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## BULLETIN BIBLIOGRAPHIQUE

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**General topology and applications. Proceedings of the 1988 Northeast Conference.** — Ed. by R.M. Shortt. — Lecture notes in pure and applied mathematics, vol. 123. — Un vol. broché, 18 × 25,5 de xiv, 291 p. — Prix: US\$99.75 (U.S. et Canada)/US\$119.50 (ailleurs). — Marcel Dekker, New York, 1990.

This book comprises papers from the 1988 Northeast Conference on General Topology and Applications held at Wesleyan University, Middletown, Connecticut. The Conference, held in honor of Melvin Henriksen, brought together over 70 distinguished mathematicians from the United States, Canada, Mexico and the Netherlands to present the latest developments in the field. Examining results on a wide range of research topics, this work focuses on the theory and applications of general topology, locale and category theory, and universal and topological algebra, including information on rings of continuous functions, topological groups and semi-groups, cardinal invariants, locales, lattice-ordered algebra and more.

Piotr BILER, Alfred WITKOWSKI. — **Problems in mathematical analysis.** — Pure and applied mathematics, vol. 132. — Un vol. relié, 16 × 23,5, de v, 227 p. — Marcel Dekker, Inc., New York, 1990.

From the preface: "This volume offers an unusual collection of problems in mathematical analysis. First, most are neither standard nor easy. Second, readers will find here both the classical topics (so classical that they are even forgotten!) and the modern ones. Third, there are also original problems on an advanced level that may lead readers to their own research projects. Some of the problems suggest new proofs of well-known theorems. They are given here to attract the readers' attention to the original and/or elegant method of proof..."

**Asymptotic and computational analysis : conference in honor of Frank W. J. Olver's 65th birthday.** — Edited by R. Wong. — Lecture notes in pure and applied mathematics, vol. 124. — Un vol. broché, 18 × 25,5, de xii, 755 p. — Prix: US\$115.00 (U.S. et Canada), US\$138.00 (Tout autre pays). — Marcel Dekker, Inc., New York, 1990.

Prof. Olver is credited with numerous contributions to the areas of asymptotics, numerical analysis, and special functions, including an algorithm for second-order recurrence relations, the computation of zeros of second-order differential equations, and estimates of remainders in asymptotic expansions. There are a total of 39 papers in these proceedings. Their topics cover the fields of special functions, asymptotics of integrals, asymptotic solutions to differential equations, numerical analysis, singular perturbations and linear difference equations.

D. HILBERT, E. SCHMIDT. — **Integralgleichungen und Gleichungen mit unendlich vielen Unbekannten.** — Hrsg. und mit einem Nachwort versehen von A. Pietsch. — Teubner-Archiv



zur Mathematik, Bd. 11. — Un vol. broché,  $14,5 \times 21,5$  de 316 p. — Prix: DM 48.00. B.G. Teubner, Leipzig, 1989.

Dieser Band enthält fotomechanische Nachdrucke der entscheidenden Originalarbeiten über „Lineare Integralgleichungen und Gleichungen mit unendlich vielen Unbekannten“, die David Hilbert und sein Schüler Erhard Schmidt in der Zeit von 1904 bis 1910 publiziert haben. Ein von Albrecht Pietsch verfasstes Nachwort würdigt diese Leistungen, die ein Meilenstein in der Geschichte der linearen Funktionalanalysis waren. Anhand einiger wichtiger Beispiele wird der Einfluss der klassischen Resultate und Methoden auf die Entwicklung moderne Theorie beschrieben.

Jean-Pierre FLORENS, Michel MOUCHART, Jean-Marie ROLIN. — **Elements of Bayesian statistics.** — Pure and applied mathematics, a series of monographs and textbooks, vol. 134. — Un vol. relié,  $16 \times 23,5$  de XXXI, 499 p. — Prix: US\$99.75 (USA et Canada)/US\$119.50 (ailleurs). — Marcel Dekker, New York, 1990.

This reference/text focuses on the theory of reduction of a Bayesian experiment considered as a (unique) probability measure on a product space (parameter space  $\times$  sample space). Treating the basic model and its essential properties, it examines sufficiency, including its applications to identification and to comparison of models, as well as ancillarity, with its application to exogeneity. In addition, this book details three developments of the basic model, features examples illustrating the essential properties of the most important statistical models, etc.

Hebe BIAGIONI. — **A nonlinear theory of generalized functions.** — Lecture notes in mathematics, vol. 1421. — Un vol. broché,  $16,5 \times 24$ , de XII, 214 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

This book provides a simple introduction to a nonlinear theory of generalized functions introduced by J.F. Colombeau, which gives a meaning to any multiplication of distributions. This theory extends from pure mathematics to physics, passing through the theory of partial differential equations both from the theoretical and the numerical viewpoint. This text presents basic concepts and results which until now were only published in article form.

Stanley O. KOCHMAN. — **Stable homotopy groups of spheres : a computer-assisted approach.** — Lecture notes in mathematics, vol. 1423. — Un vol. broché,  $16,5 \times 24$  de VIII, 330 p. — Prix: DM 53.00. — Springer-Verlag, Berlin, 1990.

A central problem in algebraic topology is the calculation of the values of the stable homotopy groups of spheres. In this book, a new method for this is developed based upon the analysis of the Atiyah-Hirzebruch spectral sequence. After the tools for this analysis are developed, these methods are applied to compute inductively the first 64 stable stems, a substantial improvement over the previously known 45. Much of this computation is algorithmic and is done by computer. As an application, an element of degree 62 of Kervaire invariant is shown to have order two.

**Complex geometry and analysis.** — Proceedings of the International Symposium in honour of Edoardo Vesentini held in Pisa (Italy), May 23-27, 1988. — Ed. by V. Villani. — Lecture notes in mathematics, vol. 1422. — Un vol. broché,  $16,5 \times 24$ , de V, 109 p. — Prix: DM 25.00. — Springer-Verlag, Berlin, 1990.

This symposium was organized on the occasion of the 60th birthday of Edoardo Vesentini. The aim of the lectures was to describe the present situation, the recent developments and

research trends for several relevant topics in the field. The contributions are by distinguished mathematicians who have actively collaborated with the mathematical school in Pisa over the past thirty years.

**Real analytic and algebraic geometry.** — Proceedings of the conference held in Trento, Italy, October 3-7, 1988. — Ed. by M. Galbiati, A. Tognoli. — Lecture notes in mathematics, vol. 1420. — Un vol. broché,  $16,5 \times 24$ , de iv, 366 p. — Prix: DM 61.00. — Springer-Verlag, Berlin, 1990.

The collection of papers in this volume focuses on many interesting problems of current research in the different, but strictly related, topics of analytical, topological, algebraic, and computational approaches to real geometry. Papers are by: J. Bochnak/W. Kucharz, L. Bröcker, E. Bujalance/A.F. Costa/J.M. Gamboa, M. Coste, J.P. Francoise/R. Silhol, D. Gondard-Cozette, M. Shiota, J.-C. Tougeron.

Peter KLEIDMAN, Martin LIEBECK. — **The subgroup structure of the finite classical groups.** — London Mathematical Society lecture note series, vol. 129. — Un vol. broché,  $15 \times 23$ , de x, 303 p. — Prix: £17.50/US\$29.95. — Cambridge University Press, Cambridge, 1990.

With the classification of the finite simple groups complete, much work over the last few years has gone into the study of maximal subgroups of almost simple groups. In this volume the authors investigate the maximal subgroups of the finite classical groups and present the current state of research into these groups as well as proving many new results. In particular, the authors develop a unified treatment of the theory of the “geometric subgroups” of the classical groups, introduced by Aschbacher and they answer the questions of maximality and conjugacy and obtain the precise shapes of these groups.

George CASPER, Mizan RAHMAN. — **Basic hypergeometric series.** — Encyclopedia of mathematics and its applications, vol. 35. — Un vol. relié,  $16 \times 24$ , de xx, 287 p. — Prix: £35.00/US\$59.50. — Cambridge University Press, Cambridge, 1990.

The theory of basic hypergeometric series was initiated over two hundred years ago, and saw much development from then to the middle of this century. Recently, it has found much application in areas as diverse as combinatorics, orthogonal polynomials, number theory and modular forms, group representation theory, Lie algebras, probability and statistics, and theoretical physics, due to the resurgence in interest following the work of Askey and Andrews and their collaborators.

Jean-Marie ARNAUDIES, Henri FRAYSSE. — **Cours de mathématiques, 4 : Algèbre bilinéaire et géométrie.** — Un vol. relié,  $16,5 \times 25$  de ix, 541 p. — Dunod, Paris, 1990.

Ce dernier volume du «Cours de mathématiques» développe les notions de base de l’algèbre bilinéaire et de la géométrie, notions indispensables pour tous ceux qui préparent les concours d’entrée aux grandes écoles ou qui souhaitent entreprendre des études scientifiques à dominante mathématique.

Günther WINDISCH. — **M-matrices in numerical analysis.** — Teubner-Texte zur Mathematik, Band 115. — Un vol. broché,  $14,5 \times 20,5$  de 140 p. — Prix: DM 17.50. — B.G. Teubner, Leipzig, 1989.

In the opening part this book gives a general survey of the theory of  $M$ -matrices, and in its main part, establishes a fairly close relationship between nonsingular  $M$ -matrices and discretization methods for second-order linear elliptic and parabolic problems. This approach applies

to inverse-monotonicity, nonnegativity and monotonicity of solutions, maximum principles and conservation laws. It is shown how such properties carry over from continuous problems into their discrete approximations via nonsingular  $M$ -matrices, arising in the application of finite difference methods, finite element methods or the method of lines.

A.C. BAJPAI, I.M. CALU, J.A. FAIRLEY. — **Mathematics for engineers and scientists : a students' course book. Vol.1.** — Revised edition. — Un vol. broché,  $17 \times 24,5$ , de 712 p. — Prix: £14.95. — John Wiley, Chichester, 1990.

This book provides a basic course in the mathematics required by science engineering students. Many applications from these fields are included. The development of the subject progresses with the student proceeding at his or her own pace, with or without supervision. In this revised edition changes have been made resulting from the authors' own experience and that of others in the use of the book. A greater number of examples have been provided, revision examples are set at the end of each unit.

**Handbook of applicable mathematics. Supplement.** — Ed. by W. Ledermann, E. Lloyd, S. Vajda and C. Alexander. — Un vol. relié,  $17,5 \times 25$ , de XIX, 479 p. — Prix: £52.50. — John Wiley, Chichester, 1990.

This supplement to the Handbook contains mathematical topics with recent applications in industry, engineering and applied sciences and includes areas of mathematics which have recently found application. All the topics discussed are applicable in some area of contemporary interest to the concerns of readers of the Handbook. As in the Handbook volumes, the mathematics is presented independently of its potential and actual applications, relying on a comprehensive cross-referencing system to provide the connections with important applications and with other parts of mathematics.

KONRAD SCHMUEDEGEN. — **Unbounded operator algebras and representation theory.** — Operator theory : advances and applications, vol. 37. — Un vol. relié,  $17 \times 24$ , de 380 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1990.

The monograph provides a unified and comprehensive treatment of  $*$ -algebras of unbounded operators acting on a dense invariant linear subspace of a Hilbert space ( $O^*$ -algebras) and of (unbounded)  $*$ -representations of general  $*$ -algebras. Important notions and basic results of the theory are developed. The graph topology, topologies on  $O^*$ -algebras, the generalized Calkin algebra, commutants of  $O^*$ -algebras and  $*$ -representations, completely strongly positive mappings and the decomposition theory of states and  $*$ -representations are studied in detail.

Paul BAMBERG, Shlomo STERNBERG. — **A course in mathematics for students of physics. Vol. 2.** — Un vol. relié,  $18 \times 25$  de XVII, p. 407-850. — Prix: £60.00/US\$ 54.50. — Cambridge University Press, Cambridge, 1990.

This textbook has been developed from a course at Harvard University over the last decade. The course covers principally the theory and physical applications of linear algebra, and of the calculus of several variables, particularly the exterior calculus. The authors adopt the "spiral method" of teaching, covering the same topic several times at increasing levels of sophistication and range of application. Thus the student develops a deep intuitive understanding of the subject as a whole and an appreciation of the natural progression of ideas.

A.T. FOMENKO. — **Variational principles of topology : multidimensional minimal surface theory.** — Mathematics and its applications (Soviet series), vol. 42. — Un vol. relié, 16,5 × 24,5 de XVIII, 374 p. — Prix: Dfl. 260.00/US\$ 133.00/£86.00. — Kluwer, Dordrecht, 1990.

The modern theory of the multidimensional calculus of variations is a powerful method for studying specific mathematical and physical problems. This volume presents some major results and introduces new important methods obtained by the author. In this volume, the solution of the Plateau problem in the class of all manifolds with fixed boundary is given in detail, and it is shown that the method of solution employed by the author reveals an extensive series of globally minimal surfaces in Riemannian manifolds. The book also contains new methods and results yielding a complete classification of totally geodesic (strongly harmonic) topologically — nontrivial submanifolds in compact symmetric spaces. In addition, many unexpected and fundamental relations are indicated between the properties of harmonic mappings of Riemannian manifolds and their topological properties.

Paul TURÁN. — **Collected papers of Paul Turán.** — Edited by Paul Erdős. — 3 vol. reliés, 17 × 24,5, de XXXVIII, 2665 p l'ensemble. — Prix: US\$ 199.00 l'ensemble des 3 vol. — «Akadémiai Kiadó», Budapest, 1990.

