

**Zeitschrift:** L'Enseignement Mathématique  
**Herausgeber:** Commission Internationale de l'Enseignement Mathématique  
**Band:** 46 (2000)  
**Heft:** 3-4: L'ENSEIGNEMENT MATHÉMATIQUE  
  
**Rubrik:** BULLETIN BIBLIOGRAPHIQUE

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### *Généralités*

Titu ANDREESCU, Razvan GELCA. — **Mathematical Olympiad challenges.** — Foreword by Mark Saul. — Un vol. broché,  $15,5 \times 23,5$ , de xv, 260 p. — ISBN 0-8176-4155-6. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2000.

*Mathematical Olympiad Challenges* is a rich collection of problems put together by two experienced and well-known professors and coaches of the U.S. International Mathematical Olympiad Team. Hundreds of beautiful, challenging, and instructive problems from algebra, geometry, trigonometry, combinatorics, and number theory were selected from numerous mathematical competitions and journals. The problems are clustered by topic into self-contained sections with solutions provided separately. All sections start with an essay discussing basic facts and one or two representative examples. A list of carefully chosen problems follows and the reader is invited to take them on. Additionally, historical insights and asides are presented to stimulate further inquiry. The emphasis throughout is on encouraging readers to move away from routine exercises and memorized algorithms toward creative solutions to open-ended problems.

Yuri BAHTURIN, (Editor). — **Algebra.** — Proceedings of the International Algebraic Conference on the occasion of the 90<sup>th</sup> birthday of A.G. Kurosh, Moscow, Russia, May 25-30, 1998. — Un vol. relié,  $17,5 \times 24,5$ , de xx, 410 p. — ISBN 3-11-016399-3. — Prix: DM 298.00. — Walter de Gruyter, Berlin, 2000.

This volume contains the selected and refereed papers submitted by the participants of the International Algebraic Conference dedicated to the memory of the prominent Soviet scholar Alexander Gennadievich Kurosh (1908-1971). The influence of Kurosh's school went far beyond the limits of general algebra, an area greatly influenced by him. This is reflected by the variety of fields of mathematics covered by the contributions to this volume: group theory; theory of rings, modules, homological algebra and K-theory; Lie groups and algebras, invariant theory, algebraic groups; algebraic geometry, algebraic number theory, commutative algebra; algebraic systems; computer algebra and algorithmic problems.

Elwyn BERLEKAMP. — **The dots-and-boxes game: sophisticated child's play.** — Un vol. broché,  $15 \times 23$ , de xii, 131 p. — ISBN 1-56881-129-2. — Prix: US\$ 14.95. — A.K. Peters, Natick, Mass., 2000.

The deceptively simple game, however, is more than just child's play. Dots-and-Boxes strategy serves as an introduction to mathematical game theory, a subject that has earned the prominent mathematician John Nash a Nobel Prize in economics. The book is an essential guide



to the game of Dots-and-Boxes and its mathematical underpinnings. By reading this easy-to-follow guide to the game, you will learn strategies in a matter of hours that took mathematicians several decades to figure out. Chapters of strategy are interspersed with 1000 sample problems and their strategic solutions. Furthermore, the strategies can be applied to several other games, such as Strings-and-Coins and Nimstring.

François SAUVAGEOT. — **Petits problèmes de géométrie et d'algèbre: issus des concours d'entrée à l'Ecole normale supérieure de Cachan.** — Scopos, vol. 7. — Un vol. broché, 15,5×23,5, de XII, 172 p. — ISBN 3-540-65986-2. — Prix: DM 49.00. — Springer, Berlin, 2000.

Cet ouvrage rassemble 29 petits problèmes et un problème qui ont été posés au concours d'entrée (à dominante mathématique) à l'Ecole Normale Supérieure de Cachan. Les énoncés sont corrigés de manière très détaillée et surtout indépendamment les uns des autres. Les corrections sont suivies de commentaires qui les éclairent, les prolongent ou les mettent en liaison avec d'autres. Ce livre sera bien évidemment utile aux étudiants et enseignants des classes préparatoires aux grandes écoles, mais il est aussi à recommander aux étudiants préparant les concours du C.A.P.E.S. et de l'agrégation de mathématiques tant pour les épreuves écrites que pour les épreuves orales.

Brigitte BIDEGARAY, Lionel MOISAN. — **Petits problèmes de mathématiques appliquées et de modélisation.** — Issus des concours d'entrée à l'Ecole normale supérieure de Cachan — Scopos, vol. 9. — Un vol. broché, 15,5×23,5, de x, 138 p. — ISBN 3-540-67303-2. — Prix: DM 39.00. — Springer, Berlin, 2000.

Cet ouvrage rassemble une trentaine de petits problèmes posés à l'épreuve orale de Mathématiques Appliquées du concours d'entrée à l'Ecole normale supérieure de Cachan, ainsi qu'un problème d'écrit. Ces problèmes sont corrigés en détail, et des indications séparées permettent de guider le lecteur dans leur résolution. Les énoncés sont présentés sous un angle purement mathématique, mais des commentaires approfondis les replacent ensuite dans le contexte précis de leurs applications, laissant souvent entrevoir dans leur généralisation des problèmes contemporains. Ce recueil est destiné aux étudiants et enseignants de classe préparatoire et de premier et second cycle universitaire, ainsi qu'aux candidats CAPES et à l'agrégation de mathématiques (épreuve de modélisation).

Ethan D. BLOCH. — **Proofs and fundamentals: a first course in abstract mathematics.** — Un vol. relié, 16×24, de x, 424 p. — ISBN 0-8176-4111-4. — Prix: SFr. 88.00. — Birkhäuser, Boston, 2000.

*Proofs and Fundamentals* is designed as a 'transition' course to introduce undergraduates to the writing of rigorous mathematical proofs, and to such fundamental mathematical ideas as sets, functions, relations, and cardinality. The text serves as a bridge between computational courses such as calculus, and more theoretical, proof-oriented courses such as linear algebra, abstract algebra, and real analysis. This 3-part work carefully balances Proofs, Fundamentals, and Extras. Part 1 presents logic and basic proof techniques; Part 2 thoroughly covers fundamental material including sets, functions, and relations; and Part 3 introduces a variety of extra topics such as groups, combinatorics, and the Peano Postulates. A gentle, friendly style is used, in which motivation and informal discussion play a key role, and yet high standards in rigor and writing are never compromised. The material is presented in the way that mathematicians actually use it; good mathematical taste is preferred to overly clever pedagogy. There is a key section devoted to the proper writing of proofs. The text has over 400 exercises, ranging from straightforward examples to very challenging proofs.

Vincent BLONDEL. — **Mathématiques: Analyse, cours et exercices corrigés.** — Sciences Sup, cours, DEUG Sciences de la vie et Sciences de la terre. — Un vol. broché, 17×24, de XII, 237 p. — ISBN 2-10-004539-3. — Prix: FF 125.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage présente les méthodes et outils mathématiques nécessaires à la poursuite d'études orientées vers les sciences expérimentales. Chaque concept introduit est motivé et illustré d'exemples d'application en biologie, en géologie, en chimie et en physique. De nombreux exercices et problèmes corrigés complètent les huit chapitres du livre et mettent en œuvre les connaissances acquises dans des situations concrètes.

Jean-François BOUTILLON. — **Best of mathématiques: les meilleurs sujets de concours, 2<sup>e</sup> année toutes filières.** — J'intègre, révision. — Un vol. 17×24, de 296 p. — ISBN 2-10-004501-6. — Prix: FF 125.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Les meilleurs sujets posés depuis la réforme des classes préparatoires ont été sélectionnés pour ce livre, en se fondant sur des critères d'ordres pédagogique et scientifique. Les solutions les plus utiles ont été choisies. En guise de préambule, chacune d'elles est introduite par une analyse rapide de l'énoncé, qui donne une première idée de l'orientation à prendre. Puis au fil de la correction, un appareil méthodologique se met en place, afin que soit clairement mise en évidence la démarche suivie. De nombreux encarts rappellent les parties du programme utilisées, insistent sur les points délicats, donnent des conseils et signalent les pièges à éviter.

R.P. BURN. — **Numbers and functions: steps into analysis.** — Second edition. — Un vol. broché, 15×22,5, de XXIII, 356 p. — ISBN 0-521-78836-6. — Prix: £ 19.95. — Cambridge University Press, Cambridge, 2000.

The transition from studying calculus in schools to studying mathematical analysis at university is notoriously difficult. In this new edition of *Numbers and Functions*, professor Burn invites the student reader to tackle each of the key concepts in turn, progressing from experience through a structured sequence of several hundred problems to concepts, definitions and proofs of classical real analysis. The sequence of problems, which all have solutions supplied, draws students into constructing definitions and theorems for themselves. This natural development is informed and complemented by historical insight.

Barry CIPRA. — **Mistakes... and how to find them before the teacher does.** — Third edition. — Un vol. broché, 15×23, de xv, 70 p. — ISBN 1-56881-122-5. — Prix: US\$ 5.95. — A.K. Peters, Natick, Mass., 2000.

An unusual supplement to any calculus textbook, *Mistakes* is just what every calculus student has been waiting for! By teaching students to think of calculus problems in terms of real objects instead of cryptic strings of numbers and letters, his book allows students to find mistakes in their work by rationalizing whether or not their answers actually make sense. *Mistakes* addresses the most common errors in calculus problem solving and explains how to eliminate them, while illustrating the point with examples that students will not soon forget. This work takes the common-sense approach to learning calculus, with a dry wit that students will appreciate.

Leonhard EULER. — **Foundations of differential calculus.** — Translated by John D. Blanton. — Un vol. relié, 16×24,5, de XIV, 194 p. — ISBN 0-387-98534-4. — Prix: DM 119.00. — Springer, New York, 2000.

In 1755 Euler published *Institutiones Calculi Differentialis*. This came in two parts. The first part is the theory of differential calculus, while the second part is concerned with applications of

differential calculus. Here, has been translated the first part of Euler's work. The translation is based on vol. 10 of the first series of the *Opera Omnia*, edited by Gerhard Kowalewski. The translator has incorporated the corrections noted by Kowalewski. *Contents*: On finite differences. — On the use of differences in the theory of series. — On the infinite and the infinitely small. — On the nature of differentials of each order. — On the differentiation of algebraic functions of one variable. — On the differentiation of transcendental functions. — On the differentiation of functions of two or more variables. — On the higher differentiation of differential formulas. — On differential equations.

John FAUVEL and Jan van MAANEN, (Editors). — **History in mathematics education: the ICMI Study**. — New ICMI study series, vol. 6. — Un vol. relié, 16,5×24,5, de XVIII, 437 p. — ISBN 0-7923-6399-X. — Prix: Dfl. 350.00. — Kluwer Academic Publishers, Dordrecht, 2000.

This book investigates how the learning and teaching of mathematics can be improved through integrating the history of mathematics into all aspects of mathematics education: lessons, homework, texts, lectures, projects, assessment, and curricula. Most of the leading specialists in the field have contributed to this ground-breaking book, whose topics include the integration of history in the classroom, its value in the training of teachers, historical support for particular subjects and for students with diverse educational requirements, the use of original texts written by great mathematicians of the past, the epistemological backgrounds to choose for history, and non-standard media and other resources, from drama to the internet.

I.M. GELFAND, V.S. RETAKH, (Editors). — **The Gelfand Mathematical Seminars, 1996-1999**. — Un vol. relié, 16×24, de 154 p. — ISBN 0-8176-4013-4. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

Dedicated to the memory of Chih-Han Sah, this volume continues a long tradition of one of the most influential mathematical seminars of this century. Topics covered are combinatorial geometry, connections between logic and geometry, Lie groups, algebras and their representations. An additional area of importance is noncommutative algebra and geometry, and its relations to modern physics.

Françoise HATCHUEL. — **Apprendre à aimer les mathématiques: conditions socio-institutionnelles et élaboration psychique dans les ateliers mathématiques**. — Un vol. broché, 13,5×21,5, de XI, 307 p. — ISBN 2-13-050187-7. — Prix: FF 138.00. — Presses universitaires de France, Paris, 2000.

A quelles difficultés se heurte-t-on quand on apprend? Pourquoi ce qui paraît évident à certain(e)s semble insurmontable à d'autres, notamment quand il(elle)s viennent d'un milieu social défavorisé? Dans cet ouvrage, issu d'un travail de doctorat, ces questions se posent en termes de rapport au Savoir, entendu dans sa dimension fantasmatique. L'auteure y montre en effet qu'apprendre, c'est accepter de s'approprier du Savoir, et que cette appropriation peut être considérée comme dangereuse, voire impossible, par le psychisme.

M. HAZEWINKEL, (Editor). — **Handbook of algebra, vol. 2**. — Un vol. relié, 17×25, de XVIII, 878 p. — ISBN 0-444-50396. — Prix: Dfl. 350.00. — Elsevier, Amsterdam, 2000.

*Category theory*: Some aspects of categories in computer science (P.J. Scott). *Algebra, categories, and databases* (B. Plotkin). — *Homological algebra, cohomology, cohomological methods in algebra, homotopical algebra*: Homology for the algebras of analysis (A. Ya. Helemskii). — *Model theoretic algebra*: Stable groups (F.O. Wagner). — *Commutative rings and algebras*: Artin approximation (D. Popescu). — *Associative rings and algebras*: Fixed rings and non-

commutative invariant theory (V.K. Kharchenko). Modules with distributive submodule lattice (A.A. Tuganbaev). Serial and semidistributive modules and rings (A.A. Tuganbaev). Modules with the exchange property and exchange rings (A.A. Tuganbaev). Separable algebras (F. Van Oystaeyen). — *Deformation theory of rings and algebras*: Varieties of Lie algebras laws (Yu. Khakimdjanoj). — *Varieties of algebras, groups*: Varieties of algebras (V.A. Artamonov). — *Lie algebras*: Infinite-dimensional Lie superalgebras (Yu. Bahturin, A. Mikkhalev, M. Zaicev). Nilpotent and solvable Lie algebras (M. Goze, Yu. Khakimdjanoj). — *Groups and semigroups*: Infinite Abelian groups: methods and results (A.V. Mikhalev, A.P. Mishina). — *Representation theory of continuous groups and the corresponding algebras*: Infinite-dimensional representations of the quantum algebras (A.U. Klimyk). — *Abstract and functorial representation theory*: Burside rings (S. Bouc). A guide to Mackey functors (P. Webb).

Dong Su KIM, In Kang KIM, (Editors). — **Combinatorics and special functions, volumes and rigidities of Riemannian manifolds, 1998: lecture notes of the thirteenth Kaist Mathematics Workshop**. — Un vol. broché,  $19 \times 26$ , de 164 p. — Korea Advanced Institute of Science and Technology, Mathematics Research Center, Taejon, Korea, 2000.

Combinatorics and special function, by Jiang Zeng: Combinatorics of orthogonal polynomials. Euler-Mahonian statistics on permutations and words. Euler-Seidel matrices and a  $q$ -analog. Genocchi numbers and orthogonal polynomials. A Ramanujan sequence that refines the Cayley formula for trees. — *Volumes and rigidities of Riemannian manifolds*, by G. Besson, G. Courtois and S. Gallot.

Jean-Pierre LECOUTRE, Philippe PILIBOSSIAN. — **Analyse I: travaux dirigés, rappels de cours, questions de réflexion, exercices d'entraînement, annales corrigées**. — Eco Sup, travaux dirigés. — Un vol. broché,  $17 \times 24$ , de vi, 216 p. — ISBN 2-10-004246-7. — Prix: FF 118.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage couvre en 170 questions et exercices, les bases de l'analyse: fonction numérique d'une variable réelle, dérivées et différentielles, formule de Taylor et applications, fonctions puissance, logarithme et exponentielle, calcul intégral, suite numériques.

Heinrich MATZINGER. — **Aide-mémoire d'analyse**. — Méthodes mathématiques pour l'ingénieur, vol. 10. — Un vol. broché,  $15 \times 21$ , de xvii, 181 p. — ISBN 2-88074-444-X. — Prix: SFr. 25.00. — Presses polytechniques et universitaires romandes, Lausanne, 2000.

Cet aide-mémoire présente de manière claire et succincte les principaux résultats et définitions de l'analyse élémentaire. La matière a été choisie en vue de ses applications aux sciences de l'ingénieur. Plus complet qu'un simple formulaire et plus court qu'un exposé, il servira de mémento aussi bien pour accompagner un cours en analyse que pour une préparation d'examens. Il s'adresse donc tout particulièrement aux étudiants et aux enseignants de 1<sup>er</sup> cycle en mathématiques, physique appliquée et sciences de l'ingénieur.

Jean-Marie MONIER. — **Algèbre I: cours et 600 exercices corrigés, 1<sup>re</sup> année MPSI, PCSI, PTSI**. — 2<sup>e</sup> édition. — J'intègre, série Monier, cours. — Un vol.  $19,5 \times 27$ , de xii, 555 p. — ISBN 2-10-004440-0. — Prix: FF 195.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cette nouvelle édition du *Cours de mathématiques* de Jean-Marie Monier a été entièrement repensée, de manière à répondre très précisément aux aspirations les plus exigeantes des élèves des classes préparatoires: un format agrandi et une nouvelle mise en pages en deux couleurs en améliorent la convivialité et la lisibilité. 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. — *Table des matières*: Vocabulaire de la théorie des ensembles. — Structures algébriques. — Nombres entiers, nombres rationnels. — Arithmétique dans  $\mathbb{Z}$ . — Polynômes, fractions rationnelles. — Espaces vectoriels. — Applications linéaires. — Matrices. — Déterminants, systèmes linéaires. — Espaces vectoriels euclidiens.

Jean-Marie MONIER. — **Algèbre et géométrie: 200 exercices développés, 980 exercices d'entraînement, rappels de cours, 1<sup>re</sup> année MPSI.** — J'intègre, série Monier, exercices. — Un vol. broché,  $17 \times 24$ , de 382 p. — ISBN 2-10-004919-4. — Prix: FF 160.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Ce recueil d'exercices corrigés couvre entièrement le programme d'algèbre et de géométrie des classes supérieures MPSI. Chaque chapitre comporte des rappels de cours détaillés, des exercices avec solutions développées qui permettent de tester la pratique du raisonnement et de la résolution, de nombreux exercices d'entraînement tous résolus.

Jean-Marie MONIER. — **Algèbre et géométrie: 90 exercices développés, 300 exercices d'entraînement, rappels de cours, 2<sup>e</sup> année PSI, PC, PT.** — J'intègre, série Monier, exercices. — Un vol. broché,  $17 \times 24$ , de 204 p. — ISBN 2-10-004920-8. — Prix: FF 150.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Ce recueil d'exercices corrigés couvre entièrement le programme d'algèbre et de géométrie des classes de Spéciales PSI, PC et PT. Chaque chapitre comporte des rappels de cours détaillés, des exercices avec solutions développées qui permettent de tester la pratique du raisonnement et de la résolution, de nombreux exercices d'entraînement tous résolus.

