the subject. After a chapter on the definition of rings and modules there are brief accounts of Artinian rings, commutative Noetherian rings and ring constructions, such as the direct product, tensor product and rings of fractions, followed by a description of free rings. The reader is assumed to have a basic understanding of set theory, group theory and vector spaces. Over two hundred carefully selected exercises are included, most with outline solutions.

Vesselin DRENSKY. — **Free algebras and PI-algebras: graduate course in algebra.** — Un vol. broché,  $15,5 \times 23,5$ , de xii, 271 p. — ISBN 981-4021-48-2. — Prix: DM 79.00. — Springer, Singapore, 2000.

This book is devoted to the combinatorial theory of polynomial algebras, free associative and free Lie algebras, and algebras with polynomial identities. It also examines the structure of automorphism groups of free and relatively free algebras. It is based on graduate courses and short cycles of lectures presented by the author at several universities and its goal is to involve the reader as soon as possible in the research area, to make him or her able to read books and

papers on the considered topics. It contains both classical and contemporary results and methods. A specific feature of the book is that it includes as its inseparable part more than 250 exercises and examples with detailed hints (50% of the numbered statements), some of them treating serious mathematical results.

### ***Catégories, algèbre homologique, cohomologie des groupes***

Henri CARTAN and Samuel EILENBERG. — **Homological algebra.** — Princeton landmarks in mathematics. — Un vol. broché,  $15,5 \times 23,5$ , de xv, 390 p. — ISBN 0-691-04991-2. — Prix: US\$19.95. — Princeton University Press, Princeton, 1999.

When this book was written, methods of algebraic topology had caused revolutions in the world of pure algebra. To clarify the advances that had been made, Cartan and Eilenberg tried to unify the fields and to construct the framework of a fully fledged theory. The invasion of algebra has occurred on three fronts through the construction of cohomology theories for groups, Lie algebras, and associative algebras. This book presents a single homology (and also cohomology) theory that embodies all three; a large number of results is thus established in a general framework. Subsequently, each of the three theories is singled out by a suitable specialization, and its specific properties are studied.

### ***Théorie des groupes et généralisations***

Paul C. EKLOF, Rüdiger GÖBEL, (Editors). — **Abelian groups and modules: International Conference in Dublin, August 10-14, 1998.** — Trends in mathematics. — Un vol. relié,  $17 \times 24$ , de viii, 373 p. — ISBN 3-7643-6172-7. — Prix: SFr. 168.00. — Birkhäuser, Basel, 1999.

In a series of eight invited survey talks, experts in the field presented several active areas of research: Almost completely decomposable abelian groups, Butler groups and almost free groups – the classification problem, and invariants of special classes of torsion free abelian groups. — Totally projective groups, their automorphism groups and their group rings – questions about unique passage between these categories. — Radicals commuting with products. — The Ziegler spectra of Neumann regular rings and the class (semi-) groups of Prüfer domains. — The Krull-Schmidt property for valuation domains. These main talks were accompanied by many other presentations of current research on abelian groups and modules. Methods from model theory, category theory, infinite combinatorics, representation theory, classical algebra and geometry were applied to the study of abelian groups and modules; conversely, results and methods from abelian group theory were applied to general module theory and non-commutative groups.

Thomas PETERFALVI. — **Character theory for the odd order theorem.** — Translated by Robert Sandling. — London Mathematical Society lecture note series, vol. 272. — Un vol. broché,  $15 \times 23$ , de vii, 154 p. — ISBN 0-521-64660-X. — Prix: £24.95. — Cambridge University Press, Cambridge, 2000.

The famous and important theorem of W. Feit and J.G. Thompson states that every group of odd order is solvable, and the proof of this has roughly two parts. The first part appeared in Bender & Glauberman's *Local analysis for the odd order theorem* which was number 188 in this series. This book provides the character-theoretic second part and thus completes the proof. Also included here is a revision of a theorem of Suzuki on split BN-pairs of rank 1; a prerequisite for the classification of finite simple groups.



## ***Groupes topologiques; groupes et algèbres de Lie***

Claude CHEVALLEY. — **Theory of Lie groups, I.** — Princeton landmarks in mathematics. — Un vol. broché, 15×23, de VII, 213 p. — ISBN 0-691-04990-4. — Prix: US\$19.95. — Princeton University Press, Princeton, 1999.

This famous book was the first treatise on Lie groups in which a modern point of view was adopted systematically, namely, that a continuous group can be regarded as a global object. To develop this idea to its fullest extent, Chevalley incorporated a broad range of topics, such as the covering spaces of topological spaces, analytic manifolds, integration of complete systems of differential equations on a manifold, and the calculus of exterior differential forms.

J.J. DUISTERMAAT, J.A.C. KOLK. — **Lie groups.** — Universitext. — Un vol. broché, 15,5×23,5, de VIII, 344 p. — ISBN 3-540-15293-8. — Prix: DM 79.00. — Springer, Berlin, 1999.

The aim of the book is to give a broad introduction to the field with an emphasis on using differential-geometrical methods, in the spirit of Lie himself. The structure of compact Lie groups is analyzed in terms of the action of the group on itself by conjugation. The book culminates in the classification of the representations of compact Lie groups and in their realization as sections of holomorphic line bundles over flag manifolds. The relations with algebraic and analytic models are also discussed. A review of the required background material is provided in appendices.

Jing-Song HUANG. — **Lectures on representation theory.** — Un vol. broché, 15,5×21,5, de IX, 189 p. — ISBN 981-02-3725-1. — Prix: £18.00. — World Scientific, Singapore, 1999.

This book is an expanded version of the lectures given at the Nankai Mathematical Summer School in 1997. Parts I-III of the book cover the relatively elementary material of representation theory of finite groups, simple Lie algebras and compact Lie groups. These theories are a natural continuation of linear algebra. The last chapter of Part III includes some recent results on extension of Weyl's construction to exceptional groups. Part IV covers some advanced material on infinite-dimensional representations of non-compact groups such as the orbit method, minimal representations and dual pair correspondences, which introduces some directions of the current research in representation theory.

## ***Mesure et intégration***

Lee Peng YEE, Rudolf VÝBORNÝ. — **Integral: an easy approach after Kurzweil and Henstock.** — Australian Mathematical Society lecture series, vol. 14. — Un vol. broché, 15×23, de XII, 311 p. — ISBN 0-521-77968-5. — Prix: £24.95. — Cambridge University Press, Cambridge, 2000.

The history of integration is a long and interesting one, and its roots can be traced as far back as the ancient Greeks. The first genuinely rigorous definition of an integral was that given by Riemann, and further (more general, and so more useful) definitions have since been given by Lebesgue, Denjoy, Perron, Kurzweil and Henstock, and this culminated in the work of McShane. This textbook provides an introduction to this theory, and it presents a unified yet elementary approach that is suitable for beginning graduate and final-year undergraduate students.

## ***Fonctions d'une variable complexe***

Rami SHAKARCHI. — **Problems and solutions for complex analysis.** — Un vol. broché, 15,5×23,5, de xi, 246 p. — ISBN 0-387-98831-9. — Prix: DM 69.00. — Springer, New York, 1999.