The 3 volumes contain 246 publications and represent the sum of P. TURÁN's scientific work. They are preceded by a short biography, "Personal reminiscences of the work of Paul Turán" by Paul Erdős, "Letter to Professor Paul Turán" by Gabor Halász, a list of publications by P. Turán, a list of papers according to topics, a list of publications dealing with P. Turán's work, a list of translators, and an index to coauthors. Only seven papers written to very specific audience were omitted from these collected papers. English translations of the papers published only in Hungarian are included. Turán did outstanding pioneering work in various branches of mathematics: in number theory, function theory, interpolation and approximation theory, polynomials, differential equations, numerical algebra, group theory and graph theory. Probably the power sum method and its applications are the most important and original result of Turán's work. Turán had the remarkable ability to initiate new and fruitful directions of research in various branches of mathematics, in which he sometimes had only a passing interest.

**Number theory: vol.1, Elementary and analytic/vol. 2, Diophantine and algebraic.** — Edited by K. Györy and G. Halász. — Colloquia mathematica societatis János Bolyai, vol. 51. — Deux vol. reliés, 17,5 × 24,5, de 1072 p. en tout. — Prix: US\$ 179.50/Dfl. 350.00. — North-Holland Publishing Company, Amsterdam, 1990.

This two-volume set gives a comprehensive picture of current research in number theory. The topics include: elementary number theory, sequences of integers, additive and multiplicative number theory, exponential and character sums, zeta and L-functions, uniform distribution, diophantine approximation, geometry of numbers, transcendental numbers, polynomials, finite fields, algebraic number theory, arithmetic algebraic geometry, computational number theory.

Herbert FLEISCHNER. — **Eulerian graphs and related topics, part 1, volume 1.** — Annals of discrete mathematics, vol. 45. — Un vol. relié, 17,5 × 24,5, de 402 p. — Prix: US\$ 94.75/Dfl. 185.00. — North-Holland, Amsterdam, 1990.

This monograph should appeal to both researchers and students. It contains enough material for an undergraduate or graduate graph theory course which emphasizes eulerian graphs. But it is also of interest to researchers because it contains many recent results, some of

which are only partial solutions to (as yet unsolved) more general problems. A number of conjectures, various problems (such as finding eulerian trails) have been included as well.

Paul C. EKLOF, Alan H. MEKLER. — **Almost free modules : set theoretic methods.** — North-Holland mathematical library, vol. 46. — Un vol. relié,  $16 \times 23$ , de xvi, 482 p. — Prix: US\$115.50/Dfl. 225.00. — North-Holland, Amsterdam, 1990.

This is an extended treatment of the set-theoretic techniques which have transformed the study of abelian group and module theory over the last 15 years. Part of the book is new work which does not appear elsewhere in any form. In addition, a large body of material which has appeared previously has been extensively reworked and in many cases given new and improved proofs. The set theory required is carefully developed with algebraists in mind and the independence results are derived from explicitly stated axioms.

S.H. MOHAMED and Bruno J. MÜLLER. — **Continuous and discrete modules.** — London Mathematical Society lecture note series, vol. 147. — Un vol. broché,  $15 \times 22,5$ , de 126 p. — Prix: £12.50/US\$22.95. — Cambridge University Press, Cambridge, 1990.

Continuous and discrete modules are, essentially, generalizations of injective and projective modules respectively. Continuous modules provide an appropriate setting for decomposition theory of von Neumann algebras and have important applications to  $C^*$ -algebras. Discrete modules constitute a dual concept and are related to number theory and algebraic geometry: they possess perfect decomposition properties. The advantage of both types of modules is that the Krull-Schmidt theorem can be applied, in part, to them.

D.L. JOHNSON. — **Presentations of groups.** — London Mathematical Society student texts, vol. 15. — Un vol. broché,  $15 \times 22,5$ , de 204 p. — Prix: £9.95/US\$16.95. — Cambridge University Press, Cambridge, 1990.

This work, which has evolved from courses given to advanced undergraduate and first year graduate students of mathematics, is primarily an introduction to combinatorial group theory. It has the secondary aim of introducing a wide variety of examples of groups and types of groups. The emphasis is algebraic rather than topological. This book is a greatly revised version of "Topics in the theory of group presentations" (1980).

B.A. DAVEY, H.A. PRIESTLEY. — **Introduction to lattices and order.** — Un vol. broché,  $15 \times 22,5$ , de viii, 248 p. — Prix: £9.95/US\$18.95. — Cambridge University Press, Cambridge, 1990.

This is the first introductory textbook on ordered sets and lattices, and covers both the basic theory and its applications. The book is divided into eleven chapters on: ordered sets, lattices and complete lattices, CPOs, algebraic lattices and domains, fixpoint theorems, lattices as algebraic structures, modular and distributive lattices, Boolean algebras and their applications, representation theory: the finite case, ideals and filters, representation theory: the general case, formal concept analysis.

Ian RICHARDS, Heekyung YOUN. — **Theory of distributions : a non- technical introduction.** — Un vol. relié,  $16 \times 24$ , de ix, 147 p. — Prix: £20.00/US\$39.50. — Cambridge University Press, Cambridge, 1990.

The authors have introduced the subject in a way that will most appeal to non-specialists, yet is still mathematically correct. Topics covered include the Dirac delta function, generalized functions, dipoles, quadrupoles, pseudofunctions and Fourier transforms of generalized



functions. All this is done without requiring of the reader any knowledge of functional analysis or topological vector spaces.

Jean-Marie MONIER. — **Analyse. Tome 1: 800 exercices résolus et 18 sujets d'étude.** — Dunod Université. — Un vol. broché,  $17,5 \times 25,5$  de 303 p. — Dunod, Paris, 1990.

Ce recueil d'exercices et de sujets d'étude, avec leurs solutions, porte sur les nombres réels, les nombres complexes, les suites, les fonctions, la dérivation et l'intégration. Il couvre ainsi la plus grande partie du programme d'analyse de 1ère année d'enseignement supérieur mathématique. La première partie comporte les énoncés, dont la difficulté est graduée, ainsi que des sujets d'étude. Ces derniers exercices ne sont pas des problèmes de concours mais des «ouvertures» qui viennent éclairer et compléter le cours magistral. La deuxième partie donne les indications de résolution ainsi que toutes les réponses aux questions posées. Ce ne sont pas des corrigés mais plutôt des jalons destinés à guider le lecteur vers la bonne réponse.

L. DETTWILLER. — **Qu'est-ce que l'optique géométrique? Fondements et applications.** — Dunod Université. — Un vol. broché,  $17,5 \times 25,5$  de 142 p. — Dunod, Paris, 1990.

Dans cet ouvrage qui est un livre de synthèse et d'approfondissement, l'auteur offre une vision globale de l'optique géométrique. Il en expose les fondements, en montre les richesses et les limites ainsi que les applications modernes ou naturelles. Cet exposé pédagogique permet ainsi de mieux comprendre les phénomènes naturels (mirages, scintillation colorée des étoiles, arc en ciel, halos) aussi bien que les résultats de recherches (influence du spin du photon sur la propagation, compréhension des mécanismes d'absorption) ou les conquêtes nouvelles de la technologie (télécommunications et optiques à fibres, optique intégrée, etc.).

Daaki MIYAMOTO. — **Fuzzy sets in information retrieval and cluster analysis.** — Theory and decision library, series D : System theory, knowledge engineering and problem solving, vol. 4. — Un vol. relié,  $16,5 \times 24,5$  de x, 259 p. — Prix: Dfl. 175.00/US\$99.00. — Kluwer, Dordrecht, 1990.

This monograph develops methods of information retrieval and hierarchical cluster analysis based on fuzzy set theory, thereby establishing a solid link between these fields. The link consists of mathematical models for formulating and solving problems in these applications. The way mathematical models are posed in this book is somewhat different from that adhered to in current methodological studies in information retrieval and clustering, although the fuzzy set models will cast new light on previous models in these fields.

**Progress in fuzzy sets and fuzzy systems.** — Ed. by Wolfgang H. Janko, Marc Roubens and H.-J. Zimmermann. — Theory and decision library, series D : Systems theory, knowledge engineering and problem solving, vol. 5. — Un vol. relié,  $16,5 \times 25,5$  de ix, 188 p. — Prix: Dfl. 150.00/US\$87.00. — Kluwer, Dordrecht, 1990.

This volume contains selected contributions to the 2nd Joint IFSA-EC (International Fuzzy Systems Association-European Chapter) EURO-WG (Working Group on Fuzzy Sets of the Association of European Operational Research Societies) workshop on "Progress in Fuzzy Sets in Europe" held in Vienna in 1988. The main emphasis in selecting the papers was on practical and theoretical relevance concerning the application and the development of this field of science. The reader, therefore, will find both types of contributions in the book.

S. Neil RASBAND. — **Chaotic dynamics of nonlinear systems.** — Un vol. relié,  $16 \times 24$ , de x, 230 p. — Prix: £32.15. — John Wiley, New York, 1990.

The scientific community has recently witnessed the birth of a new paradigm for understanding complex and seemingly unpredictable phenomena. This new paradigm is referred to as “chaos” theory and embodies an approach and a set of methods to deal with the complex behavior found in many physical systems. Indeed, the enthusiasm that has developed for the study of chaos is a result of the broad extent of its applications. This book differs from the few others on the subject in that the ideas are presented in their simplest form and yet developed to sufficient depth that actual computations can be made by a reader on a PC or programmable calculator.

Judith ROITMAN. — **Introduction to modern set theory.** — Pure and applied mathematics. — Un vol. relié,  $16 \times 24$ , de XIII, 156 p. — Prix: £32.15. — John Wiley, New York, 1990.

This book is designed for a one-semester course in set theory at the advanced undergraduate or beginning graduate level. It is aimed at two audiences, students who are interested in studying set theory for its own sake and students in other areas who may be curious about applications of set theory to their field. In particular, the author is concerned with developing the intuitions that lie behind modern, as well as classical, set theory, and with connecting set theory with the rest of mathematics.

Judita COFMAN. — **What to solve? Problems and suggestions for young mathematicians.** — Oxford science publications. — Un vol. broché,  $15,5 \times 23,5$  de XIII, 250 p. — Prix: £12.50 (broché)/£35.00 (relié). — Clarendon Press, Oxford, 1990.

Solving mathematical problems is a favourite pastime of many people, from school students to professional research mathematicians. The aim of this book is to provide a wide variety of problems suitable for teen-agers and students which will stimulate interest in mathematical ideas and methods outside the usual school syllabus.

C.C. CHANG, H.J. KEISLER. — **Model theory.** — Studies in the foundations of mathematics, vol. 73. — 3rd edition. — Un vol. relié,  $15,5 \times 23$  de XVI, 650 p. — Prix: US\$118.00/Dfl. 230.00. — North-Holland, Amsterdam, 1990.

Since the second edition of this book (1977), Model Theory has changed radically, and is now concerned with fields such as classification (or stability) theory, nonstandard analysis, model-theoretic algebra, recursive model theory, abstract model theory, and model theories for a host of nonfirst order logics. Model theoretic methods have also had a major impact on set theory, recursion theory, and proof theory. This new edition has been updated to take account of these changes, while preserving its usefulness as a first textbook in model theory. Whole new sections have been added, as well as new exercises and references. A number of updates, improvements and corrections have been made to the main text.

**General algebra 1988.** — Proceedings of the international conference held in memory of Wilfried Nöbauer, Krems, Austria, August 21-27, 1988. — Ed. by Rainer Mlitz. — Un vol. relié,  $17 \times 24,5$  de 265 p. — Prix: US\$84.50/Dfl. 165.00. — North-Holland, Amsterdam, 1990.

At the beginning of 1988, the Austrian mathematical community was preparing to celebrate the 60th birthday of one of its outstanding members, W. Nöbauer, professor at Vienna Technical University. An international conference on general algebra was planned to celebrate this jubilee. However, Professor Nöbauer's untimely death, just 6 months before the conference, turned the conference into a memorial event. Eighty-three algebraists from 21 countries

met in Krems to present and discuss their work. This volume reflects the research being carried out in various branches of algebra throughout the world.

**Qualitative theory of differential equations.** Ed. by B. Sz.- Nagy and L. Hatvani. — Colloquia mathematica societatis Janos Bolyai, vol. 53. — Un vol. relié,  $17,5 \times 24,5$  de 683 p. — Prix: US\$ 166.75/Dfl. 325.00. — North-Holland, Amsterdam, 1990.

This volume contains expounded versions of the lectures given at the recent Colloquium. The papers are mostly devoted to the study of asymptotic properties of (and stability problems relating to) solutions of ordinary and functional differential equations. Also featured is the new approach to nonlinear differential equations, using the method of abstract dynamical systems. Papers concerned with applications in mechanics, physics, biology, and control, may also be found.

Vagn Lundsgaard HANSEN. — **Braids and coverings: selected topics.** — London Mathematical Society student texts, vol. 18. — Un vol. broché,  $15 \times 22,5$  de x, 191 p. — Prix: £27.50 (relié)/£10.95 (broché). — Cambridge University Press, 1989

This book is based on lectures given at the University of Maryland, College Park, and assumes only basic knowledge of algebraic topology. The first chapter covers classical material on the Artin braid groups and the spaces related to them. The second chapter is an introduction to braids as a tool in the study of knots and links. The final 2 chapters are devoted to a study of the finite covering spaces, which arise as solution sets to continuous families of complex polynomials without multiple roots.

I.M. JAMES. — **Introduction to uniform spaces.** — London Mathematical Society lecture note series, vol. 144. — Un vol. broché,  $15 \times 22,5$  de 148 p. — Prix: £13.95/US\$24.95. — Cambridge University Press, Cambridge, 1990.

Although much has been published about uniform spaces over the past 50 years, this is the first introductory book on the subject. It is based on a course taught recently to undergraduate and graduate students at Oxford. The basic theory, which includes metric spaces and topological groups, will be of interest to non-specialists, but there are also many new results which should interest the specialist in general topology as well.