Jean-Marie MONIER. — **Analyse 4: cours et 500 exercices corrigés, 2<sup>e</sup> année MP, PSI, PC, PT.** — 3<sup>e</sup> édition. — Collection j'intègre, cours. — Un vol. broché,  $19,5 \times 27$ , de XIII, 503 p. — ISBN 2-10004916-X. — Prix: FF 170.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cette nouvelle édition du cours de mathématiques de Jean-Marie Monier a été entièrement repensée, de manière à répondre très précisément aux aspirations les plus exigeantes des élèves des classes préparatoires: un format agrandi et une nouvelle mise en page en améliore la convivialité et la lisibilité. — *Sommaire de ce volume*: Suites et séries d'applications. Séries entières. Séries de Fourier. Équations différentielles. Fonctions de plusieurs variables réelles. Compléments de calcul intégral. Solutions des exercices. Notations. Index.

Jean-Marie MONIER. — **Géométrie: cours et 400 exercices corrigés, 1<sup>re</sup> et 2<sup>e</sup> années MP, PSI, PC, PT.** — 2<sup>e</sup> édition. — J'intègre, série Monier, cours. — Un vol.  $19,5 \times 27$ , de VII, 457 p. — ISBN 2-10-004440-0. — Prix: FF 175.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Géométrie affine dans le plan et dans l'espace de dimension 3. — Géométrie affine euclidienne dans le plan et dans l'espace de dimension 3. — Géométrie affine réelle. — Courbes du plan. — Propriétés métriques des courbes du plan. — Courbes de l'espace et surfaces.

Dominique PROCHASSON. — **Mathématiques pour le DEUG: analyse 2<sup>e</sup> année, exercices corrigés.** — Sciences Sup, exercices. — Un vol. broché,  $17 \times 24$ , de 278 p. — ISBN 2-10-004599-7. — Prix: FF 125.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Ce recueil, qui rassemble 87 exercices corrigés, a été conçu pour illustrer le programme d'analyse de la seconde année des DEUG, MIAS, MASS et SM. C'est à ce titre un complément



au *Cours de mathématiques: analyse 2<sup>e</sup> année*, de François Liret et Dominique Martinais, paru dans la même collection. Dans ce volume d'analyse, on travaille sur les séries numériques, les séries de fonctions et les séries entières, les espaces vectoriels normés, les suites de fonctions, les fonctions de plusieurs variables, les courbes et surfaces, les intégrales à paramètres, les intégrales doubles, et enfin sur les équations différentielles.

Helier J. ROBINSON. — **Relation philosophy of mathematics, science, and mind.** — Un vol. broché, 13,5×21,5, de vi, 246 p. — ISBN 09690977-1-9. — Prix: Can\$29.95. — Speedside Publishing, Fergus, Ontario, 2000.

The origins of axiom generosity and of paradox are discovered in this new approach to mathematics. The author argues that mathematics is fundamentally a language of relations, and that the usual set-theoretic definition of relation is circular, so that in the foundations of mathematics relations should be more primitive than sets. Not only does this clarify the nature and limits of mathematics, but it clarifies the philosophy of science as well.

Jean-Louis SOL. — **Mathématiques: accès à l'université.** — Eco Sup, manuel. — Un vol. broché, 17×24, de xvi, 200 p. — ISBN 2-10-005042-7. — Prix: FF 115.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage a pour objectif d'aider les étudiants qui s'inscrivent en DEUG Economie-gestion, AES ou MASS, à acquérir le niveau minimum de mathématiques qui leur permettra de suivre pendant l'année et de réussir leur examen. Ce livre offre aux étudiants la possibilité de réviser seuls le programme du lycée qu'il faut absolument maîtriser. La première partie de l'ouvrage permet à l'étudiant d'évaluer son niveau, la deuxième lui présente un cours complet, la troisième le pousse à s'entraîner grâce à de nombreux exercices corrigés de façon détaillée.

Peter J. VASSILIOU, Ian G. LISLE, (Editors). — **Geometric approaches to differential equations.** — Australian Mathematical Society lecture series, vol. 15. — Un vol. broché, 15×23, de x, 227 p. — ISBN 0-521-77598-1. — Prix: £29.95. — Cambridge University Press, Cambridge, 2000.

This book provides a concise and accessible exposition of a wide range of topics in geometric approaches to differential equations. The aim of the book is to present an overview of this developing subject and a brief introduction to a number of related topics, including twistor theory, vortex filament dynamics, calculus of variations, exterior differential systems and Bäcklund transformations. Written by leading experts, this book is an ideal starting point for graduate students embarking on research. It will also be of use to researchers and anybody wishing to learn more about this burgeoning field of mathematical endeavour.

Jacques VÉLU. — **Mathématiques générales: cours et exercices corrigés.** — Sciences Sup. Mathématiques. — Un vol. broché, 17×24, de viii, 307 p. — ISBN 2-10-005041-9. — Prix: FF 120.00. — Dunod, Paris, 2000, distributeur Havas Services Suisse, Fribourg.

Cet ouvrage s'appuie sur un cours enseigné au CNAM, à Paris. La finalité de ce cours est de donner aux élèves – dont certains n'ont pas le baccalauréat scientifique – d'une part, les connaissances de bases du calcul différentiel et intégral et, d'autre part, les capacités pour calculer des développements limités et des intégrales, de résoudre des équations différentielles et de manipuler les exponentielles complexes. Le livre commence par quelques rappels de notions supposées bien connues (nombres réels, dérivée) mais qui ne le sont pas toujours. Tout au long de l'ouvrage, les concepts sont présentés avec un parti pris de simplicité et leur utilisation est illustrée par de nombreux exemples. Des exercices de niveau varié, dont les solutions sont regroupées à la fin du manuel, permettent à l'étudiant de vérifier la parfaite assimilation du cours.

G.C. YOUNG, W.H. YOUNG. — **Selected papers.** — Edited by S.D. Chatterji, H. Wefelscheid. — Un livre relié,  $17 \times 24,5$ , de IX, 870 p. — ISBN 2-88074-445-8. — Prix: SFr. 149.00. — Presses polytechniques et universitaires romandes, 2000.

The purpose of the present essay is two-fold. First, to give a brief overview of the totality of the mathematical work of the Youngs from a modern viewpoint; it is hoped that this would be an useful complement to the obituary articles of Hardy and Cartwright which are included in this volume. Second to explain the rationale behind the choice of the 52 articles selected for inclusion in the present volume, out of a total of 215 which appear in the mathematical bibliography of the Youngs. This mathematical work is divided into three broad categories: theory of real functions, Fourier analysis and miscellaneous.

## *Histoire*

Philip J. DAVIS. — **The education of a mathematician.** — Un vol. relié,  $16 \times 24$ , de x, 353 p. — ISBN 1-56881-116-0. — Prix: £29.95. — A.K. Peters, Natick, Mass., 2000.

This collection of interwoven anecdotes offers a reflection not only of the author's life, but of its surrounding historical context as well. Prof. Davis contemplates issues that he and his fellow mathematicians faced through the decades, such as the ramification of being a mathematician during World War II, and the influence of mathematics on the computer and entertainment industries. He also speculates on the future of mathematics in light of recent technological advances, and whether the field will advance or suffer as a result. The author's accounts span the past 80 years, as well as several countries, wars, and changes of societal philosophy. Readers will emerge from this lighthearted yet touching memoir with a fresh view of mathematics and how it has shaped the world today.

Jeremy J. GRAY. — **Linear differential equations and group theory from Riemann to Poincaré.** — Second edition. — Un vol. relié,  $16 \times 24$ , de xx, 338 p. — ISBN 3-7643-3837-7. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This book is a study of how a particular vision of the unity of mathematics, often called geometric function theory, was created in the 19<sup>th</sup> century. The central focus is on the convergence of three mathematical topics. The hypergeometric and related linear differential equations, group theory, and non-Euclidean geometry. The text for this new edition has been greatly expanded and revised, and the existing appendices enriched with historical accounts of the Riemann-Hilbert problem, the uniformization theorem, Picard-Vessiot theory, and hypergeometric equations in higher dimensions. The exercises have been retained, making it possible to use the book as a companion to mathematics courses at the graduate level. This work continues to be the only up-to-date scholarly account of the history of a branch of mathematics that continues to generate important research, for which the mathematics has been the occasion for some of the most profound work by numerous 19<sup>th</sup> century figures: Riemann, Fuchs, Dedekind, Klein, and Poincaré.

Albert W. GROOTENDORST. — **Jan de Witt's *Elementa curvarum linearum*, liber primus.** — Text, translation, introduction, and commentary by Albert W. Grootendorst, with the help of Miente Bakker. — Sources and studies in the history of mathematics and physical sciences. — Un vol. relié,  $16 \times 24$ , de VIII, 296 p. — ISBN 0-387-98748-7. — Prix: DM 198.00. — Springer, New York, 2000.

This book is an English translation of the first part of the first textbook on analytic geometry, written in Latin by the Dutch statesman and mathematician Jan de Witt soon after Descartes invented the subject. In the *Elementa curvarum linearum*, liber primus, the familiar conic

sections are generated entirely without reference to a cone, but rather kinematically, as the locus of a point moving according to mathematical laws. Thus, ellipses are produced by a point on a sliding line segment, parabolas by the intersection of one arm of a rotating angle and a sliding line, and hyperbolas by the intersection of a rotating line and one arm of a sliding angle. All other properties of the curves can be derived from the properties given them by their modes of generation, which thus serve as the basis for a purely algebraic treatment of the curves – the subject of the *Liber secundus*. In addition to the translation and annotations, this volume contains an extensive commentary, including a discussion of the role of conics in Greek mathematics.

Thomas HAWKINS. — **Emergence of the theory of Lie groups: an essay in the history of mathematics 1869-1926.** — Sources and studies in the history of mathematics and physical sciences. — Un vol. relié, 16×24, de XIII, 564 p. — ISBN 0-387-98963-3. — Prix: DM 159.00. — Springer, New York, 2000.

The first part of the book describes the geometrical and analytical considerations that initiated the theory at the hands of the Norwegian mathematician, Sophus Lie. The main figure in the second part is Weierstrass's student Wilhelm Killing, whose interest in the foundations of non-Euclidean geometry led to his discovery of almost all the central concepts and theorems on the structure and classification of semisimple Lie algebras. The scene then shifts to the Paris mathematical community and Elie Cartan's work on the representation of Lie algebras. The final part describes the influential, unifying contributions of Herman Weyl and their context: Hilbert's Göttingen, general relativity, and Frobenius-Schur theory and characters. The book is written with the conviction that mathematical understanding is deepened by familiarity with underlying motivations and the less formal, more intuitive manner of original conception.

Don HOWARD, John STACHEL, (Editors) — **Einstein: the formative years 1879-1909.** — Un vol. relié, 16×24, de VIII, 258 p. — ISBN 0-8176-4034-4. — Prix: SFr. 108.00. — Birkhäuser, Boston, 2000.

This volume brings together some of the best recent scholarship on what might be termed Einstein's formative period, that is, the thirty years before he obtained his first academic position in 1909. Topics covered include Einstein's early reading and his university education, his early views on scientific method and some of the crucial philosophical influences shaping those views, his early work on statistical mechanics, Brownian motion, quantum theory, relativity theory, and his youthful vision of a unified foundation for physics. An engaging book examining the young Einstein from a variety of perspectives – personal, scientific, historical, and philosophical. The contributors draw extensively upon much of the interesting new documentation, such as personal letters, including love letters to his fiancée, and unpublished manuscripts, that has come to light in the course of work on the first several volumes of *The Collected Papers* of Albert Einstein.

Arild STUBHAUG. — **Niels Henrik Abel and his times: called too soon by flames afar.** — Translated from the Norwegian by Richard H. Daly. — Un vol. relié, 16,5×24, de x, 580 p. — ISBN 3-540-66834-9. — Prix: DM 79.00 — Springer, Berlin, 2000.

Arild Stubhaug, who is both a historian and a mathematician, has written the definitive biography of Niels Henrik Abel. The Norwegian original edition was a sensational success, and Arild Stubhaug was awarded the most prestigious Literary prize (Brageprisen) in the category non-fiction. Everyone with an interest in the history of mathematics and science will enjoy reading this book on one of the most famous mathematicians in the 19<sup>th</sup> century.



Ian TWEDDLE. — **Simson on porisms: an annotated translation of Robert Simson's posthumous treatise on porisms and other items on this subject.** — Sources in the history of mathematics and physical sciences. — Un vol. relié, 16×24, de x, 274 p. — ISBN 1-85233-306-5. — Springer, London, 2000.

In this book, Ian Tweddle, a recognised authority on 18<sup>th</sup> century Scottish mathematics, presents for the first time a full and accessible translation of Simson's work. Based on Simson's early paper of 1723, the treatise *Tractatus de porismatibus*, and various extracts from Simson's notebooks and correspondence, this book provides a fascinating insight into the work of an often-neglected figure. Supplemented by historical and mathematical notes and comments, this book is a valuable addition to the literature for anyone with an interest in mathematical history or geometry.

## **Logique et fondements**

André DELESSERT. — **Gödel: une révolution en mathématiques: essai sur les conséquences scientifiques et philosophiques des théorèmes gödéliens.** — Un vol. broché, 16×24, de XVIII, 268 p. — ISBN 2-88074-449-0. — Prix: SFr. 79.50. — Presses polytechniques et universitaires romandes, Lausanne, 2000.

Ce livre, à la fois œuvre de documentation historique et de réflexion philosophique, se propose de décrire l'avant et l'après Gödel en retraçant l'histoire de la notion de nombre depuis Platon et Aristote jusqu'au renversement révolutionnaire des fondements mathématiques induit par les théorèmes de Gödel. Les notions mathématiques nécessaires pour aborder le principe des démonstrations de Gödel sont données et commentées par l'auteur, permettant ainsi à cet ouvrage inédit de s'adresser à un large public de mathématiciens, de logiciens, d'historiens et de philosophes des sciences.

Sy D. FRIEDMAN. — **Fine structure and class forcing.** — De Gruyter studies in logic and its applications, vol. 3. — Un vol. relié, 17×24, de x, 221 p. — ISBN 3-11-016777-8. — Prix: DM 178.00. — Walter de Gruyter, Berlin, 2000.

This book is intended for the student familiar with the basics of axiomatic set theory, including an introduction to Gödel's theory of constructibility. It presents a thorough analysis of the first two approximations to the set-theoretic universe, given by the universes  $L$  and  $L[0\#]$ . Gödel's constructible universe  $L$  provides the setting in which the most thorough understanding of set theory can be achieved, through use of the fine structure theory. The book's further applications of class forcing to genericity, admissibility, descriptive set theory and set-theoretic definability are sure to be of interest to a wide community of set theorists.

Deirdre HASKELL, Anand PILLAY, Charles STEINHORN, (Editors). — **Model theory, algebra, and geometry.** — Mathematical Sciences Research Institute publications, vol. 39. — Un vol. relié, 16×24, de VII, 227 p. — ISBN 0-521-78068-3. — Prix: £30.00. — Cambridge University Press, Cambridge, 2000.

This book gives the necessary background for understanding both the model theory and the mathematics behind the applications. Aimed at graduate students and researchers, it is unique in that it contains introductory surveys by leading experts covering the whole spectrum of contemporary model theory (stability, simplicity, o-minimality and variations), and introducing and discussing the diverse areas of geometry (algebraic, diophantine, real analytic,  $p$ -adic and rigid) to which the model theory is applied. The book begins with an introduction to model theory by David Marker. It then broadens into three components: pure model theory (Bradd Hart, Dugald Macpherson), geometry (Barry Mazur, Ed Bierstone and Pierre Milman, Jan Denef), and the model theory fields (Marker, Lou van den Dries, Zoe Chatzidakis).

Harold SIMMONS. — **Derivation and computation: taking the Curry-Howard correspondence seriously.** — Cambridge tracts in theoretical computer science, vol. 51. — Un vol. relié, 15,5×23,5, de xxv, 384 p. — ISBN 0-521-77173-0. — Prix: £42.50. — Cambridge University Press, Cambridge, 2000.

Mathematics is about proofs, that is the derivation of correct statements; and calculation, that is the production of results according to well-defined sets of rules. The two notions are intimately related. Proofs can involve calculations, and the algorithm underlying a calculation should be proved correct. The aim of the author is to explore this relationship. The book itself forms an introduction to simple type theory. Starting from the familiar propositional calculus the author develops the central idea of an applied lambda-calculus. This is illustrated by an account of Gödel's T, a system which codifies number-theoretic function hierarchies. Each of the book's fifty-two sections ends with a set of exercises, some two hundred in total.

## *Analyse combinatoire*

John M. HARRIS, Jeffry M. HIRST, Michael J. MOSSINGHOFF. — **Combinatorics and graph theory.** — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de xiii, 225 p. — ISBN 0-387-98736-3. — Prix: DM 69.00. — Springer, New York, 2000.

This book evolved from several courses in combinatorics and graph theory given at Appalachian State University and UCLA. Chapter 1 focuses on finite graph theory, including trees, planarity, coloring, matchings, and Ramsey theory. Chapter 2 studies combinatorics, including the principle of inclusion and exclusion, generating functions, recurrence relations, Pólya theory, the stable marriage problem, and several important classes of numbers. Chapter 3 presents infinite pigeonhole principles, König's lemma, and Ramsey's theorem, and discusses their connections to axiomatic set theory.

Wilfried IMRICH, Sandi KLAUZAR. — **Product graphs: structure and recognition.** — Wiley Interscience series in discrete mathematics optimization. — Un vol. relié, 16×24, de xv, 358 p. — ISBN 0-471-37039-8. — Prix: £54.95. — John Wiley, New York, 2000.

Written by two leading experts, the book compiles and consolidates a wealth of information previously scattered throughout the literature, providing researchers in the field with ready access to numerous recent results as well as several new recognition algorithms and proofs. Coverage includes: the basic algebraic and combinatorial properties of product graphs; hypercubes, median graphs, Hamming graphs, triangle-free graphs, and vertex-transitive graphs; colorings, automorphisms, homomorphisms, domination, and the capacity of products of graphs; sample applications, including novel applications to chemical graph theory; proofs and algorithms presented at varying levels of difficulty; clear connections to other areas of graph theory; figures, exercises, and hundreds of references.

Svante JANSON, Tomasz ŁUCZAK, Andrzej RUCIŃSKI. — **Random graphs.** — Wiley-Interscience series in discrete mathematics and optimization. — Un vol. relié, 16×24, de xi, 333 p. — ISBN 0-471-17541-2. — Prix: £48.50. — John Wiley, New York, 2000.

Written by three highly respected members of the discrete mathematics community, the book incorporates many disparate results from across the literature, including results obtained by the authors and some completely new results. Special features include: a focus on the fundamental theory as well as basic models of random graphs; a detailed description of the phase transition phenomenon; easy-to-apply exponential inequalities for large deviation bounds; an extensive study of the problem of containing small subgraphs; results by Bollobas and others on the

chromatic number of random graphs; the result by Robinson and Wormald on the existence of Hamilton cycles in random regular graphs; a gentle introduction to the zero-one laws; ample exercises, figures, and bibliographic references.

W.D. WALLIS. — **A beginner's guide to graph theory.** — Un vol. relié,  $16 \times 24$ , de xviii, 230 p. — ISBN 0-8176-4176-9. — Prix: DM 78.00. — Birkhäuser, Boston, 2000.