This volume contains all the exercises, and their solutions, for Serge Lang's fourth edition of *Complex Analysis*. The problems in the first 8 chapters are suitable for an introductory course at the undergraduate level and cover the following topics: power series, Cauchy's theorem, Laurent series, singularities and meromorphic functions, the calculus of residues, conformal mappings, and harmonic functions. The material in chapters 9 to 16 is more advanced. The reader will find problems on Schwartz reflection, analytic continuation, Jensen's formula, the Phragmén-Lindelöf theorem, entire functions, Weierstrass products, meromorphic functions, the Gamma function, and the Zeta function.

## ***Fonctions de plusieurs variables complexes***

Christina BIRKENHAKE, Herbert LANGE. — **Complex tori.** — Progress in mathematics, vol. 177. — Un vol. relié, 16×24, de xv, 251 p. — ISBN 0-8176-4103-3. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1999.

This work is at the crossroads of a number of mathematical areas, including algebraic geometry, several complex variables, differential geometry, and representation theory. The authors, both expert mathematicians in the area of complex manifolds and representation theory, focus on complex tori, which are interesting for their own sake being the simplest of complex manifolds, and important in the theory of algebraic cycles via intermediate Jacobians. Although special complex tori, namely abelian varieties, have been investigated for nearly 200 years, not much is known about arbitrary complex tori. There are very few papers on the subject and no book to date.

Seán DINEEN. — **Complex analysis on infinite dimensional spaces.** — Springer monographs in mathematics. — Un vol. relié, 17×24, de xv, 543 p. — ISBN 1-85233-158-5. — Prix: DM 179.00. — Springer, London, 2000.

The first two chapters of this book are a self-contained study of polynomials and highlight the interplay between polynomial estimates and the geometry of Banach spaces. The third chapter covers the basic theory of holomorphic functions and illustrates intrinsic properties of the infinite dimensional theory. The  $(BB)$ -property, which originated in the theory of topological tensor products, and the  $(DN)$ -property, which occupies an important place in the modern structural theory of Fréchet spaces, are shown, in chapter four, to play key roles in uncovering key relationships between the three main topologies considered. The Levi problem for Riemann domains over Fréchet spaces with the bounded approximation property is solved in chapter five while holomorphic extensions, of different kinds, are the unifying theme which draws together, in the final chapter, many of the ideas discussed in earlier chapters.

Gen KOMATSU, Masatake KURANISHI, (Editors). — **Analysis and geometry in several complex variables.** — Proceedings of the 40<sup>th</sup> Taniguchi Symposium. — Trends in mathematics. — Un vol. relié, 16,5×24, de x, 314 p. — ISBN 0-8176-4067-3. — Prix: SFr. 158.00. — Birkhäuser, Boston, 1999.

Since the inhomogeneous Cauchy-Riemann equation was introduced in the study of complex analysis of several variables, there has been strong interaction between complex analysis and real analysis, in particular, the theory of partial differential equations. This volume is an outgrowth of the 40<sup>th</sup> Taniguchi Symposium held in Katata, Japan. Highlighted are the

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

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

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

### *Equations différentielles ordinaires*

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

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

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

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

### *Equations aux dérivées partielles*

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

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



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

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

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

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

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

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

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

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

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

### ***Systèmes dynamiques et théorie ergodique***

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

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

### ***Analyse de Fourier, analyse harmonique abstraite***

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

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

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

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

## ***Equations intégrales***

Martin VÄTH. — **Volterra and integral equations of vector functions.** — Pure and applied mathematics, vol. 224. — Un vol. relié,  $16 \times 23$ , de VI, 349 p. — ISBN 0-8247-0342-1. — Prix: US\$150.00. — Marcel Dekker, New York, 2000.

This reference book develops and applies topological and algebraic methods to the study of abstract Volterra operators and differential equations arising in models for “real-world” phenomena in physics, biology and a host of other disciplines. The book studies general operator equations in which the operators are assumed to have “Volterra typical” properties... proves abstract results on the continuous dependence of the solution on parameters... considers functions that take values in infinite dimensional Banach spaces... focuses on the existence and uniqueness of solutions... surveys the Hausdorff measure of noncompactness and fixed point theory, etc.

## ***Analyse fonctionnelle et théorie des opérateurs***

Klaus-Jochen ENGEL, Rainer NAGEL. — **One-parameter semigroups for linear evolution equations.** — Graduate texts in mathematics, vol. 194. — Un vol. relié,  $16,5 \times 24,5$ , de XXI, 586 p. — ISBN 0-387-98463-1. — Prix: DM 98.00. — Springer, New York, 2000.

This book gives an up-to-date account of the theory of strongly continuous one-parameter semigroups of linear operators. It includes a systematic discussion of the spectral theory and the long-term behavior of such semigroups. A special feature of the text is an unusually wide range of applications, to ordinary and partial differential operators, delay and Volterra equations and to control theory, etc..., and an emphasis on philosophical motivation and the historical background. This book is written for students, but should also be of value for researchers interested in this field.

Francis HIRSCH, Gilles LACOMBE. — **Éléments d'analyse fonctionnelle: cours et exercices.** — Enseignement des mathématiques (Masson). — Sciences sup. Cours. Mathématiques (Dunod). — Un vol. broché,  $16 \times 24$ , de IX, 339 p. — ISBN 2-225-85573-0. — Prix: FF 215.00. — Masson, Paris, 1997, diffusé par Dunod, Paris et en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage est composé de 3 parties: Espaces fonctionnels et leurs duals (espaces de fonctions continues, mesures de Radon, espaces de Hilbert, espaces  $L^p$ . — Opérateurs (théorie spectrale, opérateurs complets). — Distributions (convolution, espaces de Sobolev  $W^{l,p}$ , problème de Dirichlet). La part importante réservée aux exercices est l'une des originalités de l'ouvrage. Ils sont rédigés sous forme d'énoncés détaillés incluant des indications destinées à surmonter chaque difficulté.

Volodymyr KOSHMANENKO. — **Singular quadratic forms in perturbation theory.** — Mathematics and its applications, vol. 474. — Un vol. relié,  $25 \times 27$ , de VIII, 308 p. — ISBN 0-7923-5625-X. — Prix: Dfl. 275.00. — Kluwer Academic Publishers, Dordrecht, 1999.

This monograph is devoted to the systematic presentation of the method of singular quadratic forms in the perturbation theory of self-adjoint operators. The concept of a singular (nowhere closable) quadratic form, a key notion of the present volume, is treated from different points of view such as definition, properties, relations with regular (closable) quadratic forms, operator representation, classification in the scale of Hilbert spaces and especially as an object carrying a singular perturbation for Hamiltonians. The main idea is to interpret singular quadratic form in the role of an abstract boundary condition for self-adjoint extension.

E. RAMÍREZ DE ARELLANO, M.V. SHAPIRO, L.M. TOVAR, N.L. VASILEVSKI, (Editors). — **Complex analysis and related topics.** — Operator theory advances and applications, vol. 114. — Un vol. relié, 17,5×24, de 284 p. — ISBN 3-7643-6228-6. — Prix: SFr. 138.00. — Birkhäuser, Basel, 2000.

This volume is a collection of up-to-date research and expository papers on different aspects of complex analysis, including relations to operator theory and hypercomplex analysis. The articles cover many important and essential subjects, such as the Schrödinger equation, sub-elliptic operators, Lie algebras and superalgebras, Toeplitz and Hankel operators, reproducing kernels and  $\mathbf{Q}_p$  spaces, among others. Most of the papers were presented at the International Symposium on Complex Analysis and Related Topics, held in Cuernavaca (Morelos), Mexico, in November 1996.