Gregory KARPILOVSKY. — **Symmetric and G-algebras, with applications to group representations.** — Mathematics and its applications, vol. 60. — Un vol. relié,  $16,5 \times 24,5$  de xvi, 368 p. — Prix: Dfl. 195.00/US\$99.00/£69.00. — Kluwer Academic Publishers, Dordrecht, 1990.

Much of group representation theory may be recovered from important results relating to symmetric and  $G$ -algebras. This volume presents the most important features of these developments and provides a comprehensive account of the current status of the subject. The early chapters convey an understanding of the basic structure of the theory, and at successive stages new concepts and tools are introduced.

Dijen RAY-CHAUDHURI. — **Coding theory and design theory, Part 1: Coding theory, Part 2: Design theory.** — IMA volumes in mathematics and its applications, vol. 20-21. — Deux vol. reliés,  $16 \times 24$ , de xiv, 239 p. et de xiii, 378 p., respectivement. — Prix: DM 58.00 pour la partie 1, et DM 78.00 pour la partie 2. — Springer-Verlag, New York, 1990.



These books are based on the proceedings of a workshop which was an integral part of the 1987-88 IMA program on Applied Combinatorics. Coding theory and design theory are areas of combinatorics which found rich applications of algebraic structures and are closely interconnected. Coding theory has developed into a rich example of abstract sophisticated mathematics being applied successfully to solve real-life problems of communication.

Glen McPHERSON. — **Statistics in scientific investigation: its basis, application and interpretation.** — Springer texts in statistics. — Un livre relié, 16 × 24, de xxvi, 666 p. — Prix: DM 98.00. — Springer-Verlag, New York, 1990.

This book explains the role of statistics in scientific investigations and gives detailed instructions on the selection and application of statistical methods. It takes account of the fact that comprehensive statistical packages are now widely available to scientists. Rather than placing emphasis on computational aspects, the aim is to provide a self-sufficiency in method selection and application.

**Finite geometries, buildings, and related topics.** — Ed. by W.M. Kantor, R.A. Liebler, S.E. Payne, E.S. Shult. — Oxford science publications. — Un vol. relié, 16 × 24, de xii, 159 p. — Prix: £20.00. — Clarendon Press, Oxford, 1990.

The July 17-23, 1988 Conference on Buildings and Related Geometries that took place at Pingree Park, Colorado, brought together experts and interested mathematicians from around the world. The contributions to these proceedings have been ordered so as to begin with an introduction to various aspects of the theory, followed by papers gradually spreading out to more wide ranging areas of geometry. In addition to the invited papers, work by Jacques Tits is included as he was unable to be present at the conference.

**Algebraic number theory.** — Proceedings of an instructional conference organized by the London Mathematical Society (a NATO Advanced Study Institute) with the support of the International Mathematical Union. — Ed. by J.W.S. Cassels and A. Fröhlich. — Un vol. broché, 15 × 23, de xviii, 366 p. — Prix: £19.00. — Academic Press, London, 1990.

Cet ouvrage est une reproduction de l'ouvrage paru en 1967, comprenant les comptes-rendus du congrès tenu à l'Université de Sussex, à Brighton, du 1<sup>er</sup> au 17 septembre, 1965, ainsi que la thèse de J.T. Tate, plus des exercices compilés par J.T. Tate avec l'aide de J.P. Serre.

**Proceedings of the third European Conference on Mathematics in Industry, August 28-31, 1988 Glasgow.** — Edited by John Manley, Sean McKee and David Owens. — European Consortium for Mathematics in Industry (ECMI), vol. 5. — Un vol. relié, 17 × 25, de xii, 564 p. — Prix: Dfl. 220.00/US\$127.00/£81.00. — B.G. Teubner, Stuttgart, and Kluwer Academic Publishers, Dordrecht, 1990.

These proceedings contain a wide selection of mathematical techniques for industrial problem solving. These range from nonlinear Maxwell equations and semiconductor modelling to supercomputing and computer tomography, and from simulated annealing and domain decomposition to the optimisation of chemical plants through to a discourse on the nature and philosophy of industrial mathematics itself. The studies presented here are the most part real examples drawn from the interaction of mathematics with industry emphasising the problem solving aspects of the work.

Kichoon YANG. — **Complete and compact minimal surfaces.** — Mathematics and its applications, vol. 54. — Un vol. relié,  $17 \times 24,5$ , de XII, 175 p. — Prix: Dfl. 120.00/US\$ 59.00/£ 39.00. — Kluwer Academic Publishers, Dordrecht, 1989.

This volume contains an exposition of minimal surfaces ranging from basic results to current research. It treats complete minimal surfaces in Euclidean space and compact minimal surfaces in various compact Riemannian homogeneous spaces. The works of Bryant, Calabi, Chern, Osserman and others are presented from a consistent perspective using the method of moving frames and the theory of compact Riemann surfaces.

William DUNHAM. — **Journey through genius: the great theorems of mathematics.** — The Wiley science editions. — Un vol. relié,  $16 \times 23,5$ , de XIII, 300 p. — Prix: £ 14.95. — John Wiley & Sons, New York, 1990.

The book explores some of the most significant and enduring ideas in mathematics: the great theorems, discoveries of beauty and insight that stand today as monuments to the human intellect. Writing with extraordinary clarity, wit, and enthusiasm, the author takes us on a fascinating journey through the intricate reasoning of these masterworks and the often turbulent lives and times of their creators. Along with the essential mathematics, the author captures the humanity of these great mathematicians from ancient to modern times.

John C. HEGARTY. — **Applied calculus.** — Un vol. broché,  $19 \times 23,5$ , de xv, 608 p. — Prix: US\$ 16.95. — John Wiley & Sons, New York, 1990.

“Applied calculus” has been written for use in an introductory calculus course for students pursuing professional careers in the management, life or social sciences. The goal of the book is to present, in an intuitive and clear manner, the fundamental concepts of differential and integral calculus to a student who is primarily interested in learning how calculus can be used. For this reason numerous examples and applications, where appropriate, are given in each section to illustrate and enhance new concepts.

S.L. SALAS, Einar HILLE. — **Calculus: one and several variables.** — 6th edition. — Un vol. broché,  $20,5 \times 25$ , de xv, 1114 p. — Prix: US\$ 21.50 (relié: US\$ 52.40). — John Wiley and Sons, New York, 1990.

From the preface: “... in this edition you will find simple physical applications scattered throughout the text and here and there, listed as optional, some applications that are not so simple. Perhaps some of these may pique the interest of the ... student. Notwithstanding the increased presence of applications, the book remains a text on mathematics, not science or engineering. The subject is calculus and the emphasis is on three basic ideas: limit, derivative, integral...”

S.L. SALAS, Einar HILLE. — **Calculus: one variable.** — 6th edition. — Un vol. relié,  $21 \times 26$ , de XIII, 779 p. — Prix: US\$ 43.15 (Disponible également en broché). — John Wiley and Sons, New York, 1990.

Limits and continuity. Differentiation. The mean-value theorem and applications. Integration. Some applications of the integral. The transcendental functions. Techniques of integration. The conic sections. Polar coordinates, parametric equations. Sequences, indeterminate forms, improper integrals, infinite series, some elementary topics, some additional proofs, tables. Answers to odd-numbered exercises.

Michel CROUZEIX, Jacques RAPPAZ. — **On numerical approximation in bifurcation theory.** — Collection "Recherches en mathématiques appliquées" (RMA), vol. 13. — Un vol. broché,  $16 \times 24$ , de 176 p. — Masson, Paris, 1989.

Cet ouvrage est consacré à l'étude de l'erreur d'approximation pour des problèmes non linéaires en situation régulière comme au voisinage de points de bifurcation. *Contenu:* Approximation of linear elliptic problems. Approximation of regular solutions of nonlinear problems. Approximation of simple limit points. Approximation of simple bifurcation points on the trivial branch. Bifurcation equations. Approximation of simple bifurcation points. Complements and references.

Stephen D. FISHER. — **Complex variables.** — Second edition. — International student edition. — Wadsworth & Brooks/Cole mathematics series. — Un vol. broché,  $16,5 \times 23,5$ , de XIV, 427 p. — Prix: £17.95. — Wadsworth & Brooks/Cole Advanced Books & Software, Pacific Grove, CA, 1990, distributed by Chapman and Hall, London.

This textbook is intended for undergraduate or graduate students who are taking their first course in complex variables. Its only prerequisite is a three-semester course in calculus, no prior knowledge of Green's theorem or line integrals is needed. A previous course in differential equations would be useful but is not necessary. The greatest changes from the first edition occur principally in the presentation of the all-important Cauchy's theorem. The author has made arrangements and clarifications in the presentation of the text and modified many of the exercises.

S.T. TAN. — **Applied calculus.** — Second edition. — International student edition. — The Prindle, Weber & Schmidt series in mathematics. — Un vol. broché,  $18,5 \times 23,5$ , de XIV, 427 p. — Prix: £21.95. — PWS-Kent Publishing Company, Boston, 1990, distributed by Chapman and Hall, London.

Precalculus review. — Functions. — The derivative. — Differentiation. — Applications of the derivative. — Exponential and logarithmic functions. — Integration. — Additional techniques and applications of integration. — Differential equations. — Calculus of several variables. — Taylor polynomials and infinite series. — Trigonometric functions. — Tables and answers to odd-numbered exercises.

Albert D. POLIMENI, H. Joseph STRAIGHT. — **Foundations of discrete mathematics.** — Second edition. — International student edition. — Un vol. broché,  $16,5 \times 23,5$ , de xv, 519 p. — Prix: £16.95. — Brooks/Cole Publishing Co., Pacific Grove CA, 1990, distributed by Chapman and Hall, London.

Logic. — Set theory. — Number theory and mathematical induction. — Relations. — Functions. — Combinatorial mathematics. — Graph theory. — Algebraic structures. — Matrices. — Answers to selected exercises and problems.

A.T. FOMENKO. — **The Plateau problem : part 2, the present state of the theory.** — Studies in the development of modern mathematics, vol. 1, part 2. — Un vol. relié,  $16 \times 23,5$ , de XII, 251 p. — Prix: US\$175.00. — Gordon and Breach Science Publishers, New York, 1990.

Containing original research data appearing for the first time in English, the first part of A.T. Fomenko's book explores the history of the theory of minimal surfaces. In the second part the author demonstrates the deep rooted connections between the theory of minimal surfaces and modern branches of mathematics, particularly the theory of differential equations, Lie groups and multidimensional variational calculus.

W. Keith NICHOLSON. — **Elementary linear algebra, with applications.** — Second edition. — International student edition. — Un vol. broché, 20,5 × 23,5 de xvi, 490 p. et 86 pages d'exercices. — Prix: £14.95. — PWS-Kent Publishing Co., Boston, 1990, distr. by Chapman and Hall, London.

This textbook is a basic introduction to the ideas and techniques of linear algebra for 1st- or 2nd-year students who have a working knowledge of high-school algebra. Its aim is to achieve a balance among the computational skills, theory, and applications of linear algebra, while keeping the level suitable for beginning students.

Stephen P. SHAO and Lawrence P. SHAO. — **Mathematics for management and finance.** — 6th edition. — International student edition. — Un vol. broché, 18,5 × 23, de xii, 814 p. — Prix: £15.95. — South-Western Publishing Co., Cincinnati, 1990, distr. by Chapman & Hall, London.

This book is designed for the first course in mathematics for students of business administration. It meets two basic needs, providing 1) mathematical background and 2) methods of solving mathematical problems in management and finance. The topics are presented with these two needs in mind.

Dennis G. ZILL. — **A first course in differential equations with applications.** — 4th edition. — Un vol. relié, 20,5 × 24 de xii, 540 p. et 44 pages d'exercices. — Prix: £16.95. — PWS-Kent Publishing Co., Boston, 1990, distr. by Chapman & Hall, London.

This text is intended for use in an introductory one-semester or one-quarter course in differential equations. The emphasis of the text is on how to solve differential equations and on how to interpret these equations and their solutions in a physical setting. The text contains an abundance of examples, problems and applications.

**Statistical design and analysis of industrial experiments.** — Ed. by Subir Ghosh. — Statistics: textbooks and monographs, vol. 109. — Un vol. relié, 16 × 23,5 de xi, 533 p. — Marcel Dekker, New York, 1990.

This reference book provides research tools to improve the developmental process and operational performance of industrial products. Combining the work of experts from both academia and industry, this book offers information on factorial and fractional factorial experiments, mixture designs, response surface methods, biotechnology, health study, and crossover designs, quality improvement techniques including Taguchi methods, etc.

A.C. BAJPAI, L.R. MUSTOE, D. WALKER. — **Advanced engineering mathematics.** — 2nd edition. — Un vol. broché, 16,5 × 24,5 de ix, 502 p. — Prix: £13.95. — John Wiley and Sons, Chichester, 1990.

This book is aimed at second year undergraduate science and engineering students in universities, polytechnics and colleges. Analytical, numerical and computer-based techniques are discussed side by side, indicating to the student how problems arising in industrial situations are solved mathematically.

Abe MIZRAHI, Michael SULLIVAN. — **Calculus and analytic geometry.** — 3rd edition. — Un vol. relié, 21 × 26, de xxi, 1250 p. et 127 pages d'exercices. — Prix: £22.95. — Wadsworth Publishing Co., Belmont, CA, 1990, distr. by Chapman & Hall, London.

Calculus instructors widely agree that this decade will see changes in the way calculus is taught. But leaders in calculus reform are moving in different directions, and it is not clear what the changes will finally be. This edition takes initial steps into the realm of the “new calculus” by including explorations in the use of graphing calculators and computers.