The work strikes a balance between a theoretical and practical approach, consisting of carefully chosen topics to develop graph-theoretic reasoning for mixed audience. Familiarity with the basic concepts of set theory, a passing acquaintance with matrices and algebra, combined with a little mathematical maturity, are all the background requirements. This gentle introduction to graph theory connects readers to exciting areas beyond pure mathematics and has a distinctly applied flavor.

### ***Théorie des nombres***

R.P. BAMBAH, V.C. DUMIR, R.J. HANS-GILL, (Editors). — **Number theory.** — Trends in mathematics. — Un vol. relié,  $17 \times 24$ , de vi, 527 p. — ISBN 3-7643-6529-6. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2000.

This book contains 23 papers on various branches of number theory by leading mathematicians, giving an overview of the developments in their respective fields together with open problems. These will be of interest to mathematicians at various levels. The interested reader will have ready access to meaningful problems and results, which have attracted the attention of some leading number theorists.

Franz HALTER-KOCH, Robert F. TICHY, (Editors). — **Algebraic number theory and Diophantine analysis.** — Proceedings of the International Conference held in Graz, Austria, August 30 to September 5, 1998. — Un vol. relié,  $17,5 \times 24,5$ , de xvii, 534 p. — ISBN 3-11-016304-7. — Prix: DM 368.00. — Walter de Gruyter, Berlin, 2000.

The conference was a satellite conference of the International Congress of Mathematicians held in Berlin in August 1998 and also a continuation of a traditional series of number theory meetings in Central Europe. The conference was open for all branches of number theory. Special emphasis was on algebraic number theory, on Diophantine and algorithmic problems and on Diophantine analysis including Diophantine equations, uniform distribution and discrepancy theory. Plenary lectures were delivered by Jörg Brüdern, Jan-Hendrik Evertse, Ernst-Ulrich Gekeler, Kálmán Györy, Stéphane Louboutin, Władysław Narkiewicz, Attila Pethö, Florian Pop, Andrzej Schinzel, René Schoof, Martin Taylor, Rober Tijdeman and Michel Waldschmidt. There was a special session on Diophantine equations, and there were about 70 contributed talks in which almost all branches of number theory were touched.

Haruzo HIDA. — **Modular forms and Galois cohomology.** — Cambridge studies in advanced mathematics, vol. 69. — Un vol. relié,  $15,5 \times 23,5$ , de x, 343 p. — ISBN 0-521-77036-X. — Prix: £42.50. — Cambridge University Press, Cambridge, 2000.

This book provides a comprehensive account of a key theory on which the Taylor-Wiles proof of Fermat's last theorem is based. The book begins with an overview of the theory of automorphic forms on linear algebraic groups and then covers the basic theory and recent results on elliptic modular forms, including a substantial simplification of the proof of Taylor-Wiles by Fujiwara and Diamond. It contains a detailed exposition of the representation theory of profinite groups (including deformation theory), as well as the Euler characteristic formulas of Galois cohomology groups. The final chapter presents a proof of a non-abelian class number formula and includes several new results from the author.

Franz LEMMERMEYER. — **Reciprocity laws: from Euler to Eisenstein.** — Springer monographs in mathematics. — Un vol. relié,  $16 \times 24$ , de XIX, 487 p. — ISBN 3-540-66957-4. — Prix: DM 129.00. — Springer, Berlin, 2000.

This book is about development of reciprocity laws, starting from conjectures of Euler and discussing the contributions of Legendre, Gauss, Dirichlet, Jacobi, and Eisenstein. Readers knowledgeable in basic algebraic number theory and Galois theory will find detailed discussions of the reciprocity laws for quadratic, cubic, quartic, sextic and octic residues, rational reciprocity laws, and Eisenstein's reciprocity law.

Wadysław NARKIEWICZ. — **The development of prime number theory: from Euclid to Hardy and Littlewood.** — Springer monographs in mathematics. — Un vol. relié,  $16 \times 24$ , de VII, 448 p. — ISBN 3-540-66289-8. — Prix: DM 169.00. — Springer, Berlin, 2000.

This book presents the development of prime number theory from its beginnings until the end of the first decade of the XXth century. Special emphasis is given to the work of Chebyshev, Dirichlet, Riemann, de La Vallée-Poussin, Hadamard, and Landau. The book presents the principal results with proofs and also gives, mostly in short comments, an overview of the development in the last 80 years. It is, however, not a historical book since it does not give biographical details of the people who have played a role in the development of prime number theory. The book contains a large list of references with more than 1800 items. It can be read by any person with a knowledge of fundamental notions of number theory and complex analysis.

Melvyn B. NATHANSON. — **Elementary methods in number theory.** — Graduate texts in mathematics, vol. 195. — Un vol. relié,  $16,5 \times 24$ , de XVIII, 513 p. — ISBN 0-387-98912-9. — Prix: DM 98.00. — Springer, New York, 2000.

The main topics of the book are divisibility, prime numbers, and congruences. There is also an introduction to Fourier analysis on finite Abelian groups, and a discussion of the *abc* conjecture and its consequences in elementary number theory. In the second and third parts of the book, deep results in number theory are proved using only elementary methods. Part II is about multiplicative number theory, and includes two of the most famous results in mathematics: the Erdős-Selberg elementary proof of the prime number theorem, and Dirichlet's theorem on primes in arithmetic progressions. Part III is an introduction to three classical topics in additive number theory: Waring's problem for polynomials, Liouville's method to determine the number of representations of an even number of squares, and the asymptotics of partition functions.

Paulo RIBENBOIM. — **My numbers, my friends: popular lectures on number theory.** — Un vol. broché,  $15,5 \times 23,5$ , de IX, 375 p. — ISBN 0-387-98911-0. — Prix: DM 79.00. — Springer, New York, 2000.

Paulo Ribenboim treats numbers as personal friends in this collection of expository essays. Topics include prime numbers, Fibonacci numbers (and the Arctic Ocean!), the classical work of Gauss on binary quadratic forms, Euler's famous prime producing polynomial, powers, and irrational and transcendental numbers. The essays are written in a light language without secrets and are thoroughly accessible to everyone with an interest in numbers.

Alain M. ROBERT. — **A course in  $p$ -adic analysis.** — Graduate texts in mathematics, vol. 198. — Un vol. relié,  $16 \times 24$ , de XV, 437 p. — ISBN 0-387-98669-3. — Prix: DM 109.00. — Springer, New York, 2000.

Kurt Hensel (1861-1941) discovered the  $p$ -adic numbers around the turn of the century. These exotic numbers (or so they appeared at first) are now well-established in the mathematical

world and used more and more by physicists as well. This book offers a self-contained presentation of basic  $p$ -adic analysis. The author is especially interested in the analytical topics in this field. Some of the features that are not treated in other introductory  $p$ -adic analysis texts are topological models of  $p$ -adic spaces inside Euclidean space, a construction of spherically complete fields, a  $p$ -adic mean value theorem and some consequences, a special case of Hazewinkel's functional equation lemma, a remainder formula for the Mahler expansion, and most importantly a treatment of analytic elements.

Daniel B. SHAPIRO. — **Compositions of quadratic forms.** — De Gruyter expositions in mathematics, vol. 33. — Un vol. relié,  $17 \times 24$ , de XIII, 417 p. — ISBN 3-11-012629-X. — Prix: DM 248.00. — Walter de Gruyter, Berlin, 2000.

The central topic of this book is the theorem of Hurwitz and Radon concerning composition formulas for sums of squares, first proved in the 1920's. Techniques from algebra and topology are used to generalize that theorem in several directions. The text includes worked examples and many exercises which develop still more variations of the central topic. The main audience is people who have had some graduate courses in abstract algebra, but many sections of the book are accessible to anyone with some training in linear algebra. Several major topics in this book will be of interest to students of topology and geometry. The author has attempted to make the presentation as clear and as elementary as possible.

## *Corps et polynômes*

Karl RUBIN. — **Euler systems.** — Annals of mathematics studies, no. 147. — Un vol. broché,  $15,5 \times 23,5$ , de XI, 225 p. — ISBN 0-691-05076-7. — Prix: US\$24.95. — Princeton University Press, Princeton, N.J., 2000.

Euler systems are special collections of cohomology classes attached to  $p$ -adic Galois representations. The author presents a self-contained development of the theory of Euler systems. Rubin first reviews and develops the necessary facts from Galois cohomology. He then introduces Euler systems, states the main theorems, and develops examples and applications. The remainder of the book is devoted to the proofs of the main theorems as well as some further speculations.

Andrzej SCHINZEL. — **Polynomials with special regard to reducibility.** — Encyclopedia of mathematics and its applications, vol. 77. — Un vol. relié,  $16 \times 24$ , de x, 558 p. — ISBN 0-521-66225-7. — Prix: £60.00. — Cambridge University Press, Cambridge, 2000.

This book is an attempt to cover most of the results on reducibility of polynomials over fairly large classes of fields; results valid only over finite fields, local fields or the rational field have not been included. On the other hand, included are many topics of interest to the author that are not directly related to reducibility, e.g. Ritt's theory of composition of polynomials. *Contents:* Arbitrary polynomials over an arbitrary field. — Lacunary polynomials over an arbitrary field. — Polynomials over an algebraically closed field. — Polynomials over a finitely generated field. — Polynomials over a number field. — Polynomials over a Kroneckerian field.

## *Géométrie algébrique*

Jean-Benoît BOST, François LOESER, Michel RAYNAUD, (Editeurs). — **Courbes semi-stables et groupe fondamental en géométrie algébrique: Luminy, décembre 1998.** — Progress in mathematics, vol. 187. — Un vol. relié,  $16 \times 24$ , de VII, 289 p. — ISBN 3-7643-6308-8. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2000.

The purpose of this volume is twofold. Firstly, it gives an account of basic facts concerning rigid geometry, stable curves, and algebraic fundamental groups, in a form which should make



them largely accessible to graduate students. Most of this material has not yet appeared in book form. In particular, the semi-stable reduction theorem for curves is covered with special care, including various detailed proofs. Secondly, the book presents self-contained expositions of important recent developments aimed at experts in number theory and algebraic geometry, but it is also accessible to students who have read the first part.

Alessio CORTI, Miles REID, (Editors). — **Explicit birational geometry of 3-folds.** — London Mathematical Society lecture note series, vol. 281. — Un vol. broché,  $15 \times 23$ , de v, 349 p. — ISBN 0-521-63641-8. — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

One of the main achievements of algebraic geometry over the last 20 years is the work of Mori and others extending minimal models and Enriques-Kodaira classification to 3-folds. This book is an integral suite of papers centred around applications of Mori theory to birational geometry. Four of the papers (those by Pukhlikov, Iano-Fletcher, Corti, and the joint paper Corti, Pukhlikov and Reid) work out in detail the theory of birational rigidity of Fano 3-folds; these papers work for the first time with a representative class of Fano varieties, 3-fold hypersurfaces in weighted projective space, and include an attractive introductory treatment and a wealth of detailed computation of special cases.

David EISENBUD, Joe HARRIS. — **The geometry of schemes.** — Graduate texts in mathematics, vol. 197. — Un vol. broché,  $15,5 \times 23,5$ , de x, 294 p. — ISBN 0-387-98637-5. — Prix: DM 52.00. — Springer, New York, 2000.

This book is intended to bridge the chasm between a first course in classical algebraic geometry and a technical treatise on schemes. It focuses on examples and strives to show “what’s going on” behind the definitions. There are many exercises to test and extend the reader’s understanding. The book aims to show schemes in relation to other geometric ideas, such as the theory of manifolds. Some familiarity with these ideas is helpful, though not required.

Geir ELLINGSRUD, William FULTON, Angelo VISTOLI, (Editors). — **Recent progress in intersection theory.** — Trends in mathematics. — Un vol. relié,  $16 \times 24$ , de VIII, 327 p. — ISBN 0-8176-4122-X. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2000.

This collection of papers focuses on new concepts and results in intersection theory, enumerative geometry, and related topics; it is an outgrowth of a conference in intersection theory held in Bologna, Italy, in December 1997. Many of the papers included here have a strongly expository content, yet they lead to the forefront of our knowledge. For this reason the work will be very useful to experts in intersection theory, as well as to graduate students and specialists in other areas of mathematics and physics. The broad range of topics covered includes: algebraic stacks, moduli theory and Gromov-Witten invariants; recent applications of homotopy theory to intersection theory; an introduction to the formalism of motives, and to the Bloch-Beilinson filtration; an introduction to the excess intersection algorithm of Stückrad and Vogel and its geometric aspects.

H. HAUSER, J. LIPMAN, F. OORT, A. QUIRÓS, (Editors). — **Resolutions of singularities: a research textbook in tribute to Oscar Zariski: based on the courses given at the Working Week in Obergurgl, Austria, September 7-14, 1997.** — Progress in mathematics, vol. 181. — Un vol. relié,  $16 \times 24$ , de XXI, 598 p. — ISBN 3-7643-6178-6. — Prix: SFr. 138.00. — Birkhäuser, Basel, 2000.

J. Lipman: Oscar Zariski 1899-1986. — H. Hauser: Resolution of singularities 1860-1999. — D. Abramovich, F. Oort: Alterations and resolution of singularities. — J.-M. Aroca:

Reduction of singularities for differential equations. — J.M. Aroca: Puiseux solutions of singular differential equations. — S. Encinas, O. Villamayor: A course on constructive desingularization and equivariance. — G. Bodnár, J. Schicho: A computer program for the resolution of singularities. — V. Cossart: Uniformisation et désingularisation des surfaces d'après Zariski. — D. Cox: Toric varieties and toric resolution. — B. van Geemen, F. Oort: A compactification of a fine moduli space of curves. — T. Geisser: Applications of de Jong's theorem on alterations. — R. Goldin, B. Teissier: Resolving singularities of plane analytic branches with one toric morphism. — H. Hauser: Excellent surfaces and their taut resolution. — A.-J. de Jong: An application of alterations to Dieudonné modules. — F.-V. Kuhlmann: Valuation theoretic and model theoretic aspects of local uniformization. — D.T. Lê: Les singularités Sandwich. — J. Lipman: Equisingularity and simultaneous resolution of singularities. — G. Müller: Resolution of weighted homogeneous surface singularities. — F. Pop: Alterations and birational anabelian geometry. — H. Reitberger: The turbulent fifties in resolution of singularities. — M. Vaquié: Valuations.

Marc HINDRY, Joseph H. SILVERMAN. — **Diophantine geometry: an introduction.** — Graduate texts in mathematics, vol. 201. — Un vol. broché, 15,5×23,5, de xiii, 558 p. — ISBN 0-387-98981-1. — Prix: DM 79.00. — Springer, New York, 2000.

Diophantine geometry is the study of integral and rational solutions to systems of polynomial equations using ideas and techniques from algebraic number theory and algebraic geometry. The ultimate goal is to describe the solutions in terms of geometric invariants of the underlying algebraic variety. This book contains complete proofs of four of the fundamental finiteness theorems in Diophantine geometry, the Mordell-Weil theorem, Roth's theorem, Siegel's theorem, Faltings' theorem. Also included are a lengthy overview (with sketched or omitted proofs) of algebraic geometry, a detailed development of the theory of height functions, a discussion of further results and open problems, numerous exercises, and a comprehensive index.

Vladimir VOEVODSKY, Andrei SUSLIN, and Eric M. FRIEDLANDER. — **Cycles, transfers, and motivic homology theories.** — Annals of mathematics studies, no. 143. — Un vol. broché, 15,5×23,5, de v, 254 p. — ISBN 0-691-04815-0. — Prix: US\$24.95. — Princeton University Press, Princeton, N.J., 2000.

The original goal that ultimately led to this volume was the construction of motivic cohomology theory, whose existence was conjectured by A. Beilinson and S. Lichtenbaum. This is achieved in the book's fourth paper, using results of the other papers whose additional role is to contribute to our understanding of various properties of algebraic cycles. The material presented provides the foundations for the recent proof of the celebrated Milnor conjecture by Vladimir Voevodsky. — *Contents*: Introduction. Relative cycles and Chow sheaves. — Cohomological theory of presheaves with transfers. — Bivariant cycle cohomology. — Triangulated categories of motives over a field. — Higher Chow groups and Etale cohomology.

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

R.B. BAPAT. — **Linear algebra and linear models.** — 2<sup>nd</sup> edition. — Universitext. — Un vol. relié, 16×24, de x, 138 p. — ISBN 0-387-98871-8. — Prix: DM 89.00. — Springer, New York, 2000.

The main purpose of *Linear Algebra and Linear Models* is to provide a rigorous introduction to the basic aspects of the theory of linear estimation and hypothesis testing. The necessary prerequisites in matrices, multivariate normal distribution, and distributions of quadratic forms are

developed along the way. The book is aimed at advanced undergraduate and first-year graduate master's students taking courses in linear algebra, linear models, multivariate analysis, and design of experiments. It should also be of use to research mathematicians and statisticians as a source of standard results and problems.

## *Anneaux et algèbres*

Stefaan CAENEPEEL, Freddy VAN OYSTAEYEN, (Editors). — **Hopf algebras and quantum groups: proceedings of the Brussels Conference.** — Lecture notes in pure and applied mathematics, vol. 209. — Un vol. broché,  $17,5 \times 25,5$ , de XII, 309 p. — ISBN 0-8247-0395-2. — Prix: US\$165.00. — Marcel Dekker, New York, 2000.

Based on the proceedings of a recently held conference at the Free University of Brussels, Belgium, this book presents state-of-the-art papers on the theory of Hopf algebras, including multiplier Hopf algebras, and quantum groups. The work examines Nichols algebras and pointed Hopf algebras, cross product bialgebras, graded coalgebras, coalgebra-Galois extensions, Doi-Hopf modules, cyclic cohomology, Schur-Weyl categories, classical Lie superalgebras, finite-dimensional quantum groupoids, and more.

Roberto COSTA, Alexander GRISHKOV, Henrique GUZZO, Jr., Luiz A. PERESI, (Editors). — **Nonassociative algebra and its applications: the fourth International Conference.** — Un vol. broché,  $17,5 \times 25,5$ , de XII, 469 p. — ISBN 0-8247-0406-1. — Prix: US\$185.00. — Marcel Dekker, New York, 2000.

This volume collects lectures presented at the fourth International Conference on Nonassociative Algebra and Its Applications held in São Paulo, Brazil, on topics including alternative, Jordan, Lie and Bernstein and Malcev algebras and superalgebras. The book reviews Petit's construction, giving proof of his existence criteria, discusses the problem of the classification of the extensions of Virasoro algebra, illustrates how a Lie-theoretic result of Zelmanov relates to group theory, describes geometric properties of smooth quasigroups defined by the left square distributive identity, reviews the construction of Toda-type equations in low- and high-dimensional spaces, studies the subloop structure of the smallest simple Moufang loop, surveys results concerning polynomial identities of quadratic algebras, and more.

Uwe FRANZ, René SCHOTT. — **Stochastic processes and operator calculus on quantum groups.** — Mathematics and its applications, vol. 490. — Un vol. relié,  $16 \times 25$ , de VII, 227 p. — ISBN 0-7923-5883-X. — Prix: Dfl. 187.00. — Kluwer Academic Publishers, Dordrecht, 1999.