Jürgen ROSSMANN, Peter TAKÁČ, Günther WILDENHAIN, (Editors). — **The Maz'ya anniversary collection, volume 1: On Maz'ya's work in functional analysis, partial differential equations and applications.** — Operator theory advances and applications, vol. 109. — Un vol. relié, 17,5×24, de XII, 364 p. — ISBN 3-7643-6201-4. — Prix: SFr. 198.00. — Birkhäuser, Basel, 1999.

V.G. Maz'ya is author or co-author of more than 300 scientific works on various fields of functional analysis, function theory, numerical analysis, partial differential equations and their applications. This collection of articles in two volumes is dedicated to him on the occasion of his 60<sup>th</sup> birthday. This first volume contains surveys on his work in different fields of mathematics or on areas to which he made essential contributions. Other articles of this book have their origin in the common work with Maz'ya.

Jürgen ROSSMANN, Peter TAKÁČ, Günther WILDENHAIN, (Editors). — **The Maz'ya anniversary collection, volume 2: Rostock Conference on Functional Analysis, Partial Differential Equations and Applications.** — Operator theory advances and applications, vol. 110. — Un vol. relié, 17,5×24, de XVI, 352 p. — ISBN 3-7643-6202-2. — Prix: SFr. 198.00. — Birkhäuser, Basel, 1999.

This is the second volume of a collection of articles dedicated to V.G. Maz'ya on the occasion of his 60<sup>th</sup> birthday. It contains most of the invited lectures of the Conference on Functional Analysis, Partial Differential Equations and Applications held in Rostock in September 1998 in honor of V.G. Maz'ya. Here different problems of functional analysis, potential theory, linear and nonlinear partial differential equations, theory of function spaces and numerical analysis are treated. The authors, who are outstanding experts in these fields, present surveys as well as new results.

## Géométrie

Michel ALESSANDRI. — **Thèmes de géométrie: groupes en situation géométrique.** — Agrégation de mathématiques. — Un vol. broché, 17×24, de 254 p. — ISBN 2-10-004556-3. — Prix: FF 175.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

La première partie de ce livre développe et illustre abondamment le langage géométrique des actions de groupes. La seconde propose quatre thèmes de réflexion présentés sous la forme de problèmes dont les niveaux sont variés et dont le corrigé très détaillé est largement commenté: deux aspects géométriques du groupe modulaire; les sous-groupes de torsion des groupes linéaires; quelques réflexions sur la géométrie vectorielle euclidienne; une introduction



à la géométrie hyperbolique en dimension deux. Chacun de ces textes est autonome, et peut aussi bien servir à préparer l'écrit du concours qu'à enrichir bon nombre de leçons d'oral en algèbre-géométrie et en analyse.

James W. ANDERSON. — **Hyperbolic geometry**. — Springer undergraduate mathematics series. — Un vol. broché,  $17 \times 23,5$ , de ix, 230 p. — ISBN 1-85233-156-9. — Prix: DM 59.00. — Springer, London, 1999.

This book provides a self-contained introduction to the subject, taking the approach that hyperbolic geometry consists of the study of those quantities invariant under the action of a natural group of transformations. Topics covered include the upper half-space model of the hyperbolic plane, Möbius transformations, the general Möbius group and the subgroup preserving path length in the upper half-space model, arc-length and distance, the Poincaré disc model, convex subsets of the hyperbolic plane, the Gauss-Bonnet formula for the area of a hyperbolic polygon and its applications.

J.-R. SACK, J. URRUTIA, (Editors). — **Handbook of computational geometry**. — Un vol. relié,  $17 \times 25$ , de x, 1027, 43 p. — ISBN 0-444-82537-1. — Prix: Dfl. 375.00. — Elsevier, Amsterdam, 2000.

This handbook will be an important source of information for all of us interested in one way or another in computational geometry. The book presents chapters which survey in detail most of the research available to date in this field. It contains survey papers in the following fundamental topics: arrangements, Voronoi diagrams, geometric data structures (incl. point location, convex hulls, etc.), spatial data structures, polygon decomposition, randomized algorithms, derandomization, parallel computational geometry (deterministic and randomized) visibility, art gallery and illumination problems, closest point problems, link distance problems, similarity and geometric objects, Davenport-Schinzel sequences, and spanning trees and spanners. There are also three chapters devoted to applications of computer geometry to other fields of science: geographical information systems, geometric shortest paths and network optimization, and mesh generation. In addition, there is a chapter devoted to robustness and numerical issues, and chapters on animation and graph drawing.

## **Géométrie différentielle**

S.S. CHERN, W.H. CHEN, K.S. LAM. — **Lectures on differential geometry**. — Series on university mathematics, vol. 1. — Un vol. broché,  $15,5 \times 21,5$ , de x, 356 p. — ISBN 981-02-4182-8. — Prix: £ 19.00. — World Scientific, Singapore, 1999.

The present book is a translation and an expansion of an introductory text based on a lecture series delivered in Peking University in 1980. This translation aims at preserving, as far as possible, both the contents and style of Professor Chern's lectures. *Contents*: Differentiable manifolds. — Multilinear algebra. — Exterior differential calculus. — Connections. — Riemannian geometry. — Lie groups and moving frames. — Complex manifolds. — Finsler geometry. — Historical notes. — Differential geometry and theoretical physics.

Franki J.E. DILLEN, Leopold C.A. VERSTRAELEN, (Editors). — **Handbook of differential geometry, vol. 1**. — Un vol. relié,  $17,5 \times 24,5$ , de xi, 1054 p. — ISBN 0-444-82240-2. — Prix: Dfl. 350.00. — North-Holland, Amsterdam, 2000.

All chapters of the Handbook are written by experts in the area and contain a large bibliography. The authors have freedom on the length, style and depth of their contributions. In

succeeding volumes, chapters concerning significant areas of differential geometry will be published as they are completed and sent in by their authors. — *Contents*: M.A. Akivis and V.V. Goldberg: Differential geometry of webs. — D.E. Blair: Spaces of metrics and curvature functionals. — B.-Y. Chen: Riemannian submanifolds. — A. Derdzinski: Einstein metrics in dimension four. — P.B. Gilkey: The Atiyah-Singer index theorem. — C.S. Gordon: Survey of isospectral manifolds. — Ü. Lumiste: Submanifolds with parallel fundamental form. — K. Shiohama: Sphere theorems. — U. Simon: Affine differential geometry. — G. Thorbergsson: A survey on isoparametric hypersurfaces and their generalizations. — T. Willmore: Curves.

Misha GROMOV. — **Metric structures for Riemannian and non-Riemannian spaces.** — Based on *Structures métriques des variétés riemanniennes*. — With appendices by M. Katz, P. Pansu, and S. Semmes. — Edited by J. LaFontaine and P. Pansu. — English translation by Sean Michael Bates. — Progress in mathematics, vol. 152. — Un vol. relié, 16,5×24, de XIX, 585 p. — ISBN 0-8176-3998-9. — Prix: SFr. 168.00. — Birkhäuser, Boston, 1999.