**Lectures in applied mathematics and informatics.** — Ed. by Luigi M. Ricciardi. — Un vol. relié, 16 × 24, de XI, 362 p. — Prix: £70.00. — Manchester University Press, Manchester, 1990.

This book consists of seven chapters written by well-known specialists in a variety of fields within applied mathematics. The first two chapters are devoted to basic topics of applied mathematics, namely the analysis of algorithms and the algebraic fundamentals of rational and recognisable languages. The third provides a discussion of measures and information in terms of generalised entropies with specific applications to statistical pattern recognition and to fuzzy sets. The fourth chapter deals with a modern approach to the quantitative analysis of mathematical models in ecology and population dynamics. The next two chapters are devoted to Brownian motion and to diffusion processes of various types. The last chapter discusses a new approach to the description and the analysis of stochastic phenomena.

W.A. LIGHT. — **An introduction to abstract analysis.** — Un vol. relié, 16 × 24, de XIII, 194 p. — Prix: £11.95. — Chapman and Hall, London, 1990.

Abstract analysis, and particularly the language of normed linear space, now lies at the heart of a major portion of modern mathematics. Unfortunately, it is also a subject which students seem to find quite challenging and difficult. Considerable care is taken in this book to introduce and use the basic methods of proof in a slow and explicit fashion. As the chapters progress, the pace quickens and later chapters on differentiation, linear mappings, integration and the implicit function theorem delve quite deep into interesting mathematical areas.

Daniel SOLOW. — **How to read and do proofs.** — An introduction to mathematical thought processes. — Second ed. — Un vol. broché, 15 × 23, de XX, 242 p. — Prix: £15.30. — John Wiley, Chichester, 1990.

*De la préface:* “The inability to communicate proofs in an understandable manner has plagued students and teachers in all branches of mathematics... What seems to have been lacking is a proper method for explaining theoretical mathematics. In this book I have developed a method for communicating proofs: a common language that can be taught by professors and understood by students. In essence, this book categorizes, identifies, and explains (at the students’ level) the various techniques that are used repeatedly in virtually all proofs.”

**Computers in mathematics.** — Ed. by David V. Chudnovsky, Richard D. Jenks. — Lecture notes in pure and applied mathematics, vol. 125. — Un vol. broché, 18 × 25 de VII, 410 p. — Prix: US\$ 89.75 (U.S. et Canada)/US\$ 107.50 (ailleurs). — Marcel Dekker, New York, 1990.

This book examines the interaction between computer systems experts and mathematicians, reviewing the role of computers in number theory, analysis, special functions, algebraic geometry, topology and mathematical physics. It discusses the history of linear programming and its effect on computer development and investigates the use of mathematics in numerical analysis, artificial intelligence and computer algebra.



P. SMITH, R.C. SMITH. — **Mechanics**. — Second edition. — Un vol. broché, 15,5 × 22,5 de XIX, 321 p. — Prix: £13.95. — John Wiley, Chichester, 1990.

This introductory text on Mechanics is designed to give a thorough grounding in particle dynamics and elementary rigid body dynamics. Aimed at first degree students in mathematics, physics, chemistry and engineering, it covers topics such as kinematics, the principles of mechanics, work and energy, rocket dynamics, linear vibration theory, orbits, non-linear dynamics, and rotating frames.

**Finite geometries, buildings, and related topics**. — Ed. by William M. Kantor, Robert A. Liebler, Stanley E. Payne, Ernest E. Shult. — Oxford science publications. — Un vol. relié. 16 × 24, de XII, 159 p. — Clarendon Press, Oxford, 1990.

The July 17-23, 1988 conference on Buildings and Related Geometries took place at Pingree Park, Colorado, and brought together experts and interested mathematicians from around the world. The contributions to these proceedings have been ordered so as to begin with an introduction to various aspects of the theory, followed by papers gradually spreading out to more wide-ranging areas of geometry.

H.A. PRIESTLEY. — **Introduction to complex analysis**. — Revised edition. — Oxford science publications. — Un vol. broché, 15,5 × 23,5 de XI, 214 p. — Prix: £12.95. — Clarendon Press, Oxford, 1990.

This book presents an introduction to elementary complex analysis. The emphasis throughout is on those aspects of the theory which are important in other branches of mathematics. The basic techniques are explained, and the major theorems are presented in such a way as to enable the reader to appreciate the power and elegance of the subject by seeing it in both practical and theoretical applications.

T.S. BLYTH. — **Module theory: an approach to linear algebra**. — Second edition. — Oxford science publications. — Un vol. broché, 15,5 × 23,5 de VI, 360 p. — Prix: £15.00. — Clarendon Press, Oxford, 1990.

The aim of this textbook is to develop the basic properties of modules and to show their importance in the theory of linear algebra. The first 11 chapters provide a graded introduction to the central results and applications of the theory of modules. Subsequent chapters deal with advanced linear algebra (including multilinear and tensor algebra) and tackle more advanced topics. These include the exterior product approach to the determinants of matrices, a module-theoretic approach to the structure of finitely generated Abelian groups, canonical forms and normal transformations.

Yuji YOSHINO. — **Cohen-Macaulay modules over Cohen-Macaulay rings**. — London Mathematical Society lecture note series, vol. 146. — Un vol. broché, 15 × 22,5 de 177 p. — Prix: £15.00/US\$24.95. — Cambridge University Press, Cambridge, 1990.

The purpose of these notes is to explain in detail some topics on the intersection of commutative algebra, representation theory and singularity theory. They are based on lectures given in Tokyo, but also contain new research. It is the first cohesive account of the area and will provide a useful synthesis of recent research for algebraists.

**Helices and vector bundles: seminaire Rudakov**. — A.N. Rudakov, A.I. Bondal, A.L. Gorodentsev... *et al.* — London Mathematical Society lecture note series, vol. 148. — Un

vol. broché,  $15 \times 23$ , de 143 p. — Prix: £15.00/US\$24.95. — Cambridge University Press, Cambridge, 1990.

This volume is devoted to the use of helices as a method for studying exceptional vector bundles, an important and natural concept in algebraic geometry. The work arises out of a series of seminars organised in Moscow by A.N. Rudakov. The approach is concrete; the theory is considered for quadrics, ruled surfaces, K3 surfaces and  $P^3(C)$ .

Peter J. CAMERON. — **Oligomorphic permutation groups.** — London Mathematical Society lecture note series, vol. 152. — Un vol. broché,  $15 \times 23$ , de VIII, 160 p. — Prix: £13.50/US\$22.95. — Cambridge University Press, Cambridge, 1990.

The study of permutation groups has always been closely associated with that of highly symmetric structures. The objects considered here are countably infinite, but have only finitely many different substructures of any given finite size. They are precisely those structures which are determined by first-order logical axioms together with the assumption of countability. This book concerns such structures, their substructures and their automorphism groups.

Bernard DWORK. — **Generalized hypergeometric functions.** — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de 188 p. — Prix: £27.50. — Oxford University Press, Oxford, 1990.

*De la préface:* "We examine the Boyarsky principle for generalized hypergeometric functions. This involves understanding the integral representations of such functions to the point of being able to show that the Frobenius matrix varies analytically with the multiplicative parameters. Following a suggestion of G. Laumon we use the Laplace transform to develop a theory broad enough to encompass the four hypergeometric functions of Appell, their Lauricella generalizations and  ${}_kF_{k-1}$ ."

Susanna S. EPP. — **Discrete mathematics with applications.** — Un vol. relié,  $19 \times 24,5$  de xx, 783 + appendices. — Prix: £16.95. — Wadsworth Publishing Co., Belmont, CA, 1990, distr. by Chapman & Hall, London.

The purpose of this book is to provide a clear, accessible treatment of discrete mathematics to support the programs of students taking a first course in computer science or planning to study such areas of advanced mathematics as linear and abstract algebra, combinatorics and number theory. The feature that most distinguishes this book from other discrete mathematics texts is that it attempts to teach the unspoken logic and reasoning that underlie mathematical thought.

Donald W. TRIM. — **Applied partial differential equations.** — International Student Edition. — Un vol. broché,  $19 \times 23,5$  de xv, 485 p. — Prix: £15.95. — PWS-Kent Publishing Co., Boston, 1990, distr. by Chapman & Hall, London.

This text evolved from notes used to teach partial differential equations to advanced undergraduate mathematics students and graduate engineering students. Major emphasis is placed on techniques for solving partial differential equations found in physics and engineering, but discussions on existence and uniqueness of solutions are also included. Every opportunity is taken to show that there may be more than one way to solve a particular problem and to discuss the advantages of each solution relative to the others. In addition, physical interpretations of mathematical solutions are stressed whenever possible.

Melvyn S. BERGER. — **Mathematical structures of nonlinear science: an introduction.** — Nonlinear topics in the mathematical sciences, vol. 1. — Un vol. relié, 17 × 24,5 de XII, 421 p. — Prix: Dfl. 220.00/US\$99.00/£79.00. — Kluwer Academic Publishers, Dordrecht, 1990.

This book covers fundamental ideas of nonlinear partial differential equations, bifurcations, iteration processes, and the calculus of variations. It presents for the first time an exposition of basic ideas such as nonlinear desingularization, vortex breakdown, Hilbert spaces of almost periodic functions, nonlinear mathematical aspects of type-II superconductivity, global aspects of geometry involving nonlinear elliptic partial differential equations and a complete new theory of integrability with classic examples.

Adrian V. GHEORGHE. — **Decision processes in dynamic probabilistic systems.** — Mathematics and its applications (East European series), vol. 42. — Un vol. relié, 17 × 24,5 de XVII, 354 p. — Prix: Dfl. 220.00/US\$112.00/£73.00. — Kluwer Academic Publishers, Dordrecht, 1990.

This volume deals with dynamic probabilistic systems (Markov and semi-Markov) and associated decision processes. It treats in a unitary manner completely and partially observable Markovian decision processes as well as those which are risk-sensitive. The book contains specific computer algorithms relating to policy iteration, linear programming and other optimization solutions. Also, a large number of examples are included with particular reference to systems engineering and policy decision making.

Jiri ADAMEK, Horst HERRLICH, George E. STRECKER. — **Abstract and concrete categories: the joy of cats.** — Pure and applied mathematics. — Un vol. relié, 19 × 26, de XII, 482 p. — Prix: £43.65. — John Wiley, New York, 1990.

Since the language of category theory is germane to a considerable part of modern mathematics and computer science, it has become an indispensable tool for mathematicians and computer scientists alike. The purpose of this book is to give an up-to-date presentation of the fundamental concepts, methods, and results of this theory. It is the first book that contains a systematic study of “factorization structures” and of “concrete categories”, particularly of “topological categories”, “algebraic categories” and “topological quasitopoi”.

Bernard RUYER. — **Logique.** — Un vol. broché, 15 × 22, de 222 p. — Prix: FF 198.00. — Presses universitaires de France, Paris, 1990.

Le lecteur de ce court traité apprendra, entre autres choses, comment on représente la forme logique d’une proposition, ce qu’est un modèle d’une formule, et une méthode pour fabriquer des modèles qui est aussi une méthode de déduction. Philosophes, linguistes, informaticiens, mathématiciens trouveront dans cet ouvrage un peu plus qu’une introduction à l’un des Arts Libéraux qui, avec, Grammaire et Rhétorique, constituent le traditionnel trivium.

A.G. BUTKOVSKIY, Yu.I. SAMOILENKO. — **Control of quantum-mechanical processes and systems.** Mathematics and its applications (Soviet series), vol. 56. — Un vol. broché, 16,5 × 24,5 de XIII, 232 p. — Prix: Dfl. 175.00/US\$99.00/£65.00. — Kluwer Academic Publishers, Dordrecht, 1990.

The control of quantum-mechanical processes and systems is a problem of increasing topicality. Purposeful control of the quantum state of matter has for some time been the focus of investigation for researchers working in various branches of physics. This volume summarizes the results of modern research in the theory of automatic control, which be used



to solve many theoretical problems of controlling systems defined by the equations of quantum physics. From the viewpoint of control, any such problem relates to the theory of controlling systems with distributed parameters, where processes of control are dealt with by means of various physical fields, and with the principles of designing both open-loop and closed-loop systems (with feedback) to control distributed parameter systems.

Gérard IOOSS, Daniel D. JOSEPH. — **Elementary stability and bifurcation theory.** — Second edition. — Undergraduate texts in mathematics. — Un vol. relié, 16 × 24, de xxiii, 324 p. — Prix: DM 108.00. — Springer-Verlag, New York, 1990.

This new edition has been substantially revised. Its purpose is to teach the theory of bifurcation of asymptotic solutions of evolution problems governed by nonlinear differential equations. It is written not only for mathematicians but for the broadest audience of potentially interested learners, including engineers, biologists, chemists, physicists and economists.

Francis E. BURSTALL, John H. RAWNSLEY. — **Twistor theory for Riemannian symmetric spaces.** — With applications to harmonic maps of Riemann surfaces. — Lecture notes in mathematics, vol. 1424. — Un vol. broché, 16,5 × 24, de iii, 112 p. — Prix: DM 25.00. — Springer-Verlag, Berlin, 1990.

In this monograph, a central theme is the interplay between the complex homogeneous geometry of flag manifolds and the real homogeneous geometry of symmetric spaces. In particular, flag manifolds are shown to arise as twistor spaces of Riemannian symmetric spaces. Applications of this theory include a complete classification of stable harmonic 2-spheres in Riemannian symmetric spaces and a Bäcklund transform for harmonic 2-spheres in Lie groups which, in many cases, provides a factorisation theorem for such spheres as well as gap phenomena.