This book aims to present several new developments on stochastic processes and operator calculus on quantum groups. Topics which are treated include operator calculus, dual representations, stochastic processes and diffusions, Appell polynomials and systems in connection with evolution equations. This volume contains introductory material for graduate students who are new in the field, as well as more advanced material for specialists in probability theory, algebraic structures, representation theory, mathematical physics and theoretical physics.

Tonny A. SPRINGER, Ferdinand D. VELDKAMP. — **Octonions, Jordan algebras and exceptional groups.** — Springer monographs in mathematics. — Un vol. relié,  $16 \times 24$ , de VIII, 208 p. — ISBN 3-540-66337-1. — Prix: DM 139.00. — Springer, Berlin, 2000.

The 1963 Göttingen notes of T.A. Springer are well-known in the field but have been unavailable for some time. This book is a translation of those notes, completely updated and revised. The part of the book dealing with the algebraic structures is on a fairly elementary level, presupposing basic results from algebra. In the group-theoretical part, use is made of some results from the theory of linear algebraic groups. The book will be useful to mathematicians interested in octonion algebras and Albert algebras, or in exceptional groups.



Freddy VAN OYSTAEYEN. — **Algebraic geometry for associative algebras.** — Pure and applied mathematics, vol. 232. — Un vol. broché,  $15,5 \times 23,5$ , de vi, 286 p. — ISBN 0-8247-0424-X. — Prix: US\$145.00. — Marcel Dekker, New York, 2000.

This innovative reference/text facilitates the origin of a noncommutative topology that provides, for the first time, the possibility to define an underlying space where geometric properties can be phrased and studied—resulting in a scheme theory that sustains the duality between algebraic geometry and commutative algebra to the noncommutative level. It constructs the scheme theory from the interaction between graded and filtered algebras appearing as a general deformation principle among geometries. *Algebraic Geometry for Associative Algebras* fully introduces noncommutative topology, deformation of structure schemes, new cohomological methods, homological algebra and regularity conditions, divisor theory using noncommutative valuations, reductions of algebras, microlocalization and quantum sections, formal completion along subvarieties, and more.

Freddy VAN OYSTAEYEN, Manuel SAORIN, (Editors). — **Interactions between ring theory and representations of algebras: proceedings of the conference held in Murcia, Spain.** — Lecture notes in pure and applied mathematics, vol. 210. — Un vol. broché,  $17,5 \times 25,5$ , de viii, 449 p. — ISBN 0-8247-0367-7. — Prix: US\$185.00. — Marcel Dekker, New York, 2000.

Based on a set of lectures and invited papers presented at a recently held meeting in Murcia, Spain, organized by the European Commission's Training and Mobility of Researchers Programme, this monograph contains up-to-date information on the structure of representation theory of groups and algebras and on general ring theoretic methods related to the theory. This title provides a wide selection of international viewpoints on Artin, path, matrix, group, Noetherian semigroup, and Hopf and multiplier Hopf algebras, quantized coordinate and quantum determinantal rings, Maranda's and duality theorems, prime spectra and ideals, and associated primes and weakly associated primes, Cohen-Macaulay, D-Gorenstein, static and  $A_1(k)$ -modules, as well as covers and envelopes of modules, and more.

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

M. SCOTT OSBORNE. — **Basic homological algebra.** — Graduate texts in mathematics, vol. 196. — Un vol. broché,  $16 \times 24$ , de x, 395 p. — ISBN 0-387-98934-X. — Prix: DM 98.00. — Springer, New York, 2000.

This book is intended for one-quarter, two-quarter, or one-semester courses in homological algebra. The aim is to cover Ext and Tor early and without distraction. It includes several further topics, which can be pursued independently of each other. Many of these, such as Lazard's theorem, long exact sequences in Abelian categories, the Ext product, or the relation between Krull dimension and global dimension, are hard to find elsewhere. The intended audience is second- or third-year graduate students in algebra, algebraic topology, or any other field that uses homological algebra.

### ***K théorie***

A.J. BERRICK and M.E. KEATING. — **Categories and modules: with K-theory in view.** — Cambridge studies in advanced mathematics, vol. 67. — Un vol. relié,  $15,5 \times 23,5$ , de xvii, 361 p. — ISBN 0-521-63276-5. — Prix: £35.00. — Cambridge University Press, Cambridge, 2000.

This book develops aspects of category theory fundamental to the study of algebraic  $K$ -theory. Ring and module theory illustrates category theory which provides insight into more advanced topics in module theory. Starting with categories in general, the text then examines

categories of  $K$ -theory. This leads to study of tensor products and the Morita theory. The categorical approach to localizations and completions of modules is formulated in terms of direct and inverse limits, prompting a discussion of localization of categories in general. Finally, local-global techniques which supply information about modules from their localizations and completions and underlie some interesting applications of  $K$ -theory to number theory and geometry are considered.

A.J. BERRICK and M.E. KEATING. — **An introduction to rings and modules with  $K$ -theory in view.** — Cambridge studies in advanced mathematics, vol. 65. — Un vol. relié, 15×23, de xv, 265 p. — ISBN 0-521-632749. — Prix: £35.00. — Cambridge University Press, Cambridge, 2000.

Starting from definitions, the book introduces fundamental constructions of rings and modules, as direct sums or products, and by exact sequences. It then explores the structure of modules over various types of ring: noncommutative polynomial rings, Artinian rings (both semisimple and not), and Dedekind domains. It also shows how Dedekind domains arise in number theory, and explicitly calculates some rings of integers and their class groups. About 200 exercises complement the text and introduce further topics. This book provides the background material for the authors' companion volume *Categories and Modules*, soon to appear.

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

David M. ARNOLD. — **Abelian groups and representations of finite partially ordered sets.** — CMS books in mathematics, vol. 2. — Un vol. relié, 16×24, de xii, 244 p. — ISBN 0-387-98982-X. — Prix: DM 159.00. — Springer, New York, 2000.

A recurring theme in a traditional introductory graduate algebra course is the existence and consequences of relationships between different algebraic structures. This is also the theme of this book, an exposition of connections between representations of finite partially ordered sets and Abelian groups. Emphasis is placed throughout on classification, a description of the objects up to isomorphism, and computation of representation type, a measure of when classification is feasible.

M. ASCHBACHER. — **Finite group theory.** — Second edition. — Cambridge studies in advanced mathematics, vol. 10. — Un vol. broché, 15×23, de xi, 304 p. — ISBN 0-521-78675-4. — Prix: £19.95. — Cambridge University Press, Cambridge, 2000.

This book develops the foundations of the theory of finite groups. It can serve as a text for a course on finite groups for students already exposed to a first course in algebra. For the reader with some mathematical sophistication but limited knowledge of finite group theory, the book supplies the basic background necessary to begin to read journal articles in the field. It also provides the specialist in finite group theory with a reference in the foundations of the subject. The second edition has been considerably improved, with a completely rewritten chapter considering the 2-signalizer functor theorem and the addition of an appendix containing solutions to exercises.

Michael ATKINSON, Nick GILBERT, James HOWIE, Steve LINTON, Edmund ROBERTSON, (Editors). — **Computational and geometric aspects of modern algebra.** — London Mathematical Society lecture note series, vol. 275. — Un vol. broché, 15×23, de viii, 279 p. — ISBN 0-521-78889-7. — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

This book comprises a collection of papers from participants at the ICMS workshop on Computational and Geometric Aspects of Modern Algebra, held at Heriot-Watt University in

1998. Written by leading researchers, the papers cover a wide range of topics in the vibrant areas of word problems in algebra and geometric group theory. This book represents a timely record of recent work and provides an indication of the key areas of future development.

Young Gheel BAIK, David L. JOHNSON, Ann Chi KIM, (Editors). — **Groups - Korea '98.** — Proceedings of the International Conference, held at Pusan National University, Pusan, Korea, August 10-16, 1998. — Un vol. relié,  $17,5 \times 25$ , de VIII, 382 p. — ISBN 3-11-016588-0. — Prix: DM 298.00. — Walter de Gruyter, Berlin. 2000.

This volume contains the Proceedings of the Fourth International Conference on the Theory of Groups, held at Pusan National University, Pusan, Korea, from August 10-16, 1998. The contributions to this volume give a broad overall picture of contemporary group theory, with a special emphasis on geometric and topological methods. Topics covered include deformations and rigidity, wild metric complexes, generalized triangle groups,  $l_1$ -homology, HNN extensions, Eilenberg-Ganea conjecture, cyclically presented groups, Takashaki manifolds, wreath products, reduction formulae, group actions on graphs and designs, Grushko-Neumann theorem, variations on a theme of Higman and Conder.

J.-C. BIRGET, S. MARGOLIS, J. MEAKIN, M. SAPIR, (Editors). — **Algorithmic problems in groups and semigroups.** — Trends in mathematics. — Un vol. relié,  $16,5 \times 24$ , de VIII, 307 p. — ISBN 0-8176-4130-0. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This book is an outgrowth of an International Conference on Algorithmic Problems in Groups and Semigroups, held in May of 1998 at the University of Nebraska-Lincoln. New results, interesting techniques, and often overlapping ideas from diverse fields are reflected in this collection of largely expository articles which cover topics in algorithmic group and semigroup theory, and computer science. This book can serve as a good introduction to algorithmic problems in groups and semigroups for graduate students and as a useful reference text for researchers in that area.

Thomas BREUER. — **Characters and automorphism groups of compact Riemann surfaces.** — London Mathematical Society lecture note series, vol. 280. — Un vol. relié,  $15 \times 23$ , de XII, 198 p. — ISBN 0-521-79809-4. — Prix: £24.95. — Cambridge University Press, Cambridge, 2000.

This book deals with automorphism groups of compact Riemann surfaces, of genus at least 2, viewed as factor groups of Fuchsian groups. The author uses modern methods from computational group theory and representation theory, providing classifications of all automorphism groups up to genus 48. The book also classifies the ordinary characters for several groups, arising from the action of automorphisms on the space of holomorphic Abelian differentials of a compact Riemann surface. This book is suitable for graduate students and researchers in group theory, representation theory, complex analysis and computer algebra.

Patrick DEHORNOY. — **Braids and self-distributivity.** — Progress in mathematics, vol. 192. — Un vol. relié,  $16,5 \times 24$ , de XIX, 623 p. — ISBN 3-7643-6343-6. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2000.

The aim of this book is to present recently discovered connections between Artin's braid groups and left self-distributive systems, which are sets equipped with a binary operation satisfying the identity  $x(yz) = (xy)(xz)$ . Order properties are crucial. In the 1980s new examples of left self-distributive systems were discovered using unprovable axioms of set theory, and purely algebraic statements were deduced. The quest for elementary proofs of these statements led to a

general theory of self-distributivity centered on a certain group that captures the geometrical properties of this identity. This group happens to be closely connected with Artin's braid groups, and new properties of the braids naturally arose as an application, in particular the existence of a left invariant linear order, which subsequently received alternative topological constructions. The text proposes a first synthesis of this area of research. Three domains are considered here, namely braids, self-distributive systems, and set theory. Although not a comprehensive course on these subjects, the exposition is self-contained, and a number of basic results are established. In particular, the first chapters include a rather complete algebraic study of Artin's braid groups.

Ernst KLEINERT. — **Units in skew fields.** — Progress in mathematics, vol. 186. — Un vol. relié,  $16 \times 24$ , de VIII, 79 p. — ISBN 3-7643-6293-6. — Prix: SFr. 58.00. — Birkhäuser, Basel, 2000.

This book is devoted to a study of the unit groups of orders in skew fields, finite dimensional and central over the rational field; it thereby belongs to the field on noncommutative arithmetic. Its purpose is a synopsis of results and methods, including full proofs of the most important results. It is addressed to researchers in number theory and arithmetic groups.

Lev V. SABININ. — **Smooth quasigroups and loops.** — Mathematics and its applications, vol. 492. — Un vol. relié,  $16 \times 25$ , de XVI, 249 p. — ISBN 0-7923-5920-8. — Prix: Dfl. 210.00. — Kluwer Academic Publishers, Dordrecht, 1999.

This monograph presents the complete theory of smooth quasigroups and loops, as well as its geometric and algebraic applications. Based on a generalization of the Lie-group theory, it establishes new backgrounds for differential geometry in the form of nonlinear geometric algebra and "loopuscular" geometry. It will prove useful in applications in such diverse fields as mathematical physics, relativity, Poisson and symplectic mechanics, quantum gravity, and dislocation theory, etc.

Marcus DU SAUTOY, Dan SEGAL, Aner SHALEV, (Editors). — **New horizons in pro- $p$  groups.** — Progress in mathematics, vol. 184. — Un vol. relié,  $16,5 \times 24$ , de XIII, 423 p. — ISBN 0-8176-4171-8. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2000.

The impetus for current research in pro- $p$  groups comes from four main directions: from new applications in number theory, which continue to be a source of deep and challenging problems; from the traditional problem of classifying finite  $p$ -groups; from questions arising in infinite group theory; and finally, from the younger subject of "profinite group theory". Key features include: comprehensive introductory material and numerous examples throughout; first complete accounts in book form of the theory of groups acting on pro- $p$  trees, branch (Grigorchuk-type) groups, the Nottingham group; wide-ranging survey of Lie methods; definitive new results on the Golod-Shafarevich condition; detailed discussions of current research on classification of finite  $p$ -groups, enumeration of finite  $p$ -groups and of subgroups in infinite groups; new treatment of cohomology of  $p$ -adic analytic groups; connections with number theory: ramification theory in local fields, applications of  $p$ -adic Galois representations.

Geoff SMITH and Olga TABACHNIKOVA. — **Topics in group theory.** — Springer undergraduate mathematics series. — Un vol. broché,  $17 \times 24$ , de XIII, 255 p. — ISBN 1-85233-235-2. — Prix: DM 59.00. — Springer, Berlin, 2000.

Designed to support a reader engaged in a first serious group theory course, or a mathematically mature reader approaching the subject for the first time, this book reviews the essential. It

recaps the basic definitions and results, up to and including Lagrange's theorem, and then continues to explore topics such as the isomorphism theorems and group actions. Later chapters include material on chain conditions and finiteness conditions, free groups and the theory of presentations. In addition, a novel chapter of "entertainments" takes the basic theory and plays with it to obtain an assortment of results that will show a little of what can be done with the theoretical machinery.

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

Jürgen FUCHS. — **Affine Lie algebras and quantum groups.** — Cambridge monographs on mathematical physics. — Un vol. broché,  $19 \times 23,5$ , de XIV, 433 p. — ISBN 0-521-48412-X. — Prix : £23.95. — Cambridge University Press, Cambridge, 1992.

This is an introduction to the theory of affine Lie algebras, to the theory of quantum groups, and to the interrelationships between these two fields that are encountered in conformal field theory. The description of affine algebras covers the classification problem, the connection with loop algebras, and representation theory including modular properties. The necessary background from the theory of semisimple Lie algebras is also provided. The discussion of quantum groups concentrates on deformed enveloping algebras and their representation theory, but other aspects such as R-matrices and matrix quantum groups are also dealt with.

Karl-Hermann NEEB. — **Holomorphy and convexity in Lie theory.** — De Gruyter expositions in mathematics, vol. 28. — Un vol. relié,  $17 \times 25$ , de XXI, 778 p. — ISBN 3-11-015669-5. — Prix : DM 298.00. — Walter de Gruyter, Berlin, 2000.

*From the preface:* "This monograph is devoted to the circle of ideas connecting *holomorphic* and unitary representations with invariant *convexity in Lie algebras*. The background of these ideas comprises many classical concepts... The irreducible unitary representations of Lie groups we are dealing with in this book are highest weight representations; in some sense these are infinite-dimensional analogs of irreducible representations of compact groups. Among the irreducible unitary representations, they can be characterized by the property that they permit a holomorphic extension to a certain complex manifold  $S$  which is a semigroup containing the group in its boundary... The *main objective* of this book is to describe the interplay between holomorphic representations of complex semigroups, their complex geometry and analysis, and invariant convexity in the Lie algebra  $\mathfrak{g}$  and its dual  $\mathfrak{g}^*$ . We briefly refer to this circle of ideas as *holomorphic representation theory*."

## ***Fonctions de variables réelles***

N.L. CAROTHERS. — **Real analysis.** — Un vol. broché,  $17,5 \times 25,5$ , de XIII, 401 p. — ISBN 0-521-49756-6 (relié: 0-521-49749-3). — Prix : £19.95 (relié: £52.50). — Cambridge University Press, Cambridge, 2000.

This is a course in real analysis directed at advanced undergraduates and beginning graduate students in mathematics and related fields. Presupposing only a modest background in real analysis or advanced calculus, the book offers something to specialists and non-specialists. The course consists of three major topics: metric and normed linear spaces, function spaces, and Lebesgue measure and integration on the line. In an informal style, the author gives motivation and overview of new ideas, while supplying full details and proofs. He includes historical commentary, recommends articles for specialists and non-specialists, and provides exercises and suggestions for further study.



## *Mesure et intégration*

M. CARTER, B. VAN BRUNT. — **The Lebesgue-Stieltjes integral: a practical introduction.** — Undergraduate texts in mathematics. — Un vol. relié,  $16 \times 24$ , de ix, 228 p. — ISBN 0-387-95012-5. — Prix : DM 89.00. — Springer, New York 2000.

The authors aim to introduce the Lebesgue-Stieltjes integral on the real line in a natural way as an extension of the Riemann integral. They make the treatment as practical as possible. The evaluation of Lebesgue-Stieltjes integrals is discussed in detail, as are the key theorems of integral calculus as well as the standard convergence theorems. The book then concludes with the brief discussion of multivariate integrals and surveys of  $L^p$  spaces and some applications. Exercises, which extend and illustrate the theory, and provide practice in techniques, are included.

## *Fonctions d'une variable complexe*

Steven G. KRANTZ. — **Handbook of complex variables.** — Un vol. relié,  $16 \times 24$ , de xxiv, 290 p. — ISBN 0-8176-4011-8. — Prix : SFr. 128.00. — Birkhäuser, Boston, 2000.

This text is a comprehensive reference work for scientists and engineers who need to know and use essential information and methods involving complex variables and analysis. Its focus is on basic concepts and informational tools for mathematical practice: solving problems in applied mathematics, science and engineering. The information is self-contained and accessible to a broad readership. All the indispensable ideas are presented, as well as applications topics and a brief survey of available computer software. The material has been carefully organized for quick, convenient reference by specialists and non-specialists alike.

## *Fonctions de plusieurs variables complexes*

P. DOLBEAULT, A. IORDAN, G. HENKIN, H. SKODA, J.-M. TRÉPREAU, (Editors). — **Complex analysis and geometry: International Conference in honor of Pierre Lelong.** — Progress in mathematics, vol. 188. — Un vol. relié,  $16 \times 24$ , de xiv, 241 p. — ISBN 3-7643-6352-5. — Prix : SFr. 98.00. — Birkhäuser, Basel, 2000.