The boundary of metric theory, which covers a domain between the fields of topology and global Riemannian geometry, has dramatically exploded in the last 20 years, in part due to the important research of one of the world's leading geometers, M. Gromov. This book is based on an earlier French work (1979) which has been substantially revised and expanded. Exciting new connections between geometry and probability theory are made and links to analysis are developed. Key ideas of real analysis are presented in an accessible way to geometers. This self-contained monograph may be used in seminars and topics courses. Numerous illustrations and examples, bibliography and index, accompany a well-written text, which is an excellent self-study resource for geometers, analysts, and probabilists.

## ***Topologie algébrique***

Paul G. GOERSS, John F. JARDINE. — **Simplicial homotopy theory.** — Progress in mathematics, vol. 174. — Un vol. relié, 16,5×23,5, de xv, 510 p. — ISBN 3-7643-6064-X. — Prix: SFr. 98.00. — Birkhäuser, Basel, 1999.

With the development of Quillen's concept of a closed model category and in particular, a simplicial model category, the collection of simplicial methods has become the primary way to describe non-abelian homological algebra and to address homotopy-theoretical issues in a variety of fields, including algebraic  $K$ -theory. This book supplies a modern exposition of these ideas, emphasizing model category theoretical techniques. Discussed here are the homotopy theory of simplicial sets, and other basic topics such as simplicial groups, Postnikov towers, and bisimplicial sets. The more advanced material includes homotopy limits and colimits, localization with respect to a map and with respect to a homology theory, cosimplicial spaces, and homotopy coherence. Interspersed throughout are many results and ideas well-known to experts, but uncollected in the literature.

Sibe MARDEŠIĆ. — **Strong shape and homology.** — Springer monographs in mathematics. — Un vol. relié, 17×24, de XII, 489 p. — ISBN 3-540-66198-0. — Prix: DM 159.00. — Springer, Berlin, 2000.

Shape theory is an extension of homotopy theory from the realm of CW-complexes to arbitrary spaces. Besides applications in topology, it has interesting applications in various other areas of mathematics, especially in dynamical systems and  $C^*$ -algebras. Strong shape is a refinement of ordinary shape with distinct advantages over the latter. Strong homology generalizes Steenrod homology and is an invariant of strong shape. The book gives a detailed account

based on approximation of spaces by polyhedra (ANRs) using the technique of inverse systems. It is intended for researchers and graduate students. Special care is devoted to motivation and bibliographic notes.

### ***Topologie des variétés, analyse globale et analyse des variétés***

Michèle AUDIN. — **Spinning tops: a course on integrable systems.** — Cambridge studies in advanced mathematics, vol. 51. — Un vol. broché, 15,5×23, de viii, 139 p. — ISBN 0-521-77919-7. — Prix: £15.95. — Cambridge University Press, Cambridge, 1999.

Since the time of Lagrange and Euler, it has been well known that an understanding of algebraic curves can illuminate the picture of rigid bodies provided by classical mechanics. A modern view of the role played by algebraic geometry has been established in recent years by many mathematicians. This book presents some of these modern techniques, which fall within the orbit of finite-dimensional integrable systems. The main body of the text presents a rich assortment of methods and ideas from algebraic geometry prompted by classical mechanics, whilst in appendices the general, abstract theory is described. The methods are given a topological application, for the first time in book form, to the study of Liouville tori and their bifurcations.

Károly BÖRÖCZKY, Jr., Walter NEUMANN, András STIPSICZ, (Editors). — **Low dimensional topology.** — Bolyai Society Mathematical Studies, vol. 8. — Un vol. relié, 17,5×24,5, de 413 p. — ISBN 963-8022-92-2. — János Bolyai Mathematical Society, Budapest, 1999.

This proceedings contains the notes of five lecture series delivered at the Summer School on Low Dimensional Topology, held August 3-14, 1998 in Budapest (Hungary), and at the EMS Summer Schools No. 1, Algebraic Geometry, held in 1996 in Eger (Hungary). *Contents:* M. Davis, G. Moussong: Notes on nonpositively curved polyhedra. — J.W. Morgan: Smooth invariants of 4-manifolds. — W.E. Neumann: Notes on geometry and 3-manifolds. — A. Némethi: Normal surface singularities. — A. Némethi: Some topological invariants of isolated hypersurface singularities.

Brian DAVIES, Yuri SAFAROV, (Editors). — **Spectral theory and geometry.** — ICMS Instructional Conference, Edinburgh 1998. — London Mathematical Society lecture note series, vol. 273. — Un vol. broché, 15,5×23, de xii, 328 p. — ISBN 0-521-77749-6. — Prix: £27.95. — Cambridge University Press, Cambridge, 1999.

This volume brings together lectures from an instructional meeting on spectral theory and geometry held under the auspices of the International Centre for Mathematical Sciences in Edinburgh. The contributions here come from world experts and many are much expanded versions of the lectures they gave; together they survey the core material and go beyond to describe deeper results. For graduate students and experts alike, this book will be a highly useful resource.

Tan LEI, (Editor). — **The Mandelbrot set, theme and variations.** — London Mathematical Society lecture note series, vol. 274. — Un vol. broché, 15×23, de xx, 365 p. — ISBN 0-521-77476-4. — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

This volume provides a systematic exposition of current knowledge about the Mandelbrot set and presents the latest research in complex dynamics. Topics discussed include the universality and the local connectivity of the Mandelbrot set, parabolic bifurcation, critical circle homeomorphisms, absolutely continuous invariant measures and matings of polynomials,

along with the geometry, dimension and local connectivity of Julia sets. In addition to presenting new work, this collection documents important results hitherto unpublished or difficult to find in the literature.

Gabriel P. PATERNAIN. — **Geodesic flows.** — Progress in mathematics, vol. 180. — Un vol. relié, 16×24, de XII, 149 p. — ISBN 0-8176-4144-0. — Prix: SFr. 88.00. — Birkhäuser, Boston, 1999.

The work begins with a concise introduction to the geodesic flow of a complete Riemannian manifold, emphasizing its symplectic properties and culminating with various applications, such as the non-existence of continuous invariant Lagrangian subbundles for manifolds with conjugate points. Subsequent chapters develop the relationship between the exponential growth rate of the average number of geodesic arcs between two points in the manifold and the topological entropy of the geodesic flow. A complete proof of Mané's formula relating these two quantities is presented. A final chapter explores the link between the topological entropy of the geodesic flow and the homology of the loop space of a manifold.

Nikolai SAVELIEV. — **Lectures on the topology of 3-manifolds: an introduction to the Casson invariant.** — De Gruyter textbook. — Un vol. broché, 17×24, de IX, 199 p. — ISBN 3-11-016271-7. — Prix: DM 59.00. — Walter de Gruyter, Berlin, 1999.

Progress in low-dimensional topology has been very fast in the last two decades, leading to the solutions of many difficult problems. One of the consequences of this "acceleration of history" is that many results have only appeared in professional journals and monographs. The purpose of this book is to provide a much-needed bridge to these modern topics. The book covers some classical topics, such as Heegaard splittings, Dehn surgery, and invariants of knots and links. It proceeds through the Kirby calculus and Rohlin's theorem to Casson's invariant and its applications, and gives a brief sketch of links with the latest developments in low-dimensional topology and gauge theory.

### ***Probabilités et processus stochastiques***

Richard M. DUDLEY. — **Uniform central limit theorems.** — Cambridge studies in advanced mathematics, vol. 63. — Un vol. relié, 16×24, de XIV, 436 p. — ISBN 0-521-46102-2. — Prix: £55.00. — Cambridge University Press, Cambridge, 1999.