**Groups of self-equivalences and related topics.** — Proceedings of a conference held in Montreal, Canada, Aug.- 8-12, 1988. — Ed. by Renzo A. Piccinini. — Lecture notes in mathematics, vol. 1425. — Un vol. broché, 16,5 × 24, de v, 214 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

Since the subject of Groups of Self-equivalences was first discussed in 1958 in a paper of Barcuss and Barratt, a good deal of progress has been achieved. This is reviewed in this volume, first by a long survey article and a presentation of 17 open problems together with a bibliography of the subject, and further by 14 original research articles.

Karin ERDMANN. — **Blocks of tame representation type and related algebras.** Lecture notes in mathematics, vol. 1428. — Un vol. broché, 16,5 × 24 de xv, 312 p. — Prix: DM 53.00. — Springer-Verlag, Berlin, 1990.

This monograph studies algebras that are associated to blocks of tame representation type. Over the past few years, a range of new results have been obtained and a comprehensive account of these is provided here together with some new proofs of known results. Some general theory of algebras is also presented, as a means of understanding the subject. The book is addressed to researchers and graduate students interested in the links between representations of finite-dimensional algebras and modular group representation theory.

Hiroshi KUNITA. — **Stochastic flows and stochastic differential equations.** — Cambridge studies in advanced mathematics, vol. 24. — Un vol. relié, 15,5 × 23,5 de xiv, 346 p. — Prix: £40.00/US\$ 59.50. — Cambridge University Press, Cambridge, 1990.

The main purpose of this book is to give a systematic treatment of the theory of stochastic differential equations and stochastic flows of diffeomorphisms, and through the former to study the properties of stochastic flows. The classical theory was initiated by K. Itoç and since then has been much developed. Professor Kunita's approach here is to regard the stochastic differential equations as a dynamical system driven by a random vector field, including thereby Itoç's theory as a special case.

Keith DEVLIN. — **Sternstunden der modernen Mathematik: berühmte Probleme und neue Lösungen.** — Aus dem Englischen von Doris Gerstner. — Un vol. relié, 17 × 24, de 327 p. — Prix: SFR. 68.00/DM 78.00. — Birkhäuser Verlag, Basel, 1990.

Hat Gerd Faltings 1983 einen Weg zur Lösung der Fermatschen Vermutung gefunden? Warum kann die Länge der Küste Britanniens immer nur annähernd vermessen werden? Die Antworten auf diese und viele weitere Fragen, die die Entwicklung der neuesten Mathematik aufwerfen, stellt Keith Devlin vor. In elf Kapiteln werden ausgewählte Probleme der Mathematik dargestellt, in denen die Forschung der letzten 25 Jahre zu aufsehenerregenden Ergebnisse gelangte.

Ashish SEN, Muni SRIVASTAVA. — **Regression analysis: theory, methods and applications.** — Springer texts in statistics. — Un vol. relié, 16 × 24, de xv, 347 p. — Prix: DM 88.00. — Springer-Verlag, New York, 1990.

*De la préface:* "... This book offers an up-to-date account of the theory and methods of regression analysis. We believe our treatment of theory to be the most complete of any book at this level. The methods provide a comprehensive toolbox for the practicing regressionist. The examples, most of them drawn from "real life", illustrate the difficulties commonly encountered in the practice of regression, while the solutions underscore the subjective judgments the practitioner must make."

Paul HERZBERG. — **How SAS works: a comprehensive introduction to the SAS system.** — Second edition. — Un vol. broché, 21,5 × 27,5 de xvii, 193 p. — Prix: DM 58.00. — Springer-Verlag, New York, 1990 (distr. in Canada by Captus Press).

This textbook is designed to span the gap between the SAS Institute's "Introductory Guide", which is a very basic introduction to the SAS system, and the "User's Guide", which is a reference tool for those already well versed in SAS. It provides the information a beginner needs to use the SAS system for small-to-medium sized jobs and helps develop a model of the SAS system in a step-by-step manner. It goes beyond the basic introduction, helping readers to get results from the SAS system and to make the most of other SAS Institute reference tools.

Morris KLINE. — **Mathematical thought from ancient to modern times. Vol. 1.** — Réimpression brochée de l'édition de 1972. — Un vol. broché, 15 × 22,5 de xv, 390 p. — Prix: £9.95. — Oxford University Press, New York, 1990.

Now available in a new 3-volume paperback edition, M. Kline's monumental work presents the major creations in mathematics from its beginnings in Babylonia and Egypt through the first few decades of the 20th century. Organized around the central ideas of mathematical thought, as well as the men responsible for them, this comprehensive history provides a broad panorama of the development of mathematics, displaying the unity behind the disconnected branches of the discipline today.

Hans STEPHANI. — **Differential equations: their solution using symmetries.** — Ed. by Malcom MacCallum. — Un vol. broché,  $15 \times 23$ , de XII, 260 p. — Prix: £37.50/US\$44.50 (relié), £12.95/US\$19.95 (broché). — Cambridge University Press, Cambridge, 1990.

This book provides an introduction to the theory and application of the solution of differential equations using symmetries, a technique of great value in mathematics and the physical sciences. In many branches of physics, mathematics, and engineering, solving a problem means a set of ordinary or partial differential equations. Nearly all methods of constructing closed form solutions rely on symmetries. The theory and application of such methods have therefore attracted increasing attraction in the last two decades. In this text the emphasis is on how to find and use the symmetries in different cases.

Jan R. STROOKER. — **Homological questions in local algebra.** — London Mathematical Society lecture note series, vol. 145. — Un vol. broché,  $15,5 \times 22,5$  de XIII, 308 p. — Prix: £20.00/US\$34.50. — Cambridge University Press, Cambridge, 1990.

This book presents an account of several conjectures arising in commutative algebra from the pioneering work of Serre and Auslander-Buchsbaum. The approach is via Hochster's "Big Cohen-Macaulay modules", though the complementary view-point of Peskine-Szpiro and Roberts, who study the homology of certain complexes, is not neglected. Various refinements of Hochster's construction, obtained in collaboration with Bartijn, are included. A special feature is a chapter by Van den Dries which explains how a certain type of result can be "lifted" from prime characteristic to characteristic zero.

Takao FUJITA. — **Classification theories of polarized varieties.** — London Mathematical Society lecture note series, vol. 155. — Un vol. broché,  $15,5 \times 22,5$  de XIV, 205 p. — Prix: £17.50/US\$29.95. — Cambridge University Press, Cambridge, 1990.

A polarized variety is a modern generalization of the notion of an embedded projective variety in classical algebraic geometry. It consists of a pair: an algebraic variety together with an ample line bundle on it. Using techniques of abstract algebraic geometry that have been developed over recent decades, T. Fujita develops classification theories of such pairs using invariants that are polarized higher-dimensional versions of the genus of algebraic curves.

Heinrich von WEIZSÄCKER, Gerhard WINKLER. — **Stochastic integrals : an introduction.** — Advanced lectures in mathematics. — Un vol. broché,  $16,2 \times 22,9$  de IX, 332 p. — Prix: DM 78.00. — Friedr. Vieweg & Sohn, Braunschweig, 1990.

Having introduced martingales and local martingales the stochastic integral is defined for locally uniform limits of elementary processes. This corresponds to the Riemann integral in one dimensional analysis and it suffices for the study of stochastic differential equations and diffusions including the Feynman-Kac formula and the Stroock-Varadhan martingale problem approach. Predictability is introduced mainly as a tool for the structure theory of semi-martingales which culminates in the Dellacherie-Bichteler characterization theorem.

Juraj BOSAK. — **Decompositions of graphs.** — Mathematics and its applications (East European series), vol. 47. — Un vol. relié,  $16,5 \times 25$ , de XVIII, 248 p. — Prix: Dfl. 195.00/US\$112.00/£72.00. — Kluwer Academic Publishers, Dordrecht, 1990.

Basic notions are introduced and various generalizations are studied. Considerable attention is also paid to the decomposition of two or more graphs as well as the decomposition of graphs into mutually isomorphic subgraphs. The volume includes a variety of exercises with solutions, and also contains a large bibliography.

**Continuation and bifurcations : numerical techniques and applications.** Edited by Dirk Roose, Bart De Dier and Alastair Spence. — NATO ASI series, series C: Mathematical and physical sciences, vol. 313. — Un vol. relié,  $17 \times 24,5$  de XIII, 426 p. — Prix: Dfl. 220.00/US\$ 132.00/£82.00. — Kluwer Academic Publishers, Dordrecht, 1990.

*From the preface:* The central theme of the workshop was the solution of parameter dependent nonlinear problems using numerical continuation. More specifically the aims can be stated as: to describe typical bifurcation problems in scientific, engineering and industrial problems; to discuss current mathematical ideas and new developments in numerical analysis and numerical techniques and to describe and evaluate program packages and to discuss future needs with respect to software.

Jiri ADAMEK and Vera TRNKOVA. — **Automata and algebras in categories.** — Mathematics and its applications (East European series). — Un vol. relié,  $17 \times 25$ , de XIV, 470 p. — Prix: Dfl. 320.00/US\$ 167.00/£106.00. — Kluwer Academic publishers, Dordrecht, 1990.

This book concerns the interrelations between the theory of automata, and category theory and universal algebra. A central idea is the expression of the types of automata by means of a functor in a suitable category. This gives rise to linear sequential automata (dynamical systems) and tree automata, the two main motivating classes of automata considered in this book. Automata in monoidal categories are also captured in this way.

Gerald A. EDGAR. — **Measure, topology, and fractal geometry.** — Undergraduate texts in mathematics. — Un vol. relié,  $16 \times 25$ , de XIII, 230 p. — Prix: DM 58.00. — Springer-Verlag, Berlin, 1990.

This text provides the mathematics necessary for the study of fractal geometry. It includes background material on metric topology and measure theory. It covers topological dimension and fractal dimension (in particular Hausdorff dimension). It contains a complete discussion of self-similarity, and the more general “graph self-similarity”. Complete proofs and background material in metric topology and measure theory round off this textbook.

Hans SAMELSON. — **Notes on Lie algebras.** — Second ed. — Universitext. — Un vol. broché,  $15,5 \times 23,5$  de XII, 162 p. — Prix: DM 58.00. — Springer-Verlag, Berlin, 1990.

This revised edition covers structuring, classification and representations of semisimple Lie algebras, a classical field that has become increasingly important to mathematicians and physicists. The text’s purpose is to introduce the student to the basic facts and their derivations using a direct approach in today’s style of thinking and language. For this revised edition, errors have been eliminated, a number of proofs have been rewritten with more clarity, and some new material has been added.

**Commutative algebra.** — Proceedings of a workshop held in Salvador, Brazil, Aug. 8-17, 1988. — W. Bruns, A. Simis, eds. — Lecture notes in mathematics, vol. 1430. — Un vol. broché,  $16,5 \times 24,5$  de v, 160 p. — Prix: DM 30.00. — Springer-Verlag, Berlin, 1990.

The central theme of this volume is commutative algebra, with emphasis on special graded algebras, which are increasingly of interest in problems of algebraic geometry, combinatorics and computer algebra. Most of the papers have partly survey character, but are research-oriented, aiming at classification and structural results.

**Enumerative geometry.** — Proceedings of a Conference held in Sitges, Spain, June 1-6, 1987. — S. Xambo-Descamps, ed. — Lecture notes in mathematics, vol. 1436. — Un vol. broché, 16,5 × 24,5 de v, 303 p. — Prix: DM 53.00. — Springer-Verlag, Berlin, 1990.

The central topics of this volume are enumerative geometry and intersection theory. Contributions are original (refereed) research papers by: E. Arrondo, R. Mallavibarrena, I. Sols, D. Avritzer, I. Vainsencher, S. Colley, T. Johnsen, S.L. Kleiman, D. Laksov, R. Speiser, P. Le Barz, J.M. Miret, S. Xambo, R. Piene, H. Tai, F. Rosellé, A. Thorup.

Reinhard DIESTEL. — **Graph decompositions: a study in infinite graph theory.** — Oxford science publications. — Un vol. relié, 16 × 24, de xviii, 221 p. — Prix: £ 25.00. — Clarendon Press, Oxford, 1990.

This book offers a complete account of the theory of simplicial decompositions of graphs, from its origins in the 1930s right up to the frontiers of present-day research. The text is centred around a few guiding problems and concepts, such as the existence and uniqueness problem of simplicial decompositions into primes, or the concept of excluded minors as a means of identifying a desired structure. It attempts to give as authentic a picture as possible of research in progress. To this end, it includes discussions of examples, proof strategies, or the formation of new concepts, as well as numerous exercises and open problems.

Robert L. BRABENEC. — **Introduction to real analysis.** — Un vol. relié, 16,5 × 24, de xiv, 294 p. — Prix: £ 17.95. — PWS-Kent Publishing Co., Boston (distr. by Chapman & Hall, London), 1990.

This book is intended for a first course in analysis, following two or three semesters of calculus, and is suitable for a variety of course structures.

M. ATTEIA, M. PRADEL. — **Eléments d'analyse numérique.** — Un vol. broché, 17 × 24, de viii, 154 p. — Prix: FF 90.00. — CEPADUES Editions, Toulouse, 1990.

Dans cet ouvrage, les auteurs se sont fixés comme objectifs de présenter les techniques numériques essentielles dans trois branches fondamentales de l'Analyse Numérique: l'approximation, la résolution des problèmes différentiels avec condition(s) initiale(s), la résolution des systèmes linéaires et de mettre en évidence, à partir d'exemples «académiques», la démarche du numéricien confronté à un problème nouveau.

M. SAMUELIDES, L. TOUZILLIER. — **Analyse harmonique.** — Collection «La Chevêche». — Un vol. relié, 17,5 × 24,5 de 224 p. — Prix: FF 180.00. — CEPADUES Editions, Toulouse, 1990.