The book opens with an exposition of the achievements of Pierre Lelong on plurisubharmonic functions, closed positive currents, and their further study by other mathematicians. Moreover, a list of eleven open problems is given. All other contributions contain new results related, for example, to the following items: capacities, product of positive currents,  $L^2$  extension theorems, Bergman kernels and metrics, new properties of convex domains of finite type: non compact boundaries of Levi-flat hypersurfaces of  $C^2$ , compact boundary problems as application of compactly supported measures orthogonal to polynomials, Hartogs' theorem on some open subsets of a projective manifold, Malgrange vanishing theorem with support conditions, etc.

Jacque FARAUT, Soji KANEYUKI, Adam KORÁNYI, Qi-keng LU, Guy ROOS. — **Analysis and geometry on complex homogeneous domains.** — Progress in mathematics, vol. 185. — Un vol. relié,  $16,5 \times 24$ , de xvii, 540 p. — ISBN 0-8176-4138-6. — Prix : SFr. 118.00. — Birkhäuser, Boston, 2000.

This introductory text covers a number of important areas in complex analysis and geometry. Written by experts in their respective fields, each of the five chapters unfolds from the basics to the more complex. Unlike other more laborious introductory texts, the exposition here is rapid-paced and efficient, without compromising proofs and examples that enable the reader to grasp

the essentials. The most basic type of domain examined is the bounded symmetric domain originally described and classified by Cartan and Harish-Chandra. *Contents*: Function spaces on complex semi-groups, by Jacques Faraut. — Graded Lie algebras and pseudo-Hermitian symmetric spaces, by Soji Kaneyuki. — Function spaces on bounded symmetric domains, by Adam Korányi. — The heat kernels of non compact symmetric spaces, by Qi-keng Lu. — Jordan triple systems, by Guy Roos.

Jiji KAJIWARA, Zhong LI, Kwang Ho SHON, (Editors). — **Finite or infinite dimensional complex analysis.** — Proceedings of the seventh international colloquium. — Lecture notes in pure and applied mathematics, vol. 214. — Un vol. broché, 17,5×25,5, de xiv, 630 p. — ISBN 0-8247-0442-8. — Prix: US\$195.00. — Marcel Dekker, New York, 2000.

Presenting the proceedings from the Seventh International Colloquium on Finite or Infinite Dimensional Complex Analysis held in Fukuoka, Japan, this state-of-the-art reference offers multiple perspectives and numerous research examples on complex variables, Clifford algebra variables, hyperfunctions, and numerical analysis. Exhibiting exclusive contributions by over 80 specialists in the field, *Finite or Infinite Dimensional Complex Analysis...* discusses the main branches of complex analysis and its applications... explores a variety of dimensions in Clifford algebra such as quaternionic and octonionic variables... covers polynomials including the Pisier-Schütt theorem... investigates various aspects of holomorphic functions—extensions, ideals, mappings, and Schauder decompositions... details research on Hardy and Chern classes... applies the Hamiltonian Algorithm to acoustics... and much more.

Thomas PETERNELL, Frank-Olaf SCHREYER, (Editors). — **Complex analysis and algebraic geometry: a volume in memory of Michael Schneider.** — Un vol. relié, 17×25, de x, 406 p. — ISBN 3-11-016204-0. — Prix: DM 298.00. — Walter de Gruyter, Berlin, 2000.

The volume consists of invited refereed papers dedicated to the memory of Michael Schneider. The contributions cover a wide spectrum in complex analysis and algebraic geometry; the main focus is on: higher dimensional varieties and Kähler geometry, moduli spaces and deformation theory, surfaces and 4-manifolds, real algebraic geometry. A part of the articles grew out of a symposium in honour of Michael Schneider (18.5.1942-29.8.1997), held in Bayreuth in June 1998 with about 80 participants.

## ***Equations différentielles ordinaires***

Werner BALSER. — **Formal power series and linear systems of meromorphic ordinary differential equations.** — Universitext. — Un vol. relié, 16,5×24,5, de xviii, 299 p. — ISBN 0-387-98690-1. — Prix: DM 94.00. — Springer, New York, 2000.

Simple ordinary differential equations may have solutions in terms of power series whose coefficients grow at such a rate that the series has a radius of convergence equal to zero. In fact, every linear meromorphic system has a formal solution of a certain form, which can be relatively easily computed, but which generally involves such power series diverging everywhere. In this book, the author presents the classical theory of meromorphic systems of ODEs in the new light shed upon it by the recent achievements in the theory of summability of formal power series.

Peter E. HYDON. — **Symmetry methods for differential equations: a beginner's guide.** — Cambridge texts in applied mathematics. — Un vol. broché, 15,5×23, de xi, 213 p. — ISBN 0-521-49786-8. — Prix: £18.95 (relié: £50.00). — Cambridge University Press, Cambridge, 2000.

Symmetry is the key to solving differential equations. There are many well-known techniques for obtaining exact solutions, but most of them are merely special cases of a few powerful

symmetry methods. These methods can be applied to differential equations of an unfamiliar type; they do not rely on special tricks. Instead, a given differential equation can be made to reveal its symmetries, which are then used to construct exact solutions. This book is a straightforward introduction to symmetry methods. The presentation is informal with many worked examples. The text contains several new methods. In particular, methods for obtaining discrete symmetries and first integrals are described.

## *Equations aux dérivées partielles*

Jürgen M. APPELL, Anatolij S. KALITVIN, Petr P. ZABREJKO. — **Partial integral operators and integro-differential equations.** — Pure and applied mathematics. Monographs and textbooks in pure and applied mathematics, vol. 230. — Un vol. relié, 16×23,5, de x, 560 p. — ISBN 0-8247-0396-0. — Prix : US\$ 195.00. — Marcel Dekker, New York, 2000.

With results and methods ranging from abstract functional-analytic approaches to specific uses in continuum mechanics and engineering, this monograph discusses the theory and applications of partial integral operators as well as linear and nonlinear equations... unifies the classical theory of differential equations in Banach spaces with the latest findings on integral operators... makes nonlinear partial integral equations more accessible... contains a wealth of details on the analytical, topological, and spectral properties of partial integral operators in spaces of continuous and measurable functions... and gathers a comprehensive list of about 400 references, many in Russian, which have been scattered throughout specialized research journals until now.

Heinrich G.W. BEGEHR, A. Okay CELEBI and Wolfgang TUTSCHKE, (Editors). — **Complex methods for partial differential equations.** — International Society for Analysis, Applications and Computation, vol. 6. — Un vol. relié, 16×25, de x, 331 p. — ISBN 0-7923-6000-1. — Prix : Dfl. 260.00. — Kluwer Academic Publishers, Dordrecht, 1999.

This book contains survey chapters as well as state-of-the art research chapters on topics ranging from complex elliptic first order systems with regular or singular coefficients to overdetermined systems in several complex variables and partial differential equations in Clifford analysis. Different boundary value problems are studied. Applications to crack problems in elasticity theory to cusped bars, plates, and shells are given. Wavelets transformations are constructed in Banach spaces and used to identify complex analysis from the viewpoint of geometry. Fixed-point problems even in abstract Banach spaces are investigated with respect to an optimal domain of existence for the solution.

Jan W. CHOLEWA, Tomasz DLOTKO. — **Global attractors in abstract parabolic problems.** — In cooperation with Nathaniel Chaffee. — London Mathematical Society lecture note series, vol. 278. — Un vol. broché, 15×23, de XII, 235 p. — ISBN 0-521-79424-2. — Prix : £27.95. — Cambridge University Press, Cambridge, 2000.

The study of dissipative equations is an area that has attracted substantial attention over many years. Much progress has been achieved using a combination of both finite dimensional and infinite dimensional techniques, and in this book the authors exploit these same ideas to investigate the asymptotic behavior of dynamical systems corresponding to parabolic equations. In particular the theory of global attractors is presented in detail. Extensive auxiliary material and rich references make this self contained book suitable as an introduction for graduate students, and experts from other areas, who wish to enter this field.



Paul DONATO. — **Calcul différentiel pour la licence: cours, exercices et problèmes résolus.** — Sciences Sup, cours, 2<sup>e</sup> cycle, Ecoles d'ingénieurs. — Un vol. broché, 17 × 24, de ix, 189 p. — ISBN 2-10-004723-X. — Prix: FF 120.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Ce livre aborde de manière détaillée les thèmes suivants: le théorème de la moyenne et ses conséquences, les diverses formules de Taylor, l'étude des extrema simples et liés (multiplicateurs de Lagrange), les théorèmes d'inversion locale, des fonctions implicites et du rang constant. Le dernier chapitre est consacré aux théorèmes classiques d'existence des solutions d'équations différentielles, ainsi qu'à une introduction aux flots des champs de vecteurs. Les sous-variétés de  $\mathbf{R}^n$  font l'objet d'un traitement autonome dans lequel est abordée la géométrie des surfaces, notamment l'étude de leur courbure. Le cours est complété par une série d'exemples et d'exercices tous corrigés, et de problèmes dont certains sont résolus.

Todor V. GRAMCHEV, Peter R. POPIVANOV. — **Partial differential equations: approximate solutions in scales of functional spaces.** — Mathematical research, vol. 108. — Un vol. broché, 17 × 24, de 155 p. — ISBN 3-527-40138-5. — Prix: DM 148.00. — Wiley-VCH, Berlin, 2000.

In this volume, the authors deal with the following themes: Microlocal properties of pseudo-differential operators with multiple characteristics of involutive type in the framework of the Sobolev spaces; abstract schemes for constructing approximate solutions to linear partial differential equations with characteristics of constant multiplicity  $m \geq 2$  in the framework of Gevrey spaces; local solvability, hypoellipticity and singular solutions in Gevrey spaces; global Gevrey solvability on the torus for linear partial differential equations; applications of asymptotic methods for local (non)solvability for quasihomogeneous operators; applications of Airy asymptotic solutions to degenerate oblique derivative problems for second order strictly hyperbolic equations; approximate Gevrey normal forms of analytic involutions and analytic glancing hypersurfaces with applications for effective stability estimates for billiard ball maps.

Irena LASIECKA, Roberto TRIGGIANI. — **Control theory for partial differential equations: continuous and approximation theories, vol. 1: Abstract parabolic systems.** — Encyclopedia of mathematics and its applications, vol. 74-75. — Un vol. relié, 16,5 × 24, de XXI, 644 p. — ISBN 0-521-43408-4. — Prix: £75.00. — Cambridge University Press, Cambridge, 2000.

This is the first volume of a comprehensive and up-to-date treatment of quadratic optimal control theory for partial differential equations over a finite or infinite time horizon and related differential (integral) and algebraic Riccati equations. A key feature of this treatise is the wealth of concrete multidimensional PDE illustrations, which fit naturally into the abstract theory. Volume 1 covers the abstract parabolic theory, including both the finite and infinite horizon optimal control problems, as well as the corresponding min-max theory with nondefinite quadratic cost. A lengthy chapter presents many multidimensional PDE illustrations with boundary/point control and observation. These include not only the traditional parabolic equations, such as the heat equation, but also second-order equations with structural ("high") damping, as well as thermo-elastic plate equations. Recently discovered, critical dynamical properties are provided in detail. Many of these new results are appearing here in print for the first time.

William MCLEAN. — **Strongly elliptic systems and boundary integral equations.** — Un vol. broché, 15 × 23, de xiv, 357 p. — ISBN 0-521-66375-X. — Prix: £20.95. — Cambridge University Press, Cambridge, 2000.

Partial differential equations provide mathematical models of many important problems in the physical sciences and engineering. This book treats one class of such equations,

concentrating on methods involving the use of surface potentials. It provides the first detailed exposition of the mathematical theory of boundary integral equations of the first kind on non-smooth domains. Included are chapters on three specific examples: the Laplace equation, the Helmholtz equation and the equations of linear elasticity.

Frank PACARD, Tristan RIVIÈRE. — **Linear and nonlinear aspects of vortices: the Ginzburg-Landau model.** — Progress in nonlinear differential equations and their applications, vol. 39. — Un vol. relié,  $16,5 \times 24$ , de x, 342 p. — ISBN 0-8176-4133-5. — Prix: SFr. 148.00. — Birkhäuser, Boston, 2000.

Ginzburg-Landau equations are relevant in modeling a number of phenomena in physics, including phase transition in superconductors, superfluids, Yang-Mills-Higgs fields, and more generally, Abelian gauge theory. The sets where the “wave function” vanishes are commonly called vortices. These most intriguing objects from both a physical and mathematical point of view pose a number of important questions examined in this text. The main achievement of this monograph is the precise description of a one-to-one correspondence between the admissible configurations of vortices and the space of solutions of the Ginzburg-Landau equations. The analysis is fairly self-contained and uses an approach and techniques that differ greatly from earlier studies of Ginzburg-Landau vortices, which emphasize the variational aspects of the problem. The approach here is based on the extensive use of Sobolev and Hölder weighted spaces, gluing methods for nonlinear partial differential equations, conformal fields, and derivations of conservation laws. Of particular importance is the interaction and central role of linear spectral analysis and the nonlinearities of the Ginzburg-Landau equations.

Olle STORMARK. — **Lie’s structural approach to PDE systems.** — Encyclopedia of mathematics and its applications, vol. 80. — Un vol. relié,  $16,5 \times 24$ , de xv, 572 p. — ISBN 0-521-78088-8. — Prix: £70.00. — Cambridge University Press, Cambridge, 2000.

The approach to quantum field theory in this book is part way between building a mathematical model of the subject and presenting the mathematics that physicists actually use. It starts with the need to combine special relativity and quantum mechanics and culminates in a basic understanding of the standard model of electroweak and strong interactions. The book is divided into five parts: Canonical quantization of scalar fields. Weyl, Dirac and vector fields. Functional integral quantization. The standard model of the electroweak and strong interactions. Renormalization.

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

Viviane BALADI. — **Positive transfer operators and decay of correlations.** — Advanced series in nonlinear dynamics, vol. 16. — Un vol. relié,  $16 \times 22,5$ , de x, 314 p. — ISBN 981-02-3328-0. — Prix: £34.00. — World Scientific, Singapore, 2000.

Although individual orbits of chaotic dynamical systems are by definition unpredictable, the average behavior of typical trajectories can often be given a precise statistical description. Indeed, there often exist ergodic invariant measures with special additional features. For a given invariant measure, and a class of observables, the correlation functions tell whether (and how fast) the system “mixes”, that is, “forgets” its initial conditions. This book addressed to mathematical (or mathematically inclined) physicists, shows how the powerful technology of transfer operators, imported from statistical physics, has been used recently to construct relevant invariant measures, and to study the speed of decay of their correlation functions, for many chaotic systems. Links with dynamical zeta functions are explained.

M. Bachir BEKKA, Matthias MAYER. — **Ergodic theory and topological dynamics of group actions on homogeneous spaces.** — London Mathematical Society lecture note series, vol. 269. — Un vol. broché, 15×23, de vii, 200 p. — ISBN 0521-66030-0. — Prix: £24.95. — Cambridge University Press, Cambridge, 2000.

The study of geodesic flows on homogeneous spaces is an area of research that has in recent years yielded some fascinating developments. This book focuses on many of these, and one of its highlights is an elementary and complete proof (due to Margulis and Dani) of Oppenheim's conjecture. Also included here: an exposition of Ratner's work on Raghunathan's conjectures; a complete proof of the Howe-Moore vanishing theorem for general semisimple Lie groups; new treatment of Mautner's result on the geodesic flow of Riemannian symmetric space; Mozes' result about mixing of all orders and the asymptotic distribution of lattice points in the hyperbolic plane; Ledrappier's example of mixing action which is not a mixing of all orders.

F. BLANCHARD, A. MAASS, A. NOGUEIRA, (Editors). — **Topics in symbolic dynamics and applications.** — London Mathematical Society lecture note series, vol. 279. — Un vol. broché, 15×23, de xvi, 245 p. — ISBN 0-521-79660-1. — Prix: £24.95. — Cambridge University Press, Cambridge, 2000.

This book is devoted to recent developments in symbolic dynamics, and it comprises eight chapters. The first two are concerned with the study of symbolic sequences of "low complexity", the following two introduce "high complexity" systems. Chapter five presents results on asymptotic laws for the random times of occurrence of rare events. Chapter six deals with diophantine problems and combinatorial Ramsey theory. Chapter seven looks at the dynamics of symbolic systems arising from numeration systems, and finally chapter eight gives a complete description of the symbolic dynamics of Lorenz maps.

M. FOREMAN, A.S. KECHRIS, A. LOUVEAU, B. WEISS, (Editors). — **Descriptive set theory and dynamical systems.** — London Mathematical Society lecture note series, vol. 277. — Un vol. broché, 15×23, de 291 p. — ISBN 0-521-78644-4. — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

In recent years there has been a growing interest in the interactions of descriptive set theory and various aspects of the theory of dynamical systems, including ergodic theory and topological dynamics. This volume contains a collection of survey papers by leading researchers covering a wide variety of recent developments in these two subjects and their interconnections. This book provides researchers and graduate students interested in either of these areas, with a guide to work done in the other, as well as an introduction to problems and research directions arising from their interconnections.

Michel L. LAPIDUS, Machiel VAN FRANKENHUYSEN. — **Fractal geometry and number theory: complex dimensions of fractal strings and zeros of zeta functions.** — Un vol. relié, 16×24, de x, 268 p. — ISBN 0-8176-4098-3. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2000.

Number theory and fractal geometry are combined in this study of the vibrations of fractal strings, that is, one dimensional drums with fractal boundary, and of the zeros of zeta functions. An explicit formula, originally developed for the proof of the prime number theorem, is extended here to apply to the zeta functions associated with fractals. This theory of complex dimensions enables a precise description of the oscillations in the geometry or in the spectrum of fractal strings. A combination of analytical and geometric methods is used to also establish new results about vertical distribution of zeros of number-theoretic and many other zeta functions.

Rafael DE LA LLAVE, Linda R. PETZOLD, Jens LORENZ, (Editors). — **Dynamics of algorithms.** — The IMA volumes in mathematics and its applications, vol. 118. — Un vol. relié,  $16,5 \times 24,5$ , de IX, 136 p. — ISBN 0-387-98920-X. — Prix: DM 120.00. — Springer, New York, 2000.

The articles collected in this volume represent the contributions presented at the IMA Workshop on Dynamics of Algorithms which took place in November 1997. The workshop was an integral part of the 1997 to 1998 IMA Program on Emerging Applications of Dynamical Systems. The interaction between algorithms and dynamical systems is mutually beneficial since dynamical methods can be used to study algorithms which are applied repeatedly. Convergence and asymptotic rates are indeed dynamical properties. Likewise, the study of dynamical systems benefits enormously from having efficient algorithms to compute dynamical objects.

### *Equations aux différences finies, équations fonctionnelles*

Themistocles M. RASSIAS. — **Functional equations and inequalities.** — Mathematics and its applications, vol. 518. — Un vol. relié,  $16,5 \times 24,5$ , de XI, 336 p. — ISBN 0-7923-6484-8. — Prix: Dfl. 275.00. — Kluwer Academic Publishers, Dordrecht, 2000.