This book shows how the central limit theorem for independent, identically distributed random variables with values in general, multidimensional spaces, holds uniformly over some large classes of functions. The book contains, with complete proofs, the Fernique-Talagrand majorizing measure theorem for Gaussian processes, an extended treatment of Vapnik-Černovenkis combinatorics, the Ossiander  $L^2$  bracketing central limit theorem, the Giné-Zinn bootstrap central limit theorem in probability, the Bronstein theorem on approximation of convex sets, and the Shor theorem on rates of convergence over lower layers. The book incorporates an updated form of the author's 1984 St.-Flour lecture notes and also gives various results of the author's not previously collected in one place.

Dominique FOATA, Aimé FUCHS. — **Wahrscheinlichkeitsrechnung.** — Grundstudium Mathematik. — Un vol. broché, 17×24, de XV, 383 p. — ISBN 3-7643-6169-7. — Prix: SFr. 42.00 (relié: SFr. 88.00). — Birkhäuser, Basel, 1999.

Die vorliegende Einführung richtet sich an Studenten, die bereits einen Grundkurs in Analysis besucht haben, und zeichnet sich durch einen hervorragenden didaktischen Aufbau aus. Sowohl die diskrete wie auch die masstheoretische Wahrscheinlichkeitstheorie werden in



allen wesentlichen Elementen behandelt und alle wichtigen Sätze werden bewiesen. Viele Übungen helfen den Stoff einzuarbeiten und zu vertiefen. Alle Lösungen, oftmals sehr detailliert, sind im Buch enthalten und der ausführliche Index erleichtert das Nachschlagen. Anders als üblich werden sowohl die diskrete wie die masstheoretische Wahrscheinlichkeit abgehandelt.

Jean-François LE GALL. — **Spatial branching processes, random snakes and partial differential equations.** — Lectures in mathematics, ETH Zürich. — Un vol. broché, 17×24, de VIII, 162 p. — ISBN 3-7643-6126-3. — Prix: SFr. 38.00. — Birkhäuser, Basel, 1999.

The text includes a presentation of the measure-valued branching processes also called superprocesses and of their basic properties. In the important quadratic branching case, the path-valued process known as the Brownian snake is used to give a concrete and powerful representation of superprocesses. This representation is applied to several connections with a class of semilinear partial differential equations. On the one hand, these connections give insight into properties of superprocesses. On the other hand, the probabilistic point of view sometimes leads to new analytic results, concerning for instance the trace classification of positive solutions in a smooth domain. An important tool is the analysis of random trees coded by linear Brownian motion.

Masao NAGASAWA. — **Stochastic processes in quantum physics.** — Monographs in mathematics, vol. 94. — Un vol. relié, 18×24, de VII, 598 p. — ISBN 3-7643-6208-1. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2000.

Together with known techniques, some new stochastic methods are applied in solving the equation of motion and the equation of dynamics of relativistic quantum particles. The problem of the origin of universes is discussed as an application of the theory. The text is almost self-contained and requires only an elementary knowledge of probability theory at the graduate level, and some selected chapters can be used as (sub)-textbooks for advanced courses on stochastic processes, quantum theory and theoretical chemistry.

Massimo PICARDELLO, Wolfgang WOESS, (Editors). — **Random walks and discrete potential theory: Cortona 1997.** — Symposia mathematica, vol. 39. — Un vol. relié, 16,5×23,5, de VIII, 361 p. — ISBN 0-521-77312-1. — Prix: £40.00. — Cambridge University Press, Cambridge, 1999.

This book covers the interplay between the behaviour of a class of stochastic processes (random walks) and structure theory. Written by leading researchers, this collection of invited papers presents links with spectral theory and discrete potential theory, besides probabilistic and structure theoretic aspects. Its interdisciplinary approach spans several areas of mathematics including geometric group theory, discrete geometry and harmonic analysis, and will be of interest to researchers and post-graduate students, both in mathematics and statistical physics.

Pál RÉVÉSZ, Bálint TÓTH. — **Random walks.** — Bolyai Society Mathematical Studies, vol. 9. — Un vol. relié, 17,5×24,5, de 384 p. — ISBN 963-8022-91-4. — János Bolyai Mathematical Society, Budapest, 1999.

R.C. Bradley: Can a theorem of Csáki and Fischer provide a key to Ibragimov's conjecture? — E. Csáki, A. Földes, P. Révész, Z. Shi: On the excursions of two-dimensional random walk and Wiener process. — M. Csörgő: Random walking around financial mathematics. — B. Davis: Reinforced and perturbed random walks. — N. Gantert, O. Zeitouni: Large deviations for one-dimensional random walk in random environment – a survey. — J. Gravner, D. Griffeath: Scaling laws for a class of critical cellular automaton growth rules. — Y. Hu, M. Yor: Asymptotic studies of Brownian functionals. — G. Lawler: Geometric and fractal

properties of Brownian motion and random walk paths in two and three dimensions. — S.G. Mohanty: Combinatorial aspects of some random walks. — G. Pap, M. Voit: Rates of convergence for the central limit theorems for random walks related with the Hankel transform. — P. Révész: Critical branching Wiener process. — B. Tóth: Self-interacting random motions — a survey.

Ken-Iti SATO. — **Lévy processes and infinitely divisible distributions.** — Cambridge studies in advanced mathematics, vol. 68. — Un vol. relié, 16×24, de XII, 486 p. — ISBN 0-521-55302-4. — Prix: £50.00. — Cambridge University Press, Cambridge, 1999.

Lévy processes are rich mathematical objects and constitute perhaps the most basic class of stochastic processes with a continuous time parameter. This book is intended to provide the reader with comprehensive basic knowledge of Lévy processes, and at the same time serve as an introduction to stochastic processes in general. No specialist knowledge is assumed and proofs are given in detail. Systematic study is made of stable and semi-stable processes, and the author gives special emphasis to the correspondence between Lévy processes and infinitely divisible distributions.

Daniel W. STROOCK. — **Probability theory: an analytic view.** — Revised edition. — Un vol. relié, 18×26, de XVI, 536 p. — ISBN 0-521-66349-0. — Prix: £18.95. — Cambridge University Press, Cambridge, 1999.

This book is intended for graduate students who have a good undergraduate introduction to probability theory, a reasonably sophisticated introduction to modern analysis and want to learn what these two topics have to say about each other. By modern standards, the topics treated here are classical and the techniques used far-ranging. No attempt has been made to present the subject as a monolithic structure resting on a few basic principles. The first part of the book deals with independent random variables, central limit phenomena, the general theory of weak convergence and several of its applications, as well as elements of both the Gaussian and Markovian theories of measures on function space. The introduction of conditional expectation values is postponed until the second part of the book, where it is applied to the study of martingales. This section also explores the connection between martingales and various aspects of classical analysis, and the connections between Wiener's measure and classical potential theory.

Sara A. VAN DE GEER. — **Applications of empirical process theory.** — Cambridge series in statistical and probabilistic mathematics. — Un vol. relié, 18×26, de XII, 286 p. — ISBN 0-521-65002-X. — Prix: £35.00. — Cambridge University Press, Cambridge, 2000.

This book reveals the relation between the asymptotic behaviour of M-estimators and the complexity of parameter space. Virtually all results are proved using only elementary ideas developed within the book; there is minimal recourse to abstract theoretical results. To make the results concrete, a detailed treatment is presented for two important examples of M-estimation, namely maximum likelihood and least squares. The theory also covers estimation methods using penalties and sieves. Many illustrative examples are given, including the Grenander estimator, estimation of functions of bounded variation, smoothing splines, partially linear models, mixture models and image analysis.