*De la préface:* «Les difficultés de convergence des séries de Fourier liées aux nécessités pour l'ingénieur de dériver des fonctions discontinues a permis de faire sentir la nécessité de généraliser le concept de fonction et a suscité ainsi la découverte des mesures et distributions. L'obligation de la discrétisation des problèmes préalables à leur résolution numérique automatisée utilise et banalise ces techniques mathématiques «de pointe» découvertes juste à la moitié de ce siècle. C'est à cette banalisation que ce livre voudrait contribuer en montrant leur intervention dans les problèmes se posant à l'ingénieur et au physicien.»

Alfred H. SCHATZ, Vidar THOMEE, Wolfgang L. WENDLAND. — **Mathematical theory of finite and boundary element methods.** — DMV Seminar, Band 15. — Un vol. broché, 17 × 24, de 276 p. — Prix: SFr. 52.00. — Birkhäuser Verlag, Basel, 1990.



These are the lecture notes of the seminar “Mathematische Theorie der finiten Element- und Randelementmethoden” organized by the Deutsche Mathematiker-Vereinigung and held in Düsseldorf from 7-14 June 1987. Finite element methods and the closely related boundary element methods nowadays belong to the standard routines for the computation of solutions to boundary and initial boundary value problems of partial differential equations with many applications, as for example in elasticity and thermoelasticity, fluid mechanics, acoustics, electromagnetics, scattering and diffusion.

Klaus GUERLEBECK, Wolfgang SPROESSIG. — **Quaternionic analysis and elliptic boundary value problems.** — International series of numerical mathematics, vol. 89. — Un vol. relié,  $17 \times 24$ , de 253 p. — Prix: SFr. 78.00. — Birkhäuser Verlag, Basel, 1990.

The main aim of the book is to formulate a new strategy for solving linear and nonlinear boundary value problems in bounded domains of  $\mathbb{R}^3$ . The volume offers a presentation of a complete hypercomplex solution theory including analytical and numerical investigations. Using a special operator calculus and a hypercomplex function theory, the questions of existence, uniqueness, representation formulas, and regularity of solutions of elliptic boundary value problems are studied.

J. Donald MONK. — **Cardinal functions on Boolean algebras.** — Lectures in mathematics, ETH Zürich. — Un vol. broché,  $17 \times 24$ , de 152 p. — Prix: SFr. 28.00. — Birkhäuser Verlag, Basel, 1990.

The study of cardinal functions brings unity and depth to many investigations in the theory of Boolean algebras. Many of the functions have proved their importance in related fields in set theory or topology. For the most important examples three general questions are considered: What is the relationship between various cardinal functions? How do they behave with respect to algebraic operations? What can one say about other cardinal functions naturally derived from a given one?

V.I. ARNOL'D. — **Huygens and Barrow, Newton and Hooke.** — Pioneers in mathematical analysis and catastrophe theory from evolvents to quasicrystals. — Translated from the Russian by Eric J.F. Primrose. — Un vol. broché,  $15 \times 21$ , de 118 p. — Prix: SFr. 24.00. — Birkhäuser Verlag, Basel, 1990.

The author, renowned for his lively style, retraces the beginnings of mathematical analysis and theoretical physics in the works (and the intrigues) of the great scientists of the 17th century. Some of Huygen's and Newton's ideas, several centuries ahead of their time, were developed only recently. The author follows the link between their inception and the breakthroughs in contemporary mathematics and physics.

S.K. DONALDSON and P.B. KRONHEIMER. — **The geometry of four- manifolds.** — Oxford mathematical monographs. — Un vol. relié,  $16 \times 24$ , de IX, 440 p. — Prix: £35.00. — Clarendon Press, Oxford, 1990.

This book grew out of two lecture courses given by the first author in Oxford in 1985 and 1986. These dealt with the applications of Yang-Mills theory to 4-manifold topology. The content of the lectures was governed by two main aims which have been preserved in the present work. The primary aim is to give a self-contained and comprehensive treatment of these new techniques as they have been applied to the study of 4-manifolds. The second aim is to bring together some of the developments in Yang-Mills theory itself, placed in the framework of contemporary differential and algebraic geometry. Leaving aside the topological applications,

ideas from Yang-Mills theory have played a large part in fixing the direction of modern research in geometry. The authors have tried to present some of these ideas at a level which bridges the gap between general textbooks and research papers.

Peter J. FREYD, Andre SCEDROV. — **Categories, allegories.** — North-Holland mathematical library, vol. 39. — Un vol. broché,  $15 \times 22,5$ , de XVIII, 294 p. — Prix: US\$82.00/Dfl. 160.00. — North-Holland, Amsterdam, Elsevier Science Publishing Co.Inc., New York, 1990.

This book is a thorough introduction to categories, emphasizing the geometric nature of the subject and explaining its connections to mathematical logic. A special feature of the work is a general calculus of relations. Some aspects of this approach find their origin in the relational calculi of Peirce and Schroeder from the last century, and in the 1940's in the work of Tarski and others on relational algebras. The representation theorems discussed are an original feature of this approach.

Leonid S. FRANK. — **Singular perturbations I: spaces and singular perturbations on manifolds without boundary.** — Studies in mathematics and its applications, vol. 23. — Un vol. relié,  $16 \times 23$ , de XIV, 556 p. — Prix: US\$89.75/Dfl. 175.00. — North-Holland, Amsterdam, Elsevier Science Publishing Co.Inc., New York, 1990.

Singular perturbations are one of the central topics in asymptotic analysis. They also play a special role as a mathematical tool for describing various physical phenomena. This volume deals with linear singular perturbations (on smooth manifolds without boundary) considered as equicontinuous linear mappings between corresponding families of Sobolev-Slobodetski's type spaces of vectorial order.

**The analytical and topological theory of semigroups: trends and developments.** — Editors: Karl Heinrich Hofmann, Jimmie D. Lawson, John S. Pym. — De Gruyter expositions in mathematics, vol. 1. — Un vol. relié,  $17 \times 24$ , de x, 398 p. — Prix: DM 138.00/US\$74.95. — Walter de Gruyter, Berlin, 1990.

This book is the first comprehensive survey of the current state of research in the theory of semigroups and its applications since twenty years. It presents trends and developments in diverse areas of semigroup theory, such as analysis, functional analysis and topology. Main topics include: Lie theory and algebraic geometry for semigroups, structure theory of compact semigroups, functional analysis on semigroups, relations to systems theory and combinatorial number theory. Particular emphasis is given to applications in probability theory and semigroups of continuous functions.

**Recent advances in Fourier analysis and its applications.** — Edited by J.S. Byrnes and Jennifer L. Byrnes. — NATO ASI series, series C, Mathematical and physical sciences, vol. 315. — Un vol. relié,  $17 \times 24,5$ , de x, 686 p. — Prix: Dfl. 300.00/US\$174.00/£108.00. — Kluwer Academic Publishers, Dordrecht, 1990.

*From the preface:* "The papers to be found herein include important new results in x-ray crystallography by Nobel Laureate Herbert Hauptman, the application of the new concept of bispectrum to system identification by ... probabilist Athanasios Papoulis, ... applications of number theory in Fourier analysis by ... Manfred R. Schroeder, and ... concepts regarding polynomials with restricted coefficients by Donald J. Newman. The book is divided in five parts: Chemical, physical and biomedical applications; polynomials with restricted coefficients; Fourier analysis in engineering; complex analysis and Fourier analysis; problems.

Michel LAVIEVILLE. — **Statistique et probabilités: précis de cours accompagné de 120 exercices corrigés, d'un formulaire d'analyse combinatoire et des tables numériques.** — Préface de Michel Méridot. — Dunod Université. — Un vol. broché,  $17,5 \times 25,5$ , de 231 p. — Dunod, Paris, 1990.

Statistique descriptive à une dimension. Distribution à deux variables. Test du Khi-carré. Estimation. Les tests sur un paramètre. Les tests de comparaison. Probabilités. Variables aléatoires. Lois de probabilité particulières. Annexes: formulaire d'analyse combinatoire, tables numériques.

James T. SANDEFUR. — **Discrete dynamical systems: theory and applications.** — Un vol. broché,  $19 \times 24,5$ , de XIII, 445 p. — Prix: £16.50 (relié: 35.00). — Clarendon Press, Oxford, 1990.

The aim of this new text is to introduce the reader both to the variety of techniques used to study dynamical systems and to their applications. In particular, investigation of dynamical systems leads to the important concepts of stability, strange attractors, chaos, and fractals. An important theme of the book is to show students that some dynamical systems have stable solutions whereas others may exhibit seemingly chaotic patterns of behavior.

Walter P. VAN STIGT. — **Brouwer's intuitionism.** — Studies in the history and philosophy of mathematics, vol. 2. — Un vol. relié,  $15,5 \times 23$ , de xxvi, 532 p. — Prix: US\$94.75/Dfl. 185.00. — North-Holland, Amsterdam, 1990.

"Dutch mathematician Luitzen Egbertus Jan Brouwer (1881-1966)... established in a short time a world-wide reputation for himself; his genius and originality were acknowledged by the great mathematicians of his time... The Intuitionist-Formalist debate became a personal feud between the mathematical giants Brouwer and Hilbert, and ended in 1928 with the expulsion of Brouwer from the editorial board of the "Mathematische Annalen" by dictat of Hilbert. Forsaken, humiliated and disillusioned Brouwer abandoned his Intuitionist Programme and withdrew into silence just about the time when the Formalist Programme appeared to be fundamentally flawed and major opposition collapsed..."

**Open problems in topology.** — Ed. by Jan van Mill, George M. Reed. — Un vol. relié,  $17 \times 24,5$  de xiv, 692 p. — Prix: US\$92.25/Dfl. 180.00. — North-Holland, Amsterdam, 1990.

*De la préface:* "This volume grew from a discussion by the editors on the difficulty of finding good thesis problems for graduate students in topology. One of us remarked, "Wouldn't it be nice to have a book of current unsolved problems always available to pull down from the shelf?" The other replied, "Why don't we simply produce such a book?" Two years later... this is the resulting volume... A key component in our specification for the volume was to provide current problems. Problems quickly become outdated, and any list soon loses its value if the status of the individual problems is uncertain... We plan a complete revision to the volume with the addition of new topics within five years..."

Herbert AMMANN. — **Ordinary differential equations: an introduction to nonlinear analysis.** — Transl. from the German by G. Metzen. — De Gruyter studies in mathematics, vol. 13. — Un vol. relié,  $18 \times 24,5$  de xiii, 458 p. — Prix: DM 148.00/US\$69.00. — Walter de Gruyter, Berlin, 1990.

This textbook provides an introduction to the modern theory of ordinary differential equations as well as nonlinear functional analysis at the advanced undergraduate and beginning graduate level. Apart from presenting the important dynamic theory of ODEs, it is intended



to prepare students for studying equations of evolution in infinite dimensional spaces. The book deals also with fundamentals of the calculus of variations and develops large parts of modern linear and nonlinear analysis in order to handle problems in the field of differential equations.

**Nonlinear evolution equations: integrability and spectral methods.** — Edited by A. Degasperis, A.P. Fordy and M. Lakshmanan. — Proceedings in nonlinear science. — Un vol. relié,  $16 \times 24$ , de 619 p. — Prix: £65.00. — Manchester University Press, Manchester, 1990.

The main emphasis of this proceedings of an International Workshop held at Como, Italy, 4-15 July 1988, is on mathematical developments dealing with current work on inverse scattering theory and other solution methods, Hamiltonian and algebraic methods, special solutions and non-integrable systems, Painlevé and singularity manifolds. Important physical applications, including plasma physics, ferromagnetism, statistical mechanics and relativistic strings are also discussed.

**Extension and interpolation of linear operators and matrix functions.** — Edited by I. Gohberg. — Operator theory, vol. 47. — Un vol. relié,  $17 \times 24$ , de VII, 305 p. — Prix: SFr. 88.00. — Birkhäuser, Basel, 1990.

Dedicated to the memory of M.G. Krein, this volume consists of five papers which develop further the theory of extension and interpolation of operators and matrix functions. The main topics include null-pole interpolation problems for matrix functions with symmetries, and for nonregular rational matrix functions; new versions of Nevanlinna-Pick interpolation problems and new versions of commutant lifting theorems; nonstationary inverse scattering and extension theorems for contractions in Krein spaces.

**Handbook of theoretical computer science, vol. A : Algorithms and complexity.** — Un vol. relié,  $17 \times 25$ , de 1004 p. — Prix: Dfl. 275.00. — Elsevier, Amsterdam, The MIT Press, Cambridge, Mass., 1990.

This is the first of a two-volume handbook which addresses the central areas of theoretical computer science, providing professionals and students with a comprehensive overview of the main results and developments in this evolving field. Extensive bibliographies and a subject index are included in each volume. Volume A presents chapters on models of computation, complexity theory, data structures, and efficient computation in many recognized sub-disciplines of theoretical computer science.

**Analytic number theory: proceedings of the Japanese-French Symposium held in Tokyo, Japan, October 10-13, 1988.** — K. Nagasaka, E. Fouvry, eds. — Lecture notes in mathematics, vol. 1434. — Un vol. broché,  $17 \times 25$  de VI, 218 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

This symposium was held at the Maison Franco-japonaise in Tokyo, Japan. Eight distinguished French number-theorists were invited (J.P. Allouche, P. Flajolet, M. Mendès-France, D. Bertrand, G. Christol, E. Fouvry, G. Tenenbaum and G. Henniart) and 29 talks were presented at this symposium. The total number of participants was over 100 from 5 countries.