This volume provides an extensive study of some of the most important topics of current interest in functional equations and inequalities. Subjects dealt with include: a Pythagorean functional equation, a functional definition of trigonometric functions, the functional equation of the square root spiral, a conditional Cauchy functional equation, an iterative functional equation, the Hille-type functional equation, the polynomial-like iterative functional equations, a qualitative study of Lobachevsky's complex functional equations, functional inequalities in special classes of functions, replicativity and function spaces, normal distributions, some difference equations, finite sum decompositions of functions, the problem of expressibility in some extensions of free groups, Alexandrov problem and mappings which preserve distances, etc.

### *Approximations et développements en série*

George A. ANASTASSIOU, Sorin G. GAL. — **Approximation theory: moduli of continuity and global smoothness preservation.** — Un vol. relié,  $16 \times 24$ , de XI, 525 p. — ISBN 0-8176-4151-3. — Prix: SFr. 158.00. — Birkhäuser, Boston, 2000.

This monograph, in two parts, is an intensive and comprehensive study of the computational aspects of the moduli of smoothness and the Global Smoothness Preservation Property (GSPP). Key features include: Systematic and extensive study of the computation of moduli of continuity and GSPP, presented for the first time in the book literature; substantial motivation and examples for key results; extensive applications of moduli of smoothness and GSPP concepts to approximation theory, probability theory, numerical and functional analysis; GSPP methods to benefit engineers in computer-aided geometric design; bibliography and index.

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

Tian-Xia HE. (Editor). — **Wavelet analysis and multiresolution methods.** — Proceedings of the conference held at the University of Illinois at Urbana-Champaign, Illinois. — Lecture notes in pure and applied mathematics, vol. 212. — Un vol. broché,  $17,5 \times 25,5$ , de VIII, 382 p. — ISBN 0-8247-0417-7. — Prix: US\$ 185.00. — Marcel Dekker, New York, 2000.

This volume contains a selection of papers presented at the Wavelet Analysis and Multiresolution Methods Session of the American Mathematical Society Meeting held recently at the University of Illinois at Urbana-Champaign. Offering self-contained papers that include an

introduction to a major topic in wavelet analysis, recent research results, analysis of key historical developments, and a detailed list of references, *Wavelet Analysis and Multiresolution Methods* explores the construction, analysis, computation, and application of multiwavelets, scaling vectors, nonhomogeneous refinement, multivariate orthogonal and biorthogonal wavelets, and much more.

Yves MEYER, Ronald COIFMAN. — **Wavelets: Calderón-Zygmund and multilinear operators.** — Translated by David Salinger. — Cambridge studies in advanced mathematics, vol. 48. — Un vol. broché,  $15 \times 22,5$ , de XIX, 314 p. — ISBN 0-521-79473-0. — Prix: £24.95 (relié: £42.50). — Cambridge University Press, Cambridge, 1997.

Now in paperback, this remains one of the classic expositions of the theory of wavelets from two of the subject's leading experts. In this volume the theory of paradifferential operators and the Cauchy kernel on Lipschitz curves are discussed with the emphasis firmly on their connection with wavelet bases. Sparse matrix representations of these operators can be given in terms of wavelet bases which have important applications in image processing and numerical analysis. The method is now widely studied and can be used to tackle a wide variety of problems arising in science and engineering. Put simply, this is an essential purchase for anyone researching the theory of wavelets.

### ***Transformations intégrales, calcul opérationnel***

Joel L. SCHIFF. — **The Laplace transform: theory and applications.** — Undergraduate texts in mathematics. — Un vol. relié,  $16,5 \times 24,5$ , de XIV, 233 p. — ISBN 0-387-98698-7. — Prix: DM 79.00. — Springer, New York, 1999.

The Laplace transform is an extremely versatile technique for solving differential equations, both ordinary and partial. It can also be used to solve difference equations. Even the Dirac delta function, which is normally covered in a heuristic fashion is given a completely justifiable treatment in the context of the Riemann-Stieltjes integral, yet at a level an undergraduate student can appreciate. When it comes to the deepest part of the theory, the complex inversion formula, knowledge of poles, residues, and contour integration of meromorphic functions is required. To this end, an entire chapter is devoted to the fundamentals of complex analysis.

### ***Equations intégrales***

Ricardo ESTRADA, Ram P. KANWAL. — **Singular integral equations.** — Un vol. relié,  $16 \times 24$ , de XII, 427 p. — ISBN 0-8176-4085-1. — Prix: SFr. 118.00. — Birkhäuser, Boston, 2000.

This work focuses exclusively on the distributional solutions of singular integral equations, progressing from basic concepts of the classical theory to the more difficult two-dimensional problems. Key features of the work include: systematic progression from basic classical concepts to more advanced distribution type solutions; applications to a variety of fields, including potential theory, mechanics, fluid dynamics, wave scattering, statistics, and population dynamics; extensive examples, illustrations, and problem sets; good bibliography and index.

### ***Analyse fonctionnelle***

J. CUNTZ, S. ECHTERHOFF, (Editors). — **C\*-algebras: proceedings of the SFB-Workshop on C\*-Algebras, Münster, Germany, March 8-12, Germany.** — Un vol. broché,  $15,5 \times 23,5$ , de XI, 272 p. — ISBN 3-540-67562-0. — Prix: DM 129.00. — Springer, Berlin, 2000.

This book represents the refereed proceedings of the SFB-Workshop on C\*-Algebras which was held at Münster in March 1999. It contains articles by some of the best researchers on the



subject of  $C^*$ -algebras about recent developments in the field of  $C^*$ -algebra theory and its connections to harmonic analysis and noncommutative geometry. Among the contributions there are several excellent surveys and overviews and some original articles covering areas like the classification of  $C^*$ -algebras,  $K$ -theory, exact  $C^*$ -algebras and exact groups, Cuntz-Krieger-Pimsner algebras, group  $C^*$ -algebras, the Baum-Connes conjecture and others.

Do Ngoc DIEP. — **Methods of noncommutative geometry for group  $C^*$ -algebra.** — Chapman & Hall/CRC research notes in mathematics series, vol. 416. — Un vol. broché,  $15,5 \times 23,5$ , de 351 p. — ISBN 1-58488-019-8. — Prix: £40.99. — Chapman & Hall/CRC, Boca Raton, 2000.

This volume provides an introduction to and presents research on the study of group  $C^*$ -algebras, suitable for all levels of readers – from graduate students to professional researchers. The introduction provides the essential features of the methods used. In Part I, the author offers an elementary overview – using concrete examples – of using  $K$ -homology, BFD-functors, and  $KK$ -functors to describe group  $C^*$ -algebras. In Part II, he uses advanced ideas and methods from representation theory, differential geometry, and  $KK$ -theory, to explain two primary tools used to study group  $C^*$ -algebras: multidimensional quantization and construction of the index of group  $C^*$ -algebras through the orbit method.

J.R. GILES. — **Introduction to the analysis of normed linear spaces.** — Australian Mathematical Society lecture series, vol. 13. — Un vol. broché,  $15 \times 23$ , de xiv, 277 p. — ISBN 0-521-65375-4. — Prix: £19.95. — Cambridge, Cambridge University Press, 2000.

This text is a basic course in functional analysis for senior undergraduate and beginning postgraduate students. It aims at providing some insight into basic abstract analysis which is now the contextual language of much modern mathematics. Although it is assumed that the student will have familiarity with elementary real and complex analysis and linear algebra and have studied a course in the analysis of metric spaces, knowledge of integration theory or general topology is not required. The theme of this text concerns structural properties of normed linear spaces in general, especially associated with dual spaces and continuous linear operators on normed linear spaces.

Henryk HUDZIK, Leszek SKRZYPCZAK, (Editors). — **Function spaces: the fifth conference.** — Proceedings of the conference at Poznań, Poland. — Lecture notes in pure and applied mathematics, vol. 213. — Un vol. broché,  $17,5 \times 25,5$ , de xiv, 511 p. — ISBN 0-8247-0419-3. — Prix: US\$185.00. — Marcel Dekker, New York, 2000.

Compiling the latest research from the International Conference “Function Spaces V” held in Poznań, Poland, this exhaustive reference presents key advances, modern applications, and important analyses of function spaces. Two special sections recognize the memory, contributions, and influences of Władysław Orlicz and Genadii Lozanowskii. Advancing the study of general theory, particular spaces, topological and geometrical properties, order structures, and the interpolation of operators, *Function Spaces* covers the geometry of Banach spaces, focusing on Orlicz spaces with applications to fixed point theory, Banach lattices and the rearrangement of invariant spaces, Sobolev type embeddings and entropy numbers, Hardy inequalities and dyadic Hardy spaces, singular integral and pseudo-differential operators, and much more.

Kjeld B. LAURSEN, Michael M. NEUMANN. — **An introduction to local spectral theory.** — Oxford science publications. — London Mathematical Society monographs. New series, vol. 20. — Un vol. relié,  $16 \times 24$ , de xii, 591 p. — ISBN 0-19-852381-5. — Prix: £115.00. — Clarendon Press, Oxford, 2000.

*From the preface:* In this monograph, we develop, rather systematically and thoroughly, the local spectral theory for bounded linear operators on Banach spaces. It should be made clear

from the outset that this book concentrates on the case of single operators... Our concentration on single operator theory means that the techniques employed can, essentially, be developed within the framework of the book itself. Of course, it is not possible to make a presentation such as this one entirely self-contained...; it has been our intention to make this exiting area of operator theory accessible to newcomers and graduate students of mathematics with an ordinary background in analysis. This has influenced both our assumptions about the reader's background knowledge, and also the high degree of detail included in the proofs throughout the book. The modest prerequisites from functional analysis and operator theory that we required are collected in the appendix...

## ***Théorie des opérateurs***

V.M. ADAMYAN, I. GOHBERG, M. GORBACHUK, V. GORBACHUK, M.A. KAASHOEK, H. LANGER, G. POPOV, (Editors). — **Differential operators and related topics: proceedings of the Mark Krein International Conference on Operator Theory and Applications, Odessa, Ukraine, August 18-22, 1997, vol. 1.** — Operator theory, vol. 117. — Un vol. relié, 17×24, de ix, 420 p. — ISBN 3-7643-6287-1. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2000.

This conference, which was dedicated to the 90<sup>th</sup> anniversary of the prominent mathematician Mark Krein focused on the main ideas, methods, results, and achievements of M.G. Krein. This first volume is devoted to the theory of differential operators and related topics. It opens with a description of the conference, biographical material and a number of survey papers about the work of M.G. Krein. The main part of the book consists of original research papers presenting the state of the art in the area of differential operators.

V.M. ADAMYAN, I. GOHBERG, M. GORBACHUK, V. GORBACHUK, M.A. KAASHOEK, H. LANGER, G. POPOV, (Editors). — **Operator theory and related topics: proceedings of the Mark Krein International Conference on Operator Theory and Applications, Odessa, Ukraine, August 18-22, 1997, vol. 2.** — Operator theory, vol. 118. — Un vol. relié, 17×24, de xxiv, 419 p. — ISBN 3-7643-6288-X. — Prix: SFr. 198.00. — Birkhäuser, Basel, 2000.

The present book is the second of the two volume proceedings of the Mark Krein International Conference on Operator Theory and Applications. It is devoted to operator theory and related topics. It opens with the bibliography of M.G. Krein and a number of survey papers about his work. The main part of the book consists of original research papers presenting the state of the art in operator theory and its applications. The two volumes will be of interest to a wide range of readership in pure and applied mathematics, physics and engineering sciences.

Jürgen APPELL, (Editor). — **Recent trends in nonlinear analysis: Festschrift dedicated to Alfonso Vignoli on the occasion of his sixtieth birthday.** — Progress in nonlinear differential equations and their applications, vol. 40. — Un vol. relié, 16×24, de 264 p. — ISBN 3-7643-6292-8. — Prix: SFr. 128.00. — Birkhäuser, Basel, 2000.

The book contains a collection of 21 original research papers which report on recent developments in various fields of nonlinear analysis. The collection covers a large variety of topics ranging from abstract fields such as algebraic topology, functional analysis, operator theory, spectral theory, analysis on manifolds, partial differential equations, boundary value problems, geometry of Banach spaces, measure theory, variational calculus, and integral equations, to more application-oriented fields like control theory, numerical analysis, mathematical physics, mathematical economy, and financial mathematics. This book is addressed to all specialists interested in nonlinear functional analysis and its applications.

A.V. BALAKRISHNAN, (Editor). — **Semigroups of operators: theory and applications.** — International conference in Newport Beach, December 14-18, 1998. — Progress in nonlinear differential equations and their applications, vol. 42. — Un vol. relié,  $16,5 \times 24$ , de v, 367 p. — ISBN 3-7643-6310-X. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2000.

This volume contains a collection of refereed papers by eminent experts originating from the “International Conference on Semigroups of Operators: Theory and Control”, held in December 1998 in Newport Beach, California. They highlight recent advances in the theory of semigroups of operators which provide the framework for the time-domain solutions of time-invariant boundary value and initial value problems of partial differential equations. There is a firewall between the abstract theory and the applications, and one of the conference aims, which is reflected in this collection, was to bring them together for the benefit of both communities.

Hari BERCOVICI, Ciprian FOIAS, (Editors). — **Operator theory and interpolation: International Workshop on Operator Theory and Applications, IWOTA 96.** — Operator theory: advances and applications, vol. 115. — Un vol. relié,  $17 \times 24$ , de 309 p. — ISBN 3-7643-6229-4. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2000.

Systems and control theories use sophisticated operator theoretical methods. They also provide new ideas and problems in operator theory. As a consequence, the biannual MTNS (Mathematical Theory of Networks and Systems) Conference is attended by many operator theorists. At the initiative of J. W. Helton and I. Gohberg, an International Workshop on Operator Theory and Applications (IWOTA) has been organized since the early 80s, as a satellite of MTNS. The articles in this volume originated from the IWOTA conference held at Indiana University, Bloomington, in June 1996. They represent most of the areas that were discussed at the workshop with some emphasis on modern interpolation theory, a topic which has seen much progress in recent years.

Albrecht BÖTTCHER, Sergei M. GRUDSKY. — **Toeplitz matrices, asymptotic linear algebra, and functional analysis.** — Un vol. broché,  $17 \times 24$ , de x, 116 p. — ISBN 3-7643-6290-1. — Prix: SFr. 48.00. — Birkhäuser, Basel, 2000.

This text is a self-contained introduction to some problems for Toeplitz matrices that are placed in the borderland between linear algebra and functional analysis. The text looks at Toeplitz matrices with rational symbols, and focuses attention on the asymptotic behavior of the singular values, which includes the behavior of the norms, the norms of the inverses, and the condition numbers as special cases. The text illustrates that the asymptotics of several linear algebra characteristics depend in a fascinating way on functional analytic properties of infinite matrices. Many convergence results can very comfortably be obtained by working with appropriate  $C^*$ -algebras, while refinements of these results, for example, estimates of the convergence speed, nevertheless require hard analysis.

Israel GOHBERG, Seymour GOLDBERG, Nahum KRUPNIK. — **Traces and determinants of linear operators.** — Operator theory: advances and applications, vol. 116. — Un vol. relié,  $17 \times 24$ , de VIII, 258 p. — ISBN 3-7643-6177-8. — Prix: SFr. 148.00. — Birkhäuser, Basel, 2000.

This book is dedicated to a theory of traces and determinants on embedded algebras of linear operators, where the trace and determinant are extended from finite rank operators by a limit process. An attractive feature of this book is that it contains the charming classical theory of determinants together with its most recent concrete and abstract developments and applications. The general presentation of the book is based on the authors' work.



Victor P. HAVIN, Nikolai K. NIKOLSKI, (Editors). — **Complex analysis, operators, and related topics: the S.A. Vinogradov Memorial Volume.** — Operator theory, vol. 113. — Un vol. relié, 17×24, de ix, 408 p. — ISBN 3-7643-6214-6. — Prix: SFr. 168.00. — Birkhäuser, Basel, 2000.

The main subjects of the volume include: — Free interpolation by analytic functions in its development from the works by L. Carleson up to the most recent achievements and in its connections with the theory of singular integral operators and Carleson-type embedding theorems, moment problems, etc. — Szökefalvi-Nagy-Foias model spaces studied from the point of view of holomorphic spaces. — Holomorphic spaces (Hardy, Bergman, Hölder, and Sobolev spaces). — Analytic functions smooth up to the boundary with their subtle properties related to the Nevanlinna-Smirnov factorization, division and multiplication, and zero sets. — A new approach to weighted inequalities for singular integrals based on the Bellman function in optimization theory. — The uncertainty principle in harmonic analysis and, in particular, a complete version of Turan's lemma on trigonometric sums. — Hankel operators and stationary Gaussian processes. — Fourier multipliers, and spectral analysis of some differential operators.

Haakan HEDENMALM, Boris KORENBLUM, Kehe ZHU. — **Theory of Bergman spaces.** — Graduate texts in mathematics, vol. 199. — Un vol. relié, 16×25, de ix, 286 p. — ISBN 0-387-98791-6. — Prix: DM 109.00. — Springer, New York, 2000.

Research interest and research activity in the theory of Bergman spaces have been high for several years. Today there are rich theories describing the Bergman spaces and their operators. This book presents the latest developments in the area. A self-contained book, with exercises at the end of each chapter, the *Theory of Bergman Spaces* will not only benefit graduate students but researchers also. — *Contents:* The Bergman spaces. — The Berezin transform. —  $A^p$ -inner functions. — Zero sets. — Interpolation and sampling. — Invariant subspaces. — Cyclicity. — Invertible noncyclic functions. — Logarithmically subharmonic weights.

Vladimir MAZ'YA, Serguei NAZAROV, Boris PLAMENEVSKII, (Editors). — **Asymptotic theory of elliptic boundary value problems in singularly perturbed domains, volume I and II.** — Translated from the German by Georg Heinig, Christian Posthoff and Boris Plamenevskij. — Operator theory, vol. 111 and vol. 112. — Deux vol. reliés, 17×24, de xxiii, 435 p et xxiii, 323 p. respectivement. — ISBN 3-7643-6397-5 (vol. 1), 3-7643-6398-3 (vol. 2). — Prix: SFr. 228.00, chaque volume, ou SFr. 398.00 pour l'ensemble. — Birkhäuser, Basel, 2000.

For the first time in mathematical literature this two-volume work introduces a unified and general approach to the asymptotic analysis of elliptic boundary value problems in singularly perturbed domains. The first volume is devoted to domains whose boundary is smooth in the neighbourhood of finitely many conical points. In particular, the theory encompasses the important case of domains with small holes. The second volume, on the other hand, treats perturbations of the boundary in higher dimensions as well as nonlocal perturbations. The core of this book consists of the solution of general elliptic boundary value problems by complete asymptotic expansion in powers of a small parameter that characterizes the perturbation of the domain. The construction of this method capitalizes on the theory of elliptic boundary value problems with nonsmooth boundary that has been developed in the past thirty years. Much attention is paid to concrete problems in mathematical physics, for example in elasticity theory. In particular, a study of the asymptotic behavior of stress intensity factors, energy integrals and eigenvalues is presented. To a large extent the book is based on the authors' work and has no significant overlap with other books on the theory of elliptic boundary value problems.

Bryan P. RYNNE, Martin A. YOUNGSON. — **Linear functional analysis.** — Springer undergraduate mathematics series. — Un vol. broché,  $17 \times 23,5$ , de x, 273 p. — ISBN 1-85233-257-3. — Prix: DM 59.00. — Springer, London, 2000.