Wolfgang WOESS. — **Random walks on infinite graphs and groups.** — Cambridge tracts in mathematics, vol. 138. — Un vol. relié, 16×23,5, de XI, 334 p. — ISBN 0-521-55292-3. — Prix: £40.00. — Cambridge University Press, Cambridge, 2000.

The main theme of this book is the interplay between the behaviour of a class of stochastic processes (random walks) and discrete structure theory. The author considers Markov chains

whose state space is equipped with the structure of an infinite, locally-finite graph, or as a particular case, of a finitely generated group. The transition probabilities are assumed to be adapted to the underlying structure in some way that must be specified precisely in each case. From the probabilistic viewpoint, the question is what impact the particular type of structure has on various aspects of the behaviour of the random walk. Conversely, random walks may also be seen as a useful tool for classifying, or at least describing, the structure of graphs and groups. Links with spectral theory and discrete potential theory are also discussed.

## **Statistique**

Cees DIKS. — **Nonlinear time series analysis: methods and applications.** — Nonlinear time series and chaos, vol. 4. — Un vol. relié,  $16 \times 22,5$ , de VII, 209 p. — ISBN 981-02-3505-4. — Prix: £ 18.00. — World Scientific, Singapore, 1999.

The currently established methods for the analysis of time series were developed mainly in two fields: statistical time series analysis and the theory of dynamical systems. A prolific cross-fertilization has recently started to develop between these areas, and it is the author's intention to present some theory and methods in view of this development, indicating the connections between the two fields wherever possible. The author has tried to keep the material accessible to a readership with an interest in nonlinear time series analysis from a wide variety of research areas; only modest mathematical background knowledge is assumed and examples are given throughout to illustrate the ideas behind the methods presented.

Subir GHOSH, (Editor). — **Multivariate analysis, design of experiments, and survey sampling.** — Statistics: textbooks and monographs, vol. 159. — Un vol. relié,  $16,5 \times 23,5$ , de XVIII, 663 p. — ISBN 0-8247-0052-X. — Prix: US\$ 195.00. — Marcel Dekker, New York, 1999.

Featuring the work of nearly 50 international leaders, this book provides a risk prediction model for optimally selecting inspection samples from shipments containing items of highly variable monetary value... reviews recent progress on obtaining approximation to sampling distributions involved in sequentially designed experiments... studies the influence of random effects on the hazard rate, survival function, and other measures of dependence in survival models... investigates statistical model evaluation problems from an information theoretic point of view... considers the effects of elliptical populations for test statistics from multivariate normal theory... supplies a nonstandard introduction to (multiple) correspondence analysis and some of its generalizations... discusses generalized multivariate analysis of variance (MANOVA) models... analyzes work on the Bayesian analysis and design of  $M/M/c$  (including  $M/M/1$  and  $M/M/\infty$ ) queues... and more.

J.R. HIGGINS and R.L. STENS, (Editors). — **Sampling theory in Fourier and signal analysis: advanced topics.** — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de XIII, 296 p. — ISBN 0-19-853496-5. — Prix: £ 60.00. — Oxford University Press, Oxford, 1999.

P.L. Butzer, M. Hauss: Applications of sampling theory to combinatorial analysis, Stirling numbers, special functions and the Riemann zeta function. — W.J. Walker: Sampling theory and the arithmetic Fourier transform. — J.R. Higgins: Derivative sampling – a paradigm example of multichannel methods. — D.H. Mugler: Computational methods in linear prediction for band-limited signals based on past samples. — W.N. Everitt and G. Nasri-Roudsari: Interpolation and sampling theories and linear ordinary boundary value problems. —

R.L. Stens: Sampling by generalized kernels. — A. Fischer: Sampling theory and wavelets. — N. Dyn: Approximation by translates of a radial function. — T. Pogány: Almost sure sampling restoration of band-limited stochastic signals. — M.M. Dodson and M.G. Beaty: Abstract harmonic analysis and the sampling theorem.

Joseph B. KADANE, Mark J. SCHERVISH, Teddy SEIDENFELD, (Editors). — **Rethinking the foundations of statistics.** — Cambridge studies in probability, induction, and decision theory. — Un vol. broché, 15,5×23, de x, 388 p. — Prix: £15.95 (relié: £42.50). — ISBN 0-521-64975-7. — Cambridge University Press, Cambridge, 1999.

This important collection of essays is a synthesis of foundational studies in Bayesian decision theory and statistics. An overarching topic of the collection is how the norms for Bayesian decision making should apply in settings with more than one rational decision maker. The essays then trace out some of the consequences of this turn for Bayesian statistics. There are four principal themes to the collection: cooperative, non-sequential decisions; the representation and measurement of “partially ordered” preferences; non-cooperative, sequential decisions; and pooling rules and Bayesian dynamics for sets of probabilities.

C. Radhakrishna RAO, Helge TOUTENBURG. — **Linear models: least squares and alternatives.** — Second edition. — With contributions by Andreas Fieger. — Springer series in statistics. — Un vol. relié, 16,5×24,5, de xv, 427 p. — ISBN 0-387-98848-3. — Prix: DM 136.00. — Springer, New York, 1999.

This book provides an up-to-date account of the theory and applications of linear models. It can be used as a text for courses in statistics at the graduate level as well as an accompanying text for other courses in which linear models play a part. The authors present a unified theory of inference from linear models with minimal assumptions, not only through least squares theory, but also using alternative methods of estimation and testing based on convex loss functions and general estimating equations. The book includes a discussion of: sensitivity analysis and model selection, incomplete data sets including regression diagnostics to identify non-MCAR-processes, the analysis of categorical data based on a unified presentation of generalized linear models including GEE-methods for correlated response.

## **Analyse numérique**

Werner HAUSSMANN, Kurt JETTER, Manfred REIMER, (Editors). — **Advances in multivariate approximation.** — Proceedings of the 3<sup>rd</sup> International Conference on Multivariate Approximation Theory held at Witten-Bommerholz, Germany, September 27-October 2, 1998. — Mathematical research, vol. 107. — Un vol. relié, 18×24,5 de 334 p. — ISBN 3-527-40236-5. — Prix: DM 198.00. — Wiley-VCH, Berlin, 1999.

The following topics are covered: Node distributions on the sphere. Positive quadratures. Discrepancy and spherical designs. Fekete points. Interpolation and hyperinterpolation on the sphere. Modelling of geopotential data. Periodic, monotone and convex approximations. Stability of the fast Fourier transform. Interpolation with bivariate splines and periodic functions. Range restricted interpolation. Saturation phenomena for box spline operators. Universal harmonic functions. Best one-sided approximation by harmonic and blending functions. Besov regularity for the Stokes problem. Spherical polynomial approximations. Simultaneous approximation in the Dirichlet space. Weighted K-functionals and moduli of smoothness.



Bernard HÉRON, Françoise ISSARD-ROCH, Colette PICARD. — **Analyse numérique: exercices et problèmes corrigés.** — Sciences sup. — Un vol. broché, 17×24, de XII, 292 p. — ISBN 2-10-004372-2. — Prix: FF 175.00. — Dunod, Paris, 1999, diffusé en Suisse par Havas Services Suisse, Fribourg.