Jean DE SIEBENTHAL. — **Sur la notion d'angle.** — Géométrie et civilisation. — Un vol. broché,  $15 \times 21$ , de 38 p. — Prix: SFr. 15.00. — Editions Terre Haute, Lausanne, 1990.

De la couverture au dos du fascicule: La notion de distance est particulièrement facile à saisir. Chacun sait comment on évalue la distance de deux points, par report d'une unité de

longueur, éventuellement subdivisée. La notion d'angle est plus difficile à concevoir; elle gouverne un monde de situations concrètes, dans la vie courante et dans l'art de la construction; elle fait partie de ces notions que l'on peut approfondir dans une intention esthétique, en vue aussi d'une utilité certaine. Trois aspects apparaissent ici: La notion élémentaire actuelle. — La richesse de la notion d'angle chez les Anciens. — Quelques illustrations actuelles.

Israel GOHBERG, Seymour GOLDBERG. — **Basic operator theory.** — Un vol. relié, 15,5 × 23,5 de XIII, 285 p. — Prix: SFr. 56.00. — Birkhäuser Verlag, Basel, 1990.

This book provides an introduction to functional analysis with an emphasis on the theory of linear operators and its application to differential and integral equations, approximation theory and numerical analysis. A textbook designed for senior undergraduate and graduate students, "Basic operator theory" begins with the geometry of Hilbert space and proceeds to the spectral theory for compact self-adjoint operators with a wide range of applications. Part of the volume is devoted to Banach spaces and operators acting on these spaces.

J. KEVORKIAN. — **Partial differential equations: analytical solution techniques.** — The Wadsworth and Brooks/Cole mathematics series. — International student edition. — Un vol. broché, 16,5 × 23,5 de XIV, 547 p. — Prix: £ 14.95. — Wadsworth & Brooks/Cole, Pacific Grove, 1990 (distr. par Chapman & Hall, London).

*De la préface:* "The primary purpose of this book is to analyze the formulation and solution of representative problems that arise in the physical sciences and engineering and are modeled by partial differential equations... The emphasis throughout is on deriving explicit analytical results, rather than on the abstract properties of solutions."

Claude LOBRY. — **Et pourtant... ils ne remplissent pas N.** — Un vol. broché, 15 × 21, de 310 p. — Prix: FF 110.00. — Aléas Editeur, Lyon, 1989.

*De la préface:* «Il y a entre la terre des nombres familiers et le ciel du transfini, des choses insoupçonnées par la mathématique officielle. C'est... un fait scientifique établi au moyen de l'appareil de précision qu'est la logique formelle: «l'existence des nombres infiniment grands», donc aussi des infinitésimaux... Cette étrange histoire a sans doute éveillé dans bien des esprits curieux, le désir d'aller voir cela de près. C'est pour eux que ce livre a été écrit, pour les conduire sans trop de fatigue jusqu'au seuil de cette nouvelle analyse «colorée», dite Analyse Non Standard.»

**Geometries, codes and cryptography.** — Ed. by G. Longo, M. Marchi, A. Sgarro. — International Centre for Mechanical Sciences, courses and lectures, no. 313. — Un vol. relié, 17 × 24, de 227 p. — Prix: DM 65.00. — Springer-Verlag, Wien, 1990.

*Contents:* G. Tallini "Lectures on Galois geometries and Steiner systems", H. Karzel "Circle geometry and its application to code theory", W. Heise "Topics in algebraic coding theory", P.G. Farrell "An introduction to array error control codes", A. Sgarro "An introduction to the theory of unconditional secrecy and authentication", A. Beutelspacher "Applications of finite geometry to cryptography", M. De Soete "Authentication/secrecy codes" and "Geometric threshold schemes", G.D. Cohen "W\*M's: a survey writing on some binary memories with constraints".

Ernst ZINNER. — **Regiomontanus: his life and work.** — Studies in the history and philosophy of mathematics, vol. 1. — Un vol. relié, 15,5 × 23 de x, 402 p. — Prix: US\$ 82.00/Dfl. 160.00. — North-Holland, Amsterdam, 1990.

The 500th anniversary of Regiomontanus's birth has occasioned this depiction of his life and work. It is the first English translation of E. Zinner's biography, plus a number of specially-written supplementary articles which help paint a more comprehensive picture of the current state of knowledge about Regiomontanus. His contributions to mathematics are discussed (for example, he may have discovered the fifth and sixth perfect numbers) as well as the mysteries surrounding his life and death.

**Data quality control: theory and pragmatics.** — Ed. by Gunar E. Liepins, V.R.R. Uppuluri. — Statistics: textbooks and monographs, vol. 112. — Un vol. relié, 16 × 23,5 de XII, 360 p. — Marcel Dekker, New York, 1990.

Reporting and expanding upon topics discussed at the Survey Data Control Workshop held in Oak Ridge, Tenn. this book reflects the work of academicians, laboratory researchers, government personnel, private practitioners and managers responsible for survey data — integrating practical applications with theory for effective quality control management. Written to address current concerns in the field, this book contains valuable tools for all those interested in statistical analysis and planning for data quality control.

Robert P. DILWORTH. — **The Dilworth theorems: selected papers of Robert P. Dilworth.** — Edited by Kenneth P. Bogart, Ralph Freese, and Joseph P.S. Kung. — Contemporary mathematicians. — Un vol. relié, 18 × 26, de XXVI, 465 p. — Prix: SFr. 98.00. — Birkhäuser, Basel, 1990.

This volume contains almost all of the fundamental mathematical papers of Robert P. Dilworth, one of the most important pioneers in lattice theory, combinatorics, and universal algebra. His incisive specific results have served, and are still serving, as landmarks and inspirations for further work. Included in this volume are Dilworth's papers on chain decompositions in ordered sets, lattices with unique complements, decomposition theory, completions of submodular functions, distributivity, and covering equalities in modular lattices. All the papers are provided with commentaries by leading experts, with mini-surveys of the field. Extensive bibliographies are included.

Alan BAKER. — **Transcendental number theory.** — Cambridge mathematical library. — Un vol. broché, 16 × 23, de X, 165 p. — Prix: £10.90/US\$ 17.95. — Cambridge University Press, Cambridge, 1990.

First published in 1975, this classic book gives a systematic account of transcendental number theory, that is those numbers which cannot be expressed as the roots of algebraic equations having rational coefficients. The volume was revised in 1979; however, the author has taken this further opportunity to update the book.

A.E. INGHAM. — **The distribution of prime numbers.** — Cambridge mathematical library. — Un vol. broché, 16 × 23, de XVII, 114 p. — Prix: £9.95/US\$ 17.95. — Cambridge University Press, Cambridge, 1990.

Originally published in 1934 in the Cambridge tracts, this volume presents the theory of the distribution of prime numbers in the series of natural numbers. The major part of the book is devoted to the analytical theory founded on the zeta-function of Riemann. This tract still remains unsurpassed as an introduction to the field, combining an economy of detail with a clarity of exposition.

Kazimierz GOEBEL, W.A. KIRK. — **Topics in metric fixed point theory.** — Cambridge studies in advanced mathematics, vol. 28. — Un vol. relié,  $16 \times 24$ , de VIII, 244 p. — Prix: £30.00/US\$49.50. — Cambridge University Press, Cambridge, 1990.

The authors consider a number of central themes: the classical theory of nonexpansive mappings, nonstandard methods that employ ultrafilters, ultrapowers and ultranets, generalizations to mappings that are not nonexpansive but which nevertheless satisfy closely related metric constraints. Sections that deal with metrical problems evolving from classical fixed point theorems of Brouwer and Schauder end the book.

Ali R. AMIR-MOEZ. — **Extreme properties of linear transformations.** — Un vol. relié,  $16 \times 24$ , de VII, 166 p. — Prix: £24.00. — Polygonal Publishing House, Washington, N.J., 1990.

This is a detailed description of linear transformations on real or complex unitary spaces (i.e., inner-product spaces), concentrating mainly on the properties of Hermitian, positive, non-negative, and unitary transformations. A major part of the book is devoted to equations and inequalities involving proper values (i.e., eigenvalues) and singular values of transformations. A part of the book is a review of unitary spaces with particular emphasis on ideas which have geometric nature.

Ian STEWART. — **Spielt Gott Roulette : chaos in der Mathematik.** — Aus dem Englischen von Gisela Menzel. — Un vol. relié,  $16 \times 23$ , de 325 p. — Prix: SFr. 68.00/DM 78.00. — Birkhäuser Verlag, Basel, 1990.

Dieses Buch ist eine humorvoll verfasste Einführung in das mathematische Thema Chaos. Reich illustriert, aufgelockert durch zahlreiche Beispiele aus der Natur, verfolgt das Buch die Geschichte dieses mathematischen Phänomens, von den alten Griechen über Newton, die klassische Wahrscheinlichkeitstheorie und Poincaré bis hin zu den sensationellen Entwicklungen der Gegenwart, wo mit Hilfe der Computergraphie, die dieses Phänomen auch sichtbar macht, Chaos zum Modethema der letzten Jahre geworden ist.

Ioana CIORANESCU. — **Geometry of Banach spaces, duality mappings and nonlinear problems.** — Mathematics and its applications, vol. 62. — Un vol. relié,  $17 \times 24,5$  de XIV, 260 p. — Prix: Dfl. 175.00/US\$99.00/£62.00. — Kluwer Academic Publishers, Dordrecht, 1990.

This volume presents an introduction to the basic results and methods of the theory of nonlinear operators and their applications to functional equations and partial differential equations. A significant feature of the book is that duality mapping is taken as the unifying approach. The presentation is self-contained with only knowledge of the elementary theory of Banach spaces and some acquaintance with local convex topologies being assumed. Each chapter concludes with exercises and useful bibliographical comments.

V.L. GIRKO. — **Theory of random determinants.** — Mathematics and its applications (Soviet series), vol. 45. — Un vol. relié,  $16,5 \times 24,5$  de XXV, 677 p. — Prix: Dfl. 420.00/US\$245.00/£147.00. — Kluwer, Dordrecht, 1990.

This volume presents a comprehensive treatment of the theory of random determinants. Many original results are included which have not been published previously. Most chapters deal with proofs of different assertions concerning the distributions of random determinants and proofs of limit theorems. The theory thus developed is used in many different applications

in numerical analysis, pattern recognition, control of linear stochastic systems, linear stochastic programming, disordered crystalline structures, statistical and nuclear physics, theory of experimental planning, and signal filtering.

Vladimir G. MAKHANKOV. — **Soliton phenomenology.** — Mathematics and its applications (Soviet series), vol. 33. — Un vol. relié,  $16,5 \times 24,5$  de XI, 452 p. — Prix: Dfl. 260.00/US\$ 149.00/£91.00. — Kluwer, Dordrecht, 1990.

The first part of this survey of soliton phenomenology deals with quantum systems and classical behaviour, and surveys various physical models of importance and some physically interesting nonlinear equations. Part 2 is concerned with exact results in  $D=1$  space and concentrates on aspects of the nonlinear Schrödinger equation as well as the Landau-Lifschitz equation. In part 3, noncompact symmetries and the Bose gas are considered in detail. The last two parts deal with the phenomenology of  $D=1$  solitons and many-dimensional solitons.

Serge LEVENDORSKII. — **Asymptotic distribution of eigenvalues of differential operators.** — Mathematics and its applications (Soviet series), vol. 53. — Un vol. relié,  $16,5 \times 24,5$  de XVII, 279 p. — Prix: Dfl. 220.00/US\$ 112.00/£74.00. — Kluwer, Dordrecht, 1990.

This volume describes a general method, the so-called spectral projector method, for computing and investigating the asymptotics of eigenvalues of wide classes of differential and pseudo-differential operators. The main tool in constructing this method is a version of the Weyl-Hörmander calculus of pseudo-differential operators, which is described in part 1. Part 2 contains the general theorems obtained by the method, together with proofs. The results of part 2 are then applied to specific classes of operators: elliptic, hypoelliptic, Douglis-Nirenberg elliptic, Schrödinger, Dirac and linearized Navier-Stokes operators, as well as to differential operators with rapidly increasing coefficients or with operator coefficients.

**Stochastic processes and their applications in mathematics and physics.** — Ed. by Sergio Albeverio, Philippe Blanchard and Ludwig Streit. — Mathematics and its applications. — Un vol. relié,  $16,5 \times 24,5$  de XIII, 402 p. — Prix: Dfl. 220.00/US\$ 129.00/£79.00. — Kluwer, Dordrecht, 1990.

This volume contains a collection of papers which present different aspects of the modern theory of stochastic processes and its interactions with topics in mathematics and physics which are of great current interest. The subjects dealt with centre around classical and quantum dynamics, particularly as treated by methods of stochastic analysis, combined with algebraic, analytic and differential geometric tools. Various topics are covered, such as classical and gauge fields, diffusion processes and potential theory, probabilistic methods in quantum theory and statistical mechanics, and stochastic processes in solid state physics.

**Maximum entropy and Bayesian methods, Dartmouth, U.S.A., 1989.** — Ed. by Paul F. Fougère. — Fundamental theories of physics, vol. 39. — Un vol. relié,  $16,5 \times 24,5$  de XII, 480 p. — Prix: Dfl. 220.00/US\$ 129.00/£77.50. — Kluwer, Dordrecht, 1990.

Bayesian probability theory and maximum entropy are the twin foundations of consistent inductive reasoning about the physical world. This volume presents the major contributions to the 9th Annual Workshop on Maximum Entropy and Bayesian Methods. The 32 papers included are devoted to both foundations and applications and combine tutorial presentations and more research-oriented contributions. Together these provide an account of the latest developments in coherent imaging, regression analysis, tomography, neural networks, plasma theory, quantum mechanics, etc.