Providing an introduction to the ideas and methods of linear functional analysis, this book shows how familiar and useful concepts from finite-dimensional linear algebra can be extended or generalized to infinite-dimensional spaces. In the initial chapters the theory of infinite-dimensional normed spaces (in particular Hilbert spaces) is developed, while in later chapters the emphasis shifts to studying operators between such spaces. Functional analysis has applications to a vast range of areas of mathematics; the final chapter discusses the two particularly important areas of integral and differential equations.

## *Calcul des variations*

Richard VINTER. — **Optimal control.** — Systems & control: foundations & applications. — Un vol. relié,  $16 \times 24$ , de xv, 507 p. — ISBN 0-8176-4075-4. — Prix: SFr. 138.00. — Birkhäuser, Boston, 2000.

Optimal control emerged as a distinct field of research only in recent decades. It provides a unified perspective of optimization problems, arising in scheduling and the control of engineering devices, that are beyond the reach of traditional analytical and computational techniques. In addition, the field has contributed significant advances to branches of applied mathematics and broad applications in process control, scheduling, robotics, resource economics, and other areas. This book brings together many of the important advances in 'nonsmooth' optimal control over the last two decades concerning necessary conditions, minimizer regularity and global optimality conditions associated with the Hamilton-Jacobi equation. The book's development and analysis is largely self-contained and incorporates many simplifications and unifying features for subjects' key concepts and foundations. This new book is an essential resource for an authoritative and comprehensive presentation of the foundations and applications of nonsmooth optimal control.

## *Géométrie*

Claude-Alain FAURE and Alfred FRÖLICHER. — **Modern projective geometry.** — Mathematics and its applications, vol. 521. — Un vol. relié,  $16,5 \times 24,5$ , de xvii, 363 p. — ISBN 0-7923-6525-9. — Prix: Dfl. 270.00. — Kluwer Academic Publishers, Dordrecht, 2000.

This monograph develops projective geometries and provides a systematic treatment of morphisms. It is unique in that it does not confine itself to isomorphisms. This work introduces a new fundamental theorem and its applications describing homogeneous co-ordinates as morphisms of projective geometries by semilinear maps. Other topics treated include three equivalent definitions of projective geometries and isomorphism theorems, recent results in dimension theory, morphisms and homomorphisms of projective geometries, special morphisms, duality theory, morphisms of affine geometries, polarities, orthogonalities, Hilbertian geometries and propositional systems. The book concludes with a large section of exercises.

Richard HARTLEY, Andrew ZISSERMAN. — **Multiple view geometry in computer vision.** — Un vol. relié,  $18 \times 25$ , de xvi, 607 p. — ISBN 0-521-62304-9. — Prix: £60.00. — Cambridge University Press, Cambridge, 2000.

A basic problem in computer vision is to reconstruct a real world scene given several images of it. This book describes techniques for solving this problem which have been developed from projective geometry and photogrammetry. Recent major developments in the theory and practice

of scene reconstruction and auto-calibration are described in detail in a unified framework. The book covers the geometric principles, their algebraic representation in terms of camera projection matrices, the fundamental matrix and the trifocal tensor. The theory and methods of computation of these entities is discussed with real examples, as is their use in the reconstruction of scenes from multiple images. Comprehensive background material is provided, so a reader familiar with linear algebra and basic numerical methods will be able to understand the projective geometry and estimation algorithms presented, and implement the algorithms directly from the book.

Robin HARTSHORNE. — **Geometry: Euclid and beyond.** — Undergraduate texts in mathematics. — Un vol. relié,  $18 \times 24$ , de xi, 526 p. — ISBN 0-387-98650-2. — Prix : DM 98.00. — Springer, New York, 2000.

The book offers an opportunity to understand the essence of one of the great thinkers of western civilization. A guided reading of Euclid's *Elements* leads to a critical discussion and rigorous modern treatment of Euclid's geometry and its more recent descendants, with complete proofs. Topics include the introduction of coordinates, the theory of area, geometrical constructions and finite field extensions, history of the parallel postulate, the various non-Euclidean geometries, and the regular and semiregular polyhedra. The text is intended for junior- to senior-level mathematics majors.

Patrice TAUVEL. — **Cours de géométrie.** — Agrégation de mathématiques. — CAPES/AGREG. — Un vol. broché,  $17 \times 24$ , de x, 491 p. — ISBN 2-10-004592-X. — Prix : FF 235.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Cet ouvrage traite l'essentiel du programme de géométrie au concours de l'agrégation de mathématiques. Il reprend certains sujets enseignés dans les seconds cycles universitaires et ne suppose aucune connaissance préalable en géométrie. Il peut donc être utilisé avec profit par les étudiants de licence ou de maîtrise de mathématiques. Dans les 31 chapitres de ce livre sont traités : les réseaux, les angles, les espaces affines, la géométrie euclidienne, les coniques, les polyèdres, les espaces projectifs, les courbes et les surfaces. Afin d'être autonome, ce cours intègre également un chapitre traitant de calcul différentiel. Les résultats sont tous accompagnés de leur démonstration.

## ***Géométrie différentielle***

D. BAO, S.-S. CHERN, Z. SHEN. — **An introduction to Riemann-Finsler geometry.** — Graduate texts in mathematics, vol. 200. — Un vol. relié,  $16 \times 24$ , de xx, 431 p. — ISBN 0-387-98948-X. — Prix : DM 98.00. — Springer, New York, 2000.

In Riemannian geometry, measurements are made with both yardstick and protractors. These tools are represented by a family of inner products. In Riemannian-Finsler geometry (or Finsler geometry for short), one is in principle equipped with only a family of Minkowski norms. So yardsticks are assigned, but protractors are not. With such a limited tool kit, it is natural to wonder, just how much geometry one can uncover and describe? It now appears that there is a reasonable answer. Finsler geometry encompasses a solid repertoire of rigidity and comparison theorems, most of them founded upon a fruitful analogue of the sectional curvature. There is also a bewildering array of explicit examples, illustrating many phenomena which admit only Finslerian interpretation. This book focuses on the elementary but essential items among these results.

## ***Topologie algébrique***

Lech GÓRNIOWICZ. — **Topological fixed point theory of multivalued mappings.** — Mathematics and its applications, vol. 495. — Un vol. relié, 16×25, de ix, 399 p. — ISBN 0-7923-6001-X. — Prix: Dfl. 330.00. — Kluwer Academic Publishers; Dordrecht, 1999.

This volume presents a broad introduction to the topological fixed point theory of multivalued (set-valued) mappings, treating both classical concepts as well as modern techniques. Topics covered include the basic theory of set-valued mappings with both convex and nonconvex values, approximation and homological methods in the fixed point theory together with a thorough discussion of various index theories for mappings with a topologically complex structure of values, applications to many fields of mathematics, mathematical economics and related subjects, the fixed point approach to the theory of ordinary differential inclusions.

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

Boris N. APANASOV. — **Conformal geometry of discrete groups and manifolds.** — De Gruyter expositions in mathematics, vol. 32. — Un vol. relié, 17,5×24,5, de XIII, 523 p. — ISBN 3-11-014404-2. — Prix: DM 298.00. — Walter de Gruyter, Berlin, 2000.

This book presents the first systematic account of conformal geometry of  $n$ -manifolds, as well as its Riemannian counterparts. A unifying theme is their discrete holonomy groups. In particular, hyperbolic manifolds, in dimension 3 and higher, are addressed. The treatment covers also relevant topology, algebra (including combinatorial group theory and varieties of group representations), arithmetic issues, and dynamics. Progress in these areas has been very fast over the last two decades, especially due to the Thurston geometrization program, leading to the solution of many difficult problems. A strong effort has been made to point out new connections and perspectives in the field and to illustrate various aspects of the theory. An intuitive approach which emphasizes the ideas behind the constructions is complemented by a large number of examples and figures which both use and support the reader's geometric imagination. The text will be of value to graduate students and researchers in topology, geometry, group representations and theoretical physics.

Eduardo CASAS-ALVERO. — **Singularities of plane curves.** — London Mathematical Society lecture note series, vol. 276. — Un vol. broché, 15×23, de xv, 345 p. — ISBN 0-521-78959-1. — Prix: £29.95. — Cambridge University Press, Cambridge, 2000.

This book provides a comprehensive and self-contained exposition of the algebro-geometric theory of singularities of plane curves, covering both its classical and its modern aspects. The book gives a unified treatment, with complete proofs, presenting modern results which have only ever appeared in research papers. It updates and correctly proves a number of important classical results for which there was formerly no suitable reference, and includes new, previously unpublished results as well as applications to algebra and algebraic geometry.

Erica FLAPAN. — **When topology meets chemistry: a topological look at molecular chirality.** — Outlooks. — Un vol. broché, 15×22,5, de XIII, 241 p. — ISBN 0-521-66482-9 (relié: 0-521-66254-0). — Prix: £16.95 (relié: £45.00). — Mathematical Association of America and Cambridge University Press, Cambridge, 2000.

The applications of topological techniques for understanding molecular structures have become increasingly important over the past thirty years. In this topology text, the reader will learn about knot theory, 3-dimensional manifolds, and the topology of embedded graphs, while

learning the role these play in understanding molecular structures. Most of the results that are described in the text are motivated by questions asked by chemists or molecular biologists, though the results themselves often go beyond answering the original question asked. There is no specific mathematical or chemical prerequisite; all the relevant background is provided. The text is enhanced by nearly 200 illustrations and more than 100 exercises. Reading this fascinating book, undergraduate mathematics students can escape the world of pure abstract theory and enter that of real molecules, while chemists and biologists will find simple, clear but rigorous definitions of mathematical concepts they handle intuitively in their work.

Peter B. GILKEY, John V. LEAHY, Jeonghyeong PARK. — **Spectral geometry, Riemannian submersions and the Gromov-Lawson conjecture.** — Studies in advanced mathematics. — Un vol. broché, 16×34, de 279 p. — ISBN 0-8493-8277-7. — Prix: £53.00. — Chapman & Hall, Boca Raton, 1999.

This text explores the spectral geometry of Riemannian submersions. After providing the necessary background, including discussion of elliptic operators and basic differential geometry, the authors address questions of positive curvature and discuss recent developments in this area. They establish – for the first time in mathematical literature – a link between the spectral geometry of Riemannian submersions and the Gromov-Lawson conjecture. *Features:* provides a background review of differential geometry and elliptic operators; creates a link between the spectral geometry of Riemannian submersions and the Gromov-Lawson conjecture; includes an extensive bibliography; offers surprising results and sets forth unsolved problems.

John M. LEE. — **Introduction to topological manifolds.** — Graduate texts in mathematics, vol. 202. — Un vol. broché, 23,5×15,5, de xvii, 385 p. — ISBN 0-387-95026-5. — Prix: DM 69.00. — Springer, New York, 2000.

This book is an introduction to manifolds at the beginning graduate level. It contains the essential topological ideas that are needed for the further study of manifolds, particularly in the context of differential geometry, algebraic topology, and related fields. Its guiding philosophy is to develop these ideas rigorously but economically, with minimal prerequisites and plenty of geometric intuition. A course on manifolds differs from most other introductory mathematics graduate courses in that the subject matter is often completely unfamiliar. It is even possible to get through an entire undergraduate mathematics education without hearing the word “manifolds”. Yet manifolds are part of the basic vocabulary of modern mathematics, and students need to know them as intimately as they know the integers.

Gregory L. NABER. — **Topology, geometry, and gauge fields: interactions.** — Applied mathematical sciences, vol. 141. — Un vol. relié, 16,5×24,5, de xiii, 443 p. — ISBN 0-387-98947-1. — Prix: DM 139.00. — Springer, New York, 2000.

This book covers topology and geometry beginning with an accessible account of the impact of mathematical physics, especially gauge theory, on the study of the geometry and topology of manifolds. Much of the mathematics developed in the book to study the classical field theories of physics (de Rham cohomology, Chern classes, etc.) is standard, but the treatment always keeps one eye on the physics and unhesitatingly sacrifices generality to clarity. The author concludes with a brief discussion of the Seiberg-Witten invariants. Although this volume can be read independently, Naber carries on the program initiated in his earlier volume, *Topology, Geometry, and Gauge Fields: Foundations* (Springer, 1997), and writes in much the same spirit with precisely the same philosophical motivation.



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

Christoph BANDT, Siegfried GRAPH, Martina ZÄHLE. (Editors). — **Fractal geometry and stochasticity II.** — Progress in probability, vol. 46. — Un vol. relié, 16×24, de x, 292 p. — ISBN 3-7643-6215-4. — Prix: SFr. 98.00. — Birkhäuser, Basel, 2000.

The combination of fractal geometry and stochastic methods can be used to create convincing models in many different areas of science such as biology, chemistry, computer science, mathematics and physics. The present book deals with the mathematical theory needed for this purpose. The book is addressed to mathematicians and scientists who are interested in any of the following topics: fractal dimensions, fractal measures and multifractals, self-similar and self-affine fractals, random fractals, stable processes, ergodic theory and dynamical systems, harmonic analysis and stochastic processes on fractals.

L.C.G. ROGERS, David WILLIAMS. — **Diffusions, Markov processes, and martingales. Vol. 1: Foundations.** — Second edition. — Cambridge Mathematical Library. — Un vol. broché, 15×23, de xvii, 385 p. — ISBN 0-521-77594-9. — Prix: £22.95. — Cambridge University Press, Cambridge, 2000.

The authors' aim is not to present the subject of Brownian motion as a dry part of mathematical analysis, but to convey its real meaning and fascination. The opening, heuristic chapter does just this, and it is followed by a comprehensive and self-contained account of the foundations of the theory of stochastic processes. Chapter III is a lively and readable treatment of the theory of stochastic processes.

L.C.G. ROGERS, David WILLIAMS. — **Diffusions, Markov processes and martingales. Vol. 2: Itô calculus.** — Cambridge mathematical library. — 2<sup>nd</sup> edition. — Un vol. broché, 15×23, de xiii, 480 p. — ISBN 0-521-77593-0. — Prix: £24.95. — Cambridge University Press, Cambridge, 2000.

Now available in paperback, this book has been prepared with readers' needs in mind, remaining a systematic treatment of the subject whilst retaining its vitality. The second volume follows on from the first, concentrating on stochastic integrals, stochastic differential equations, excursion theory, and the general theory of processes. Much effort has gone into making these subjects as accessible as possible by providing many concrete examples that illustrate techniques of calculation, and by treating all topics from the ground up, starting from simple cases. Many of the examples and proofs are new; some important calculational techniques appeared for the first time in this book. Together with Volume 1: *Foundations*, this book helps equip graduate students for research into a subject of great intrinsic interest and wide application in physics, biology, engineering, finance and computer science.

## ***Statistique***

Sampritt CHATTERJEE, Ali S. HADI, Bertram PRICE. — **Regression analysis by example.** — Wiley series in probability and statistics. Texts and references section. — Third edition. — Un vol. relié, 16×24, de xi, 359 p. — ISBN 0-471-31946-5. — Prix: £51.95. — John Wiley, New York, 2000.

This book explains the principles underlying exploratory data analysis, emphasizing data analysis rather than statistical theory. This is not just another edition of the book; it is a major rewriting and reorganization of the previous edition. The new edition is expanded and updated to reflect recent advances in the field, offering in-depth treatment of diagnostic plots, time series regression, multicollinearity, and logic regression. Suitable for anyone with an understanding of

elementary statistics, this third edition illustrates methods of regression analysis, with examples containing the types of irregularities commonly encountered in the real world. Each example isolates one or two techniques themselves, the required assumption, and the evaluated success of each technique. Each of the methods described can be carried out with most currently available statistical software packages.

Maurice COMTE, Joël GADEN. — **Statistiques et probabilités pour les sciences économiques et sociales.** — Collection Major. — Un vol. broché, 17, 5 × 24, de XVIII, 517 p. — ISBN 2-13-049682-2. — Prix: FF 259.00. — Presses universitaires de France, Paris, 2000.

Cet ouvrage couvre la totalité du programme officiel de statistiques et probabilités figurant aux concours interne et externe du CAPES de Sciences économiques et sociales et s'adresse aussi aux étudiants des premiers cycles. Ce manuel, destiné à permettre un travail autonome, se caractérise par trois principes: ne pas séparer les techniques de leur usage, utiliser un minimum de formalisation mathématique et ne considérer aucune notion comme évidente. Les illustrations ou exemples sont traités dans le moindre détail et les nombreux exercices font appel au vécu, en utilisant des données économiques et sociologiques d'usage courant et sont accompagnés d'un corrigé entièrement rédigé.

Jean-Pierre LECOUTRE. — **Statistique et probabilités: travaux dirigés, rappels de cours, questions de réflexion, exercices d'entraînement, annales corrigées.** — Eco Sup, travaux dirigés. — Un vol. broché, 17 × 24, de VI, 209 p. — ISBN 2-10-003998-9. — Prix: FF 118.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

Les ouvrages de la série TD répondent à trois objectifs, apprendre grâce à un résumé de cours, comprendre par l'intermédiaire de questions de réflexion, appliquer par des exercices d'entraînement. Complété par un dernier chapitre entièrement consacré à des sujets d'annales, cet ouvrage couvre en 190 questions et exercices, les bases des statistiques et probabilités: notion de probabilité, variable aléatoire discrète, variable aléatoire continue, couple et vecteurs aléatoires, notions de convergence, estimation ponctuelle, estimation par intervalle de confiance, théorie des tests.

Hardeo SAHAI, Mohammed I. AGEEL. — **The analysis of variance: fixed, random and mixed models.** — Un vol. relié, 16 × 24, de XXXV, 742 p. — ISBN 3-7643-4012-6. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

The book provides a detailed and thorough introduction to fixed, random and mixed effects analysis of variance, covering models, populations, hypotheses and assumptions involved. It presents a comprehensive, logical and systematic treatment of the commonly employed analysis of variance designs, giving a parallel and tandem discussion of fixed, random and mixed effects models. The goal of the book is to bridge the gap between an overly abstract viewpoint and one that underplays the concepts, ideas and essential statistical insights. A balance of both perspectives is needed to use analysis of variance models with an emphasis on intelligent use of applications and methods.

## **Analyse numérique**

Gary D. KNOTT. — **Interpolating cubic splines.** — Progress in computer science and applied logic, vol. 18. — Un vol. relié, 16 × 24, de XII, 244 p. — ISBN 0-8176-4100-9. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2000.

This book emphasizes interpolating splines. Almost always, the cubic polynomial form is treated in depth. Interpolating cubic splines covers a wide variety of explicit approaches to

designing splines for the interpolation of points in the plane by curves, and the interpolation of points in 3-space by surfaces. These splines include various estimated-tangent Hermite splines and double-tangent splines, as well as classical natural splines and geometrically-continuous splines such as beta-splines and nu-splines. A variety of special topics are covered, including monotonic splines, optimal smoothing splines, basis representations, and exact energy-minimizing physical splines. An in-depth review of differential geometry of curves and broad range of exercises, with selected solutions, and complete computer programs for several forms of splines and smoothing splines, make this book useful for a broad audience.