Ce recueil d'exercices et de problèmes d'analyse numérique s'adresse tout particulièrement aux étudiants de licence et de maîtrise de mathématiques, de mathématiques et ingénierie mathématique (MIM) et de mécanique et aux élèves-ingénieurs. Les énoncés, progressifs, sont répartis en cinq grands chapitres: Analyse matricielle; équations aux dérivées partielles elliptiques; optimisation; approximation d'équations aux dérivées partielles; méthodes numériques itératives. Les solutions, très détaillées et accompagnées de commentaires et de renvois bibliographiques, permettent une assimilation active des notions abordées.

## **Informatique**

Jerry GLYNN, Theodore GRAY. — **The beginner's guide to Mathematica® Version 4.** — Un vol. relié, 20×23, de VIII, 434 p. — ISBN 0-521-77769-0. — Prix: £47.50. — Cambridge University Press, Cambridge, 2000.

This is a new edition of the book *The beginner's guide to Mathematica*. It teaches the basics of *Mathematica's* powerful new Version 4, including chapters on its new high speed numerics, statistics and data analysis, and image processing. It also includes chapters on the interactive system for typesetting equations, on using style sheets, defining functions, creating graphs and notebooks, and on applying useful problem-solving techniques. Many concepts are illustrated with real life examples written in the authors' engaging dialog style.

George GRÄTZER. — **First steps in LATEX.** — Un vol. broché, 19×23,5, de XX, 131 p. — ISBN 0-8176-4132-7. — Prix: SFr. 36.00. — Birkhäuser, Boston, and Springer, New York, 1999.

This book is for the scientist, or technical typist who needs to learn quickly how to typeset articles containing mathematical formulas. This book will provide a quick introduction to LaTeX, including the American Mathematical Society's enhancements, so that your first article can be typeset in only a few hours. Key features include: simple and direct approach, "formula building blocks" to learn how to type math, a "formula gallery" to practise math formulas, samples to demonstrate the basic structure of LaTeX and AMS articles, useful appendices containing mathematical and text symbol tables, and a brief discussion of TeX, LaTeX, and the internet, a unique "Quick Finder" – supplementing a detailed table of contents and index – to look up common terms used in word processing and desktop publishing applications.

Arthur O. PITTENGER. — **An introduction to quantum computing algorithms.** — Progress in computer science and applied logic, vol. 19. — Un vol. relié, 16×24, de XII, 138 p. — ISBN 3-7643-4127-0. — Prix: SFr. 84.00. — Birkhäuser, Boston, 2000.

The purpose of this monograph is to provide the mathematically literate reader with an accessible introduction to the theory of quantum computing algorithms. The author briefly describes the historical context of quantum computing and provides the motivation, notation, and assumptions appropriate for quantum statistics, a non-dynamical, finite dimensional model of quantum mechanics. A discussion of the basic algorithms of Simon, Deutsch and Jozsa sets the stage for the presentation of Grover's search algorithm and Shor's factoring algorithm, key algorithms which crystallized interest in the practicality of quantum computers. The last part of

the book briefly elaborates the need for error-correction capabilities and then traces the theory of quantum error-correcting codes from the earliest examples to an abstract formulation in Hilbert space.

Raymond SÉROUL. — **Programming for mathematicians.** — Universitext. — Un vol. broché,  $15,5 \times 23,5$ , de xv, 429 p. — ISBN 3-540-66422-X. — Prix: DM 69.00. — Springer, Berlin, 2000.

The aim of this book is to teach mathematics students how to program using their knowledge of mathematics. For this they require only to know how to construct a proof. The entire book's emphasis is on "how to think" when programming. Three methods for constructing an algorithm or a program are used: a) manipulation and enrichment of existing code; b) use of recurrent sequences; c) deferral of code writing, in order to deal with one difficulty at a time. Many theorems are mathematically proved and programmed. The last chapter explains how a compiler works and shows how to compile "by hand" little (but not trivial - even recursive) programs. The book is intended for anyone who thinks mathematically and wants to program and play with mathematics.

### ***Mécanique des solides, élasticité et plasticité***

Gérard A. MAUGIN. — **Nonlinear waves in elastic crystals.** — Oxford science publications. — Oxford mathematical monographs. — Un vol. relié,  $16 \times 24$ , de ix, 314 p. — ISBN 0-19-853484-1. — Prix: £ 70.00. — Oxford University Press, Oxford, 1999.

*From the preface:* The precise project for this book took shape after the writing of the lecture notes for a course on the "Physical and mathematical models of nonlinear waves in solids" delivered in 1993 at the International Centre for Mechanical Sciences, Udine, Italy... It was neither to be a book on crystallography per se nor a treatise of mathematics. Rather, it was intended to be devoted to applied mathematics exploited in a specific physical field of basic interest to many scientists and engineers. — *Contents:* Different types of crystal. Discrete and continuum descriptions: general introduction. Elasticity and anelasticity: continuous viewpoint. Elasticity and anelasticity: discrete viewpoint. Coupled fields in elasticity. Nonlinear waves in elastic chains. Nonlinear waves in elastic crystals with a microstructure. Nonlinear waves in martensite structures. Nonlinear acoustic surface waves in crystals. Shock waves and phase-transition fronts in thermoelastic crystals.

### ***Mécanique des fluides, acoustique***

Albert GYR, Wolfgang KINZELBACH, Arkady TSINOBER, (Editors). — **Fundamental problematic issues in turbulence.** — Trends in mathematics. — Un vol. relié,  $17,5 \times 24$ , de viii, 480 p. — ISBN 3-7643-6150-6. — Prix: SFr. 198.00. — Birkhäuser, Basel, 1999.

The intention of the book is to highlight the problematic aspects of turbulence. The contributions treat a variety of mathematical, physical and engineering subjects related to turbulence. The topics include mathematical issues, control and related problems, observational aspects, two- and quasi-two-dimensional flows, basic aspects of turbulence modeling, statistical issues and passive scalars. The main questions addressed are the controllability of turbulent flows, possible qualitative differences between pure two-dimensional and real quasi-two-dimensional turbulent flows, common features of two-dimensional and three-dimensional turbulence, etc.

Clifford TRUESDELL, Kumbakonam Ramamani RAJAGOPAL. — **An introduction to the mechanics of fluids.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×24, de XII, 277 p. — ISBN 0-8176-4014-2. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This new advanced text/reference presents an introduction to many aspects of fluid mechanics, with particular emphasis on the description and response of nonlinear fluids. Results are developed and established with rigor, and the topics span from Euler fluids to fluids that have memory. *Topics and features:* Integrated chapter exercises. — Numerous detailed, worked examples and results. — Visometric flows. — Nonlinear fluids. — Navier-Stokes fluids. — Compressible and incompressible Euler fluids and flows.

### ***Thermodynamique classique, propagation de la chaleur***

Vincent GIOVANGIGLI. — **Multicomponent flow modeling.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×24, de XVI, 321 p. — ISBN 0-8176-4048-7. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1999.

This book provides a complete interdisciplinary overview of multicomponent flow modeling and analysis. The goal of this book is to give a detailed presentation of the governing equations – including the expression of multicomponent transport coefficients – obtained from the kinetic theory of gases. Another goal is to analyze the mathematical properties of the model, more specifically, to investigate thermochemistry properties, the structure of multicomponent transport, and well posedness of the resulting system of partial differential equations. Finally, the book discusses the numerical simulation of reactive flows and presents complex chemistry-flame simulations.