Alfio QUARTERONI, Riccardo SACCO, Fausto SALERI. — **Numerical mathematics.** — Texts in applied mathematics, vol. 37. — Un vol. relié, 16×24, de xx, 654 p. — ISBN 0-387-98959-5. — Prix : DM 98.00. — Springer, Berlin, 2000.

One of the purposes of this book is to provide the mathematical foundations of numerical methods, to analyze their basic theoretical properties (stability, accuracy, and computational complexity) and to demonstrate their performances on examples and counterexamples, which outline their pros and cons. This is done using the MATLAB™ software environment, which is user-friendly and widely adopted. Within any specific class of problems, the most appropriate scientific computing algorithms are reviewed, their theoretical analysis is carried out, and the expected results are verified on a MATLAB™ computer implementation. Every chapter is supplied with examples, exercises, and applications of the discussed theory to the solution of real-life problems.

Alfio QUARTERONI, — **Méthodes numériques pour le calcul scientifique : programmes en MATLAB.** — Collection Iris. — Un vol. broché, 15,5×23,5, de xi, 444p. — ISBN 2-287-59701-8. — Prix : DM 98.00. — Springer, Paris, 2000.

Cet ouvrage présente les méthodes fondamentales du calcul scientifique. Il a pour objectif d'aborder à la fois des aspects théoriques et pratiques. On y trouvera donc aussi bien les propriétés de stabilité, convergence et complexité des méthodes que les questions relatives à leur implémentation. De nombreux programmes, proposés en MATLAB (les sources de ces programmes sont également disponibles sur internet à l'adresse <http://www1.mate.polimi.it/calnum/programs.html>), permettent au lecteur de tester immédiatement les algorithmes étudiés. De plus, diverses applications à des problèmes issus de la physique et des sciences de l'ingénieur illustrent l'utilisation des méthodes numériques dans des cas concrets.

## ***Informatique***

Peter BÜRGISSE. — **Completeness and reduction in algebraic complexity theory.** — Algorithms and computation in mathematics, vol.7. — Un vol. relié, 16×24, de xii, 168 p. — ISBN 3-540-66752-0. — Prix : DM 129.00. — Springer, Berlin, 2000.

The theory of NP-completeness is a cornerstone of computational complexity. This monograph provides a thorough and comprehensive treatment of this concept in the framework of algebraic complexity theory. Many of the results presented are new and published for the first time. Topics include: complete treatment of Valiant's algebraic theory of NP-completeness, interrelations with the classical theory as well as the Blum-Shub-Smale model of computation, questions of structural complexity, fast evaluation of representations of general linear groups, and complexity of immanants. The book can be used at the advanced undergraduate or at the beginning graduate level in either mathematics or computer science.

Kevin R. COOMBES, Brian R. HUNT, Ronald L. LIPSMAN, John E. OSBORN, Garrett J. STUCK. — **Mathematica: cours et applications, 1<sup>re</sup> et 2<sup>e</sup> années toutes filières.** — J'intègre, cours. — Un vol. 17×24, de XIII, 189 p. — ISBN 2-10-004778-7. — Prix: FF 135.00. — Dunod, Paris, 2000, diffusé en Suisse par Havas Services Suisse, Fribourg.

*Mathematica*, le célèbre logiciel de calcul formel, peut tracer des courbes représentatives de fonctions, résoudre des équations, procéder à des études statistiques. Il sait aussi mettre en page et possède un éditeur de texte capable de combiner des calculs mathématiques avec du texte et des graphes pour créer un document complet. Ce document peut même être mis à disposition sur Internet. On trouvera dans ce livre, un cours explicite et illustré, des exercices corrigés d'algèbre et d'analyse pour s'entraîner, un chapitre consacré aux applications concrètes du logiciel en mathématiques, physique, chimie, et cryptographie, un glossaire complet répertoriant commandes, options, fonctions, constantes prédéfinies et packages.

Alain DARTE, Yves ROBERT, Frédéric VIVIEN. — **Scheduling and automatic parallelization.** — Un vol. relié, 18×26, de XVI, 261 p. — ISBN 0-8176-4149-1. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

A new state-of-the-art text which addresses the study of compiler transformations for parallel aspects of sophisticated scheduling problems, task-graph scheduling and loop-nest scheduling. The presentation is self-contained and complete with detailed code for algorithms, proofs and selected exercise sets. The book is essential reading for advanced graduates, postgraduates and professionals in computer science and software engineering who are studying automatic parallelization techniques, program transformations and optimization criteria.

George GRÄTZER. — **Math into LaTeX.** — 3<sup>rd</sup> edition. — Un vol. broché, 19×24, de XXXVIII, 584 p. — ISBN 0-8176-4131-9. — Prix: SFr. 88.00. — Birkhäuser, Boston co-published by Springer, New York, 2000.

*Math into LaTeX* is for the mathematician, physicist, engineer, scientist, or technical typist who needs to learn quickly how to write and typeset articles and books containing mathematical formulas, and requires a thorough reference book on all aspects of LaTeX and the AMS packages, the enhancements to LaTeX by the American Mathematical Society. Key features of Math into LaTeX: a simple, example-based, visual approach; a quick introduction (Part I) allowing readers to type their first articles in only a few hours; sample articles to demonstrate the basic structure of LaTeX and AMS articles; useful appendices containing mathematical and text symbol tables and information on how to convert to standard LaTeX from older versions of LaTeX and AMS-LaTeX. New features of the 3<sup>rd</sup> edition include: coverage of AMS packages, version 2.0; a new chapter on writing books in LaTeX; a new part, Math and the Web covers where to find useful LaTeX-related information on the Internet and how to publish LaTeX documents on the Web.

Jürgen RICHTER-GEERT, Ulrich H. KORTENKAMP. — **User manual for the interactive geometry software Cinderella.** — Un vol. broché, 15,5×23,5, de x, 143 p. — ISBN 3-540-67139-0. — Prix: DM 39.00. — Springer, Berlin, 2000.

*Cinderella* is a program for doing geometry on a computer. In its present form it is the product of a sequel of three projects done between 1993 and 1998. It is based on various mathematical theories ranging from the great discoveries of the geometers in the nineteenth century to newly developed methods that find their first applications in this program. The authors want to point out the major features of this software: Cinderella is a mouse-driven interactive geometry

program... has built-in automatic proving facilities... allows simultaneous manipulation and construction in different views... has “native support” for non-euclidean geometries... has advanced facilities for geometric loci... is “internet-aware” (written in Java)... produces high-quality printouts... is based on mathematical logic.

## ***Mécanique des particules et systèmes***

Nicola BELLOMO, Luigi PREZIOSI, Antonio ROMANO. — **Mechanics and dynamical systems with *Mathematica*®.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16 × 24, de XIII, 417 p. — ISBN 0-8176-4007-X. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This book provides a systematic and unified treatment of mechanics and dynamical systems, addressing modeling, qualitative analysis, and simulations of physical systems using ordinary differential equations. The scientific computational components are presented using the software program *Mathematica*, both in worked examples and in the end-of-chapter problems. Special attention is given to classical mechanics models in light of new computational methods and concepts from dynamical systems. The book's nine chapters are organized into three unified parts: mathematical methods for differential equations; methods of classical mechanics; and dynamics, stochastic models, and discretization of continuous models.

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

Teodor M. ATANACKOVIC, Ardéshir GURAN. — **Theory of elasticity for scientists and engineers.** — Un vol. relié, 16 × 24, de XII, 374 p. — ISBN 3-8176-4072-X. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This new book treats classical elasticity theory from a modern point of view. It is intended as a general introduction to the various branches of elasticity theory and its applications. In the first part of the book, the theory of stress and strain is treated in a standard way. The important feature here is that the nonlinear stress tensor is the basis from which the linearized version is obtained. Next, the standard derivation of the Hooke's law for isotropic elastic and the Duhamel-Neumann law for thermoelastic body is presented. After that various generalizations of the Hooke's law for one-dimensional case are given. The three-dimensional generalizations of the Hooke's law are also discussed and the influence of geometric non-linearity on finite deformations in a linear state of stress is examined. The book contains solutions to numerous problems in two and three dimensions.

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

Carlo CERCIGNANI. — **Rarefied gas dynamics: from basic concepts to actual calculations.** — Cambridge texts in applied mathematics. — Un vol. broché, 15 × 23, de XVIII, 320 p. — ISBN 0-521-65992-2. — Prix: £18.95 (relié: £50.00). — Cambridge University Press, Cambridge, 2000.

The aim of this book is to present the concepts, methods, and applications of kinetic theory to rarefied gas dynamics. After introducing the basic tools, problems in plane geometry are treated using approximation techniques (perturbation and numerical methods). These same techniques are later used to deal with two- and three-dimensional problems. The models include not only monatomic but also polyatomic gases, mixtures, and chemical reactions. A special chapter is devoted to evaporation and condensation phenomena.



Georges-Henri COTTET, Petros D. KOUMOUTSAKOS. — **Vortex methods: theory and practice.** — Un vol. relié, 16×24, de XIII, 313 p. — ISBN 0-521-62186-0. — Prix: £37.50. — Cambridge University Press, Cambridge, 2000.

The goal of this book is to present and analyze vortex methods as a tool for the direct numerical simulation of incompressible viscous flows. In the past two decades research in the numerical analysis aspects of vortex methods has provided a solid mathematical background for understanding the convergence features of the method and several new tools have been developed to generalize its applications. At the same time vortex methods retain their appealing physical character that was the motivation for their introduction. Scientists working in the areas of numerical analysis and fluid mechanics will benefit from this book, which may serve both communities as both a reference monograph and a textbook for computational fluid dynamics courses.

Julian L. DAVIS. — **Mathematics of wave propagation.** — Un vol. relié, 16×24, de xv, 394 p. — ISBN 0-691-02643-5. — Prix: US\$49.50. — Princeton University Press, Princeton, N.J., 2000.

Taking a medium-by-medium approach the author explains the mathematics needed to understand wave propagation in inviscid and viscous fluids, elastic solids, viscoelastic solids, and thermoelastic media, including hyperbolic partial differential equations and characteristics theory, which makes possible geometric solutions to nonlinear wave problems. The result is a clear and unified treatment of wave propagation that makes a diverse body of mathematics accessible to engineers, physicists, and applied mathematicians engaged in research on elasticity, aerodynamics, and fluid mechanics.

Antonio FASANO, (Editor). — **Complex flows in industrial processes.** — Modeling and simulation in science, engineering and technology. — Un vol. relié, 16×24, de x, 338 p. — ISBN 0-8176-4087-8. — Prix: SFr. 138.00. — Birkhäuser, Boston, 2000.

The book contains state-of-the-art surveys for select models and applications that offer the most illustrative use of new model analysis and application. The chapters are organized into three broad categories: flows of nonlinear materials, flows accompanied by thermal processes, and nonlinear flows in porous media. *Topics and features*: polymer viscosity; stability problems in extrusion; modeling of glass problems; pipelining of gases and slurries; polymerization process; thermally induced flows in polymer; composite materials manufacturing; flows through active porous media.

Viktor P. MASLOV, Petr P. MOSOLOV. — **Nonlinear wave equations perturbed by viscous terms.** — De Gruyter expositions in mathematics, vol. 31. — Un vol. relié, 17×24, de x, 329 p. — ISBN 3-11-015282-7. — Prix: DM 298.00. — Walter de Gruyter, Berlin, 2000.

This book deals with mathematical statements of a wide class of problems studied in mechanics. In particular, equations of one-dimensional barotropic gas, the Cauchy problem for equations of viscous compressible fluids, hyperbolic equations with small viscosity, and the theory of elasticity for media with different moduli of elasticity are studied. Admissible discontinuities of solutions are classified, and the problem of interaction of discontinuities is considered. The book is intended for scientists in mathematics and mechanics, as well as for graduate and post-graduate students.

## ***Mécanique quantique***

Rodolfo GAMBINI, Jorge PULLIN. — **Loops, knots, gauge theories and quantum gravity.** — Cambridge monographs on mathematical physics. — Un vol. broché,  $17 \times 25$ , de xvi, 321 p. — ISBN 0-521-47332-2. — Prix: £27.95. — Cambridge University Press, Cambridge, 2000.

This text begins with a detailed review of loop representation theory. It then goes on to describe loop representations in Maxwell theory, Yang-Mills theories as well as lattice techniques. Applications in quantum gravity are then discussed in detail. Following chapters move on to consider knot theories, braid theories and extended loop representations in quantum gravity. A final chapter assesses the current status of the theory and points out possible directions for future research.

Masaki KASHIWARA, Tetsuji MIWA, (Editors). — **Physical combinatorics.** — Progress in mathematics, vol. 191. — Un vol. relié,  $16,5 \times 24$ , de viii, 317 p. — ISBN 0-8176-4175-0. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2000.

This work is concerned with combinatorial aspects arising in the theory of exactly solvable models and representation theory. Recent developments in integrable models reveal an unexpected link between representation theory and statistical mechanics through combinatorics. For example, Young tableaux, which describe the basis of irreducible representations, appear in the Bethe Ansatz method in quantum spin chains as labels for the eigenstates of Hamiltonians. Taking into account the various criss-crossing among mathematical subjects, "Physical Combinatorics" presents new results and exciting ideas from three viewpoints: representation theory, integrable models, and combinatorics. This volume will be of interest to mathematical physicists and graduate students in the above-mentioned fields. Contributors to the volume: T. H. Baker, O. Foda, G. Hatayama, Y. Komori, A. Kuniba, T. Nakanishi, M. Okado, A. Schilling, J. Suzuki, T. Takagi, D. Uglov, O. Warnaar, T.A. Welsh, A. Zabrodin.

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

Jerzy A. FILAR, Vladimir GAITSGORY, Koichi MIZUKAMI, (Editors). — **Advances in dynamic games and applications.** — Annals of the International Society of Dynamical Games, vol. 5. — Un vol. relié,  $16 \times 24$ , de xvii, 459 p. — ISBN 0-8176-4002-9 — Prix: SFr. 188.00. — Birkhäuser, Boston, 2000.

The book focuses on various aspects of dynamic-game theory, providing authoritative, state-of-the-art information and serving as a guide to the vitality of the field and its applications. The chapters are based on presentations at the 7<sup>th</sup> International Symposium on Dynamic Games and Applications held in Kanagawa, Japan. A variety of topics of current interest are presented. *Topics and features:* robust control design and H-infinity; pursuit-evasion games; recent game-theoretic developments; select applications in ecology and environmental science.

## ***Biologie et sciences du comportement***

Jacques ISTAS. — **Introduction aux modélisations mathématiques pour les sciences du vivant.** — Mathématiques & applications, vol. 34. — Un vol. broché,  $15,5 \times 23,5$ , de viii, 160 p. — ISBN 3-540-67254-0. — Prix: DM 60.00. — Springer, Paris, 2000.

Le but de cet ouvrage est de présenter un panorama de différentes méthodes mathématiques utilisées pour la modélisation de phénomènes issus du vivant. Nous avons voulu être le plus

large possible, incluant ainsi à la fois les méthodes déterministes (systèmes dynamiques, théorie des jeux) et les méthodes stochastiques (processus aléatoires, statistiques). Chaque modèle mathématique proposé est accompagné d'un exemple concret éclairant la modélisation retenue.

## ***Systèmes, contrôle optimal***

Fritz COLONIUS, Wolfgang KLIEMANN. — **The dynamics of control.** — With an appendix by Lars Grüne. — Systems & control. — Un vol. relié, 16×24, de XII, 629 p. — ISBN 0-8176-3683-8. — Prix : SFr. 158.00. — Birkhäuser, Boston, 2000.

The book provides a carefully integrated development of the mathematical connections between nonlinear control, dynamical systems and time-varying perturbed systems for scientists and engineers. The central theme is the notion of control flow with its global dynamics and linearization presented in detail. The book's scope is comprehensive and includes the global theory of dynamical systems under time-varying perturbations, global and local dynamics of control systems, connections between control systems and dynamical systems and the relevant numerical methods for global dynamics, linearization and stability. Topics are developed with a diverse and extensive selection of applied problems from control and dynamical systems.

Eugenius KASZKUREWICZ, Amit BHAYA. — **Matrix diagonal stability in systems and computation.** — Un vol. relié, 16×24, de XIV, 267 p. — ISBN 0-8176-4088-6. — Prix : SFr. 138.00. — Birkhäuser, Boston, 2000.

This book addresses the matrix-stability concept and its applications to the analysis and design of several types of dynamical systems, both discrete-time and continuous-time dynamical systems. The comprehensive presentation begins with an introductory chapter surveying applied examples from diverse fields, i.e., robust stability analysis, asynchronous iterative computation, neural networks and variable structure dynamical systems. The next few chapters develop the theory and include a unified presentation of results in the area of matrix-diagonal stability and D-stability. The remaining chapters examine the various applications in greater detail. Both classical and new results are discussed, and the overall treatment is self contained, only requiring a knowledge of linear algebra, difference equations, and differential equations.

William G. LITVINOV. — **Optimization in elliptic problems with applications to mechanics of deformable bodies and fluid mechanics.** — Operator theory, vol. 119. — Un vol. relié, de 16×24, de XVII, 522 p. — ISBN 3-7643-6199-9. — Prix : SFr. 198.00. — Birkhäuser, Basel, 2000.

This book is unique in that it presents a profound mathematical analysis of general optimization problems for elliptic systems, which are then applied to a great number of optimization problems in mechanics and technology. After the setting of a problem, attention is focused on existence theorems that lead to the construction of approximate solutions. The coefficients of the equations, the shape of the domain, and the right-hand sides of the equations are considered to be controls. Applications include optimization problems arising in mechanics of elastic solids, plates, shells, composite materials and structures fabricated with them, as well as fluid mechanics.

Alexey S. MATVEEV, Andrey V. SAVKIN. — **Qualitative theory of hybrid dynamical systems.** — Control engineering. — Un vol. relié, 16×24, de X, 348 p. — ISBN 0-8176-4141-6. — Prix : SFr. 128.00. — Birkhäuser, Boston, 2000.

This book provides a thorough development and systematic presentation of the foundations and framework for hybrid dynamical systems. The presentation offers an accessible, but precise,

development of the mathematical models, heuristic algorithms and stability criteria. The book largely concentrates on the case of discretely controlled continuous-time systems and their relevance for modeling aspects of flexible manufacturing systems and dynamically routed queuing networks. It is an excellent resource for the study and analysis of hybrid dynamical systems used in systems and control engineering.

### *Information, communication, circuits*

J.W. KAY and D.M. TITTERINGTON, (Editors). — **Statistics and neural networks: advances at the interface.** — Un vol. relié. 16×24, de xvii, 260 p. — ISBN 0-19-852422-8. — Prix: £40.00. — Oxford University Press. Oxford, 1999.

There is now a growing awareness of the interface between statistical research and recent advances in neural computing and artificial neural networks. This book covers various aspects of current work in the area, drawing together contributions from authors who are leading researchers in the two fields. Topics covered include: nonlinear approaches to discriminant analysis; information-theoretic neural networks for unsupervised learning; radial basis function networks; techniques for optimizing predictions; approaches to the analysis of latent structure, including probabilistic principal component analysis, density networks and the use of multiple latent variables; and a substantial chapter outlining techniques and their application in industrial case-studies.