### ***Mécanique quantique***

Jean-Noël CHAZALVIEL. — **Coulomb screening by mobile charges: applications to materials science, chemistry, and biology.** — Un vol. relié, 17×24,5, de X, 355 p. — ISBN 0-9176-3950-0. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1999.

This work is the first comprehensive treatment of screening, particularly with respect to out-of-equilibrium systems. It is divided into two parts. The first outlines the principles of screening at equilibrium or near equilibrium, while the second is devoted to the case of strong deviations from equilibrium. A great strength of this text is its unique interdisciplinary exposition, which sometimes leads to an unconventional presentation of classical results. Following the introduction of each major concept, applications to different subject areas are described, and further developed by problems, with solutions provided. The extensive list of references will be useful to both graduate student and researcher.

Sam TREIMAN. — **The odd quantum.** — Un vol. relié, 16,5×24, de VIII, 262 p. — ISBN 0-691-00926-0. — Prix: US\$24.95. — Princeton University Press, Princeton, 1999.

The author begins with an overview of quantum mechanics. He sketches the early development of the field by Einstein, Bohr, Heisenberg, Schrödinger, and others, and he makes clear how the quantum outlook flies in the face of common sense. As he explains, the quantum world is intrinsically probabilistic. For example, a particle is not in general in some particular place at a given instant, nor does it have a definite momentum. Weaving together impeccable and up-to-date science, engaging writing, and a talent for clear explanation honed over Treiman's distinguished career as a physicist and teacher, this book provides a remarkable survey of a field that changed the course of modern scientific and philosophical thought.

## ***Economie, recherche opérationnelle, jeux***

Alan D. TAYLOR and William S. ZWICKER. — **Simple games: desirability relations, trading, pseudoweightings.** — Un vol. relié, 16,5×24, de XIII, 246 p. — ISBN 0-691-00120-0. — Prix: £38.00. — Princeton University Press, Princeton, 1999, distributed by John Wiley, Chichester.

Simple games are mathematical structures inspired by voting systems in which a single alternative, such as a bill, is pitted against the status quo. The first in-depth mathematical study of the subject as a coherent subfield of finite combinatorics – one with its own organized body of techniques and results – this book blends new theorems with some of the striking results from threshold logic, making all of it accessible to game theorists.

## ***Systèmes, contrôle optimal***

Biswa Nath DATTA, (Editor). — **Applied and computational control, signals, and circuits, Vol. 1.** — Un vol. relié, 16,5×24,5, de XXI, 539 p. — ISBN 0-8176-3954-3. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1999.

This new “annual volume” is an interdisciplinary publication that provides surveys, expository papers, algorithms, and software addressing significant new developments, applications and computations in control, signal processing, and circuit design and analysis. The goal is to provide authoritative and accessible accounts of fast-paced developments in computational engineering methods, applications and algorithms. These state-of-the-art surveys will benefit researchers and practitioners in applied mathematics, computer science and engineering. A more general goal is to foster communications and exchange of information between various scientific and engineering communities with mutual interests in concepts, software, new techniques and workable, reliable practices.

Vasile DRAGAN, Aristide HALANAY. — **Stabilization of linear systems.** — Systems & control. — Un vol. relié, 16×24, de XIV, 308 p. — ISBN 0-8176-3970-5. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1999.

This new book focuses on various aspects of stabilization of linear systems, in particular those arising in the mathematical and physical applications that are found in many areas of research addressing stabilization of linear dynamical systems in continuous time. The authors deal specifically with stabilization under incomplete information by high-gain and adaptive procedures; in this connection, they pay close attention to systems with several time scales, which are of interest because they allow model reduction. One of the most important features of the book is a discussion of the discrete implementation of stabilization procedures. Problems of optimal stabilization are considered in connection with frequency domain conditions.

Ian R. PETERSEN, Andrey V. SAVKIN. — **Robust Kalman filtering for signals and systems with large uncertainties.** — Control engineering. — Un vol. relié, 16×24, de x, 200 p. — ISBN 0-8176-4089-4. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1999.

The aim of this book is to cover recently developed theory of robust state estimation for the case in which the process model contains significant uncertainties and nonlinearities and the potential applications of this theory. Most of the book concentrates on the case of linear uncertain systems and robust filters constructed via Riccati equations methods. This approach extends the classical Kalman filter to the realm of systems with uncertain parameters. As well as standard filtering problems, more general filtering problems are introduced such as robust filters with missing data, sample and hybrid data filtering problems, robust prediction, and the design of low order filters.



## ***Information, communication, circuits***

Johannes BUCHMANN, Tom HØHOLDT, Henning STICHTENOTH, Horacio TAPIA-RECILLAS, (Editors). — **Coding theory, cryptography and related areas.** — Proceedings of an International Conference on Coding Theory, Cryptography and Related Areas, held in Guanajuato, Mexico, in April 1998. — Un vol. broché,  $15,5 \times 23,5$ , de VIII, 259 p. — ISBN 3-540-66248-0. — Prix: DM 129.00. — Springer, Berlin, 2000.

This book contains 23 contributions presented at the “International Conference on Coding Theory, Cryptography and Related Areas (ICCC)”, held in Guanajuato, Mexico, in April 1998. It comprises a series of research papers on various aspects of coding theory (geometric-algebraic, decoding, exponential sums, etc.) and cryptography (discrete logarithm problem, public key cryptosystems, primitives, etc.), as well as in other research areas, such as codes over finite rings and some aspects of function fields and algebraic geometry over finite fields. The book contains new results on the subject, never published in any other form.

David JOYNER, (Editor). — **Coding theory and cryptography: from Enigma and Geheimschreiber to quantum theory.** — Un vol. broché,  $15,5 \times 23,5$ , de VI, 256 p. — ISBN 3-540-66336-3. — Prix: DM 129.00. — Springer, Berlin, 2000.

These are the proceedings of the Conference on Coding Theory, Cryptography, and Number Theory held at the U.S. Naval Academy during October 25-26, 1998. The emphasis is on geometric Goppa codes, but there is also a paper on codes arising from combinatorial constructions. There are both historical and mathematical papers on cryptography. Several of the contributions on cryptography describe the work done by the British and their allies during World War II to crack the German and Japanese ciphers. Some mathematical aspects of the Enigma rotor machine and more recent research on quantum cryptography are described. Moreover, there are two papers concerned with the RSA cryptosystem and related number-theoretic issues.

Gilbert G. WALTER, Martha CONTRERAS. — **Compartmental modeling with networks.** — Modeling and simulation in science, engineering and technology. — Un vol. relié,  $16 \times 24$ , de XVIII, 250 p. — ISBN 0-8176-4019-3. — Prix: SFr. 108.00. — Birkhäuser, Basel, 1999.

In order to provide a complete and balanced presentation, the book is organized in four parts. Part 1 is devoted to the theory of digraphs; Part 2 addresses Markov chains; Part 3 discusses differential equations; and Part 4 presents the theory of compartmental models, addressing the relations between dynamics of the solution and structure of the model. Key applications discussed include ecosystem models, fluid transfer, competition models, tracer kinetic experiments, and network flows. Essential topics and methods are presented in an accessible style with many examples: directed graphs, differential equations, Markov chains, and compartmental model construction.