Bl. SENDOV. — **Hausdorff approximations.** — Mathematics and its applications (East European series), vol. 50. — Un vol. relié,  $16,5 \times 24,5$  de XIX, 364 p. — Prix: Dfl. 230.00/US\$ 134.00/£81.00. — Kluwer, Dordrecht, 1990.

This is a systematic account of the main results in the theory of approximation of functions and point sets with respect to the Hausdorff distance in the plane. The first 2 chapters present a thorough discussion of the necessary background material relating to the Hausdorff distance, including definitions and properties. Subsequent chapters deal with the theory of Hausdorff approximations, how to achieve the best approximations by means of various polynomials and functions, and converse methods, and a range of related topics.

Lars HOERMANDER. — **The analysis of linear partial differential operators I: distribution theory and Fourier analysis.** — Second ed. — Springer study edition. — Un vol. broché,  $15,5 \times 23,5$  de XI, 440 p. — Prix: DM 69.00. — Springer-Verlag, Berlin, 1990.

This is a study edition of the 1983 work. The main change in this new edition is the inclusion of exercises with answers and hints. That is meant to emphasize that this volume can serve as a general course in modern analysis on a graduate student level and not only as a beginning of a specialised course in partial differential equations. In particular, it could also serve as an introduction to harmonic analysis.

Kai-Tai FANG, Yao-Ting ZHANG. — **Generalized multivariate analysis.** — Un vol. broché,  $16 \times 24$ , de XI, 220 p. — Prix: DM 98.00. — Springer-Verlag, Berlin/ Science Press, Beijing, 1990.

The theory of generalized multivariate analysis, based on elliptically contoured distributions, represents an achievement in the field of multivariate analysis. This is the first book on the subject. The text discusses estimation of parameters, testing of hypotheses, and linear models employing the methods of stochastic representation, rather than following the classical treatments.

Asuman G. AKSOY, Mohamed A. KHAMSI. — **Nonstandard methods in fixed point theory.** — Universitext. — Un vol. broché,  $15,5 \times 23,5$  de IX, 139 p. — Prix: DM 58.00. — Springer-Verlag, Berlin, 1990.

The aim of this book is to give a unified account of the major new developments inspired by Maurey's application of Banach space ultraproducts to the fixed point theory for nonexpansive mappings. The first third of the book is devoted to laying a careful foundation for the actual fixed point theoretic results which follow. Set theoretic and Banach space ultraproducts construction are studied in detail in the second part of the book, while the remainder of the book gives an introduction to the classical fixed point theory in addition to a discussion of normal structure. This is the first book that studies classical fixed point theory for non-expansive maps in the view of nonstandard methods.

James E. HUMPHREYS. — **Reflection groups and Coxeter groups.** — Cambridge studies in advanced mathematics, vol. 29. — Un vol. relié,  $15,5 \times 23,5$  de XII, 204 p. — Prix: £25.00/\$39.50. — Cambridge University Press, Cambridge, 1990.

In this graduate textbook the author presents a concrete and up-to-date introduction to the theory of Coxeter groups. It is assumed that the reader has a good knowledge of algebra, but otherwise the book is self-contained. The first part is devoted to establishing concrete examples. The second part starts by developing from scratch the properties of Coxeter groups in general,

including the Bruhat ordering. Then, it is shown how earlier examples and others fit into the general classification of Coxeter graphs. Another chapter introduces the work of Kazhdan and Lusztig on representations of Hecke algebras associated with Coxeter groups. The final chapter sketches complementary topics as well as connections with Lie theory.

Victor G. KAC. — **Infinite dimensional Lie algebras.** — 3rd ed. — Un vol. relié,  $16 \times 23,5$  de XXI, 400 p. — Prix: £40.00/US\$69.50. — Cambridge University Press, Cambridge, 1990.

This is the third, substantially revised edition of this monograph. The book is concerned with Kac-Moody algebras, a particular class of infinite dimensional Lie algebras, and their representations. Each chapter begins with a motivating discussion and ends with a collection of exercises, with hints to the more challenging problems. The theory has applications in many areas of mathematics and mathematical physics and these are discussed in relation to the basic theory where appropriate.

Michael ATIYAH. — **The geometry and physics of knots.** — Lezioni Lincee, Accademia Nazionale dei Lincei. — Un vol. broché, de  $14 \times 21,5$  de x, 78 p. — Prix: £6.95/US\$14.95 (relié: £20.00/US\$39.50). — Cambridge University Press, Cambridge, 1990.

The material presented here rests primarily on the pioneering work of Vaughan Jones and Edward Witten relating polynomial invariants of knots to a topological quantum field theory in  $2+1$  dimensions. Prof. Atiyah here presents an introduction to Witten's ideas from the mathematical point of view. The book will be essential reading for all geometers and gauge theorists as an exposition of new and interesting ideas in a rapidly developing area.

Bernd CARL, Irmtraud STEPHANI. — **Entropy, compactness and the approximation of operators.** — Cambridge tracts in mathematics, vol. 98. — Un vol. relié,  $16 \times 23,5$  de x, 277 p. — Prix: £35.00/US\$69.50. — Cambridge University Press, Cambridge, 1990.

Entropy quantities are connected with the degree of compactness of compact or precompact spaces, and so are appropriate tools for investigating linear and compact operators between Banach spaces. The main intention of this work is to study the relations between compactness and other analytical properties, for example approximability and eigenvalue sequences, of such operators. In the final chapter, the authors demonstrate that, to a certain extent, the geometry of Banach spaces can also be developed on the basis of operator theory.

**Reaction-diffusion equations.** — Proceedings of a Symposium Year on Reaction-Diffusion Equations organized by the Department of Mathematics, Heriot-Watt University, 1987-1988. — Oxford science publications. — Edited by K.J. Brown and A.A. Lacey. — Un vol. relié,  $16 \times 24$ , de x, 224 p. — Prix: £27.50. — Clarendon Press, Oxford, 1990.

This book contains a collection of articles which survey recent developments over the whole area of reaction-diffusion equations. The contributions indicate both the wide range of situations in which reaction-diffusion equations can arise, for example biology (nerve propagation), electrochemistry, etc... as well as the wide range of mathematical techniques which are being brought to bear on such problems, for example, classical partial differential equation techniques such as comparison principles, nonlinear functional analysis and topological index theory.

**Handbook of theoretical computer science, vol. B: Formal models and semantics.** — Edited by Jan van Leeuwen. — Un vol. relié,  $18 \times 24,5$  de 1280 p. — Prix: Dfl. 325.00. — Elsevier, Amsterdam, 1990.

Together, with vol A entitled “Algorithms and complexity”, this volume provides the foundations for understanding and using the concepts and mechanisms of computing and information processing and reflects the development of the matter from its classical roots up to modern theoretical approaches. Extensive bibliographies and a subject index are included in each volume. Volume B presents a choice of material on the theory of automata and rewriting systems, the foundations of modern programming languages, logics for program specification and verification, and some chapters on the theoretic modelling of advanced information processing.

Niel SHELL. — **Topological fields and near valuations.** — Pure and applied mathematics, vol. 135. — Un vol. relié,  $16 \times 23,5$  de 238 p. — Prix: US\$ 107.50 (89.75 pour les USA et le Canada). — Marcel Dekker, Inc., New York, 1990.

Designed for the reader with a basic knowledge of point-set topology and algebra, this advanced reference text introduces prevaluation as a tool to study locally bounded topologies. It covers a variety of topics relating to topological and valued fields, including independent topologies, neighborhood bases at zero, weakening ring topologies, locally bounded rings, nilpotence and normability, ultra-regular fields, nonarchimedean absolute values, complete and algebraically closed fields, type V fields, addiator sequences, partially ordered abelian groups ... etc ...

**Surveys on analysis, geometry and mathematical physics.** — Edited by Bert-Wolfgang Schulze and Hans Triebel. — Teubner-Texte zur Mathematik, Bd. 117. — Un vol. broché,  $14,5 \times 21,5$  de 308 p. — Prix: DM 51.00. — B.G. Teubner, Leipzig, 1990.

H. Gajewski, K. Gröger: Initial boundary value problems modelling heterogeneous semiconductor devices. — V.S. Georgiev, V.C. Kovachev: Nonlinear problems in quantum mechanics. — A. Juhl: Quantized geodesic flow and the Selberg trace formula I. T. Runst: Solvability of semilinear elliptic boundary value problems in Besov-Triebel-Lizorkin spaces. — A. Unterberger: A relativistic pseudodifferential analysis.

**Proceedings of the Annual Seminar of the Canadian Mathematical Society on Lie Theory, Differential Equations and Representation Theory, Montréal, August 1st-11, 1989.** — Edited by Véronique Hussin. — Les publications CRM. — Un vol. broché,  $17 \times 24,5$ , de xvi, 445 p. — Université de Montréal, Centre de Recherches Mathématiques, Montréal, 1990.

*From the preface:* “The part of the program devoted to applications of Lie group theory to differential equations concentrated on new developments of this topic. These developments included nonlinear completely integrable Hamiltonian systems involving infinite dimensional Lie groups and algebras, the Lie theoretical basis of separation of variables in both linear and nonlinear partial differential equations, classification of differential equations under point transformations and more general transformations, the recognition of linearizability and integrability and finally “partially integrable” nonlinear systems. The second part ... emphasized developments in constructive methods in the theory of Lie algebras and groups and their representation theory, affine Kac-Moody and Virasoro algebras, Lie superalgebras, Jordan algebras and a number of their applications to problem arising in quantum field theory and Hamiltonian systems.”

**Proceedings of the CRM workshop on Hamiltonian Systems, Transformation Groups and Spectral Transform Methods, Montréal, October 20- 26, 1989.** — Edited by: J. Harnad and J.E. Marsden. — Les publications CRM. — Un vol. broché,  $17 \times 24,5$  de viii, 252 p. — Université de Montréal, Centre de Recherche Mathématiques, Montréal, 1990.



*From the preface:* “... a rather varied range of topics was addressed, the common element being the role of transformation groups in Hamiltonian systems. Over half of the papers presented related to integrable systems, including some unusual interconnections with control theory and sorting algorithms. The remaining topics included: symmetry considerations and relative equilibria, quantization,  $R$ -matrices and classical gauge theory.”

R.V. AMBARTZUMIAN. — **Factorization calculus and geometric probability.** — Encyclopedia of mathematics and its applications, vol. 33. — Un vol. relié,  $16,5 \times 24$ , de XI, 286 p. — Prix: US\$35.00/£59.50. — Cambridge University Press, Cambridge, 1990.

This book develops the classical subjects of geometric probability and integral geometry, and the more modern one of stochastic geometry, in rather a novel way to provide a unifying framework in which they can be studied. The author focuses on factorization properties of measures and probabilities implied by the assumption of their invariance with respect to a group in order to investigate nontrivial factors. The main ideas presented here have application to such areas as stereology and tomography, geometrical statistics, pattern and texture analysis.

J.W. BRUCE, P.J. GIBLIN, P.J. RIPON. — **Microcomputers and mathematics.** — Un vol. broché,  $17,5 \times 24,5$  de XVI, 425 p. — Prix: £17.50/US\$29.95, (relié: £52.50/US\$90.00). — Cambridge University Press, Cambridge, 1990.

This book shows how simple programs can be used to do significant and interesting mathematics. It invites the reader to experiment and to discover mathematics with the help of a microcomputer. The book covers prime numbers and other aspects of number theory, solution of equations, geometry of curves, special numbers such as  $\pi$  and  $e$ , differential equations, and iterative processes including chaotic ones. The numerical programs are written in BASIC, the graphics programs require only that the programmer know the commands for drawing points and straight lines.

M. COORNAERT, T. DELZANT, A. PAPADOPOULOS. — **Géométrie et théorie des groupes: les groupes hyperboliques de Gromov.** — Lecture notes in mathematics, vol. 1441. — Un vol. broché,  $16,5 \times 24$ , de X, 165 p. — Prix: DM 30.00. — Springer-Verlag, Berlin, 1990.

The book is an introduction of Gromov's theory of hyperbolic spaces and hyperbolic groups. It contains complete proofs of some basic theorems which are due to Gromov, and emphasizes some important developments on isoperimetric inequalities, automatic groups, and the metric structure on the boundary of hyperbolic space.

Karl Heinz DOVERMANN, Reinhard SCHULTZ. — **Equivariant surgery theories and their periodicity properties.** — Lecture notes in mathematics, vol. 1443. — Un vol. broché,  $16,5 \times 24$ , de VI, 227 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

The theory of surgery on manifolds has been generalized to categories of manifolds with group actions in several different ways. This book discusses some basic properties that such theories have in common. Special emphasis is placed on analogs of the fourfold periodicity theorems in ordinary surgery and the roles of standard general position hypotheses on the strata of manifolds with group actions.

**EQUADIFF 7** : proceedings of the 7th Czechoslovak Conference on Differential Equations and their Applications held in Prague, 1989. — Ed. by Jaroslav Kurzweil. — Teubner-Texte zur Mathematik, Band 118. — Un vol. broché,  $14,5 \times 20,5$  de 313 p. — Prix: DM 42.00. — B.G. Teubner, Leipzig, 1990.

This volume contains the lectures of invited speakers of the 7th Czechoslovak Conference on Differential Equations and their Applications (EQUADIFF 7). Previous conferences were held in 1962, 1966, 1972, 1977, 1983, 1985 and they attracted a constantly growing number of mathematicians from all over the world. The lectures were delivered either at plenary sessions or in one of the following sections: ordinary differential equations, partial differential equations, numerical methods and applications.

**The popularization of mathematics.** — Ed. by A.G. Howson and J.-P. Kahane. — ICMI study series. — Un vol. broché,  $17 \times 24,5$  de xi, 210 p. — Prix: £8.50/US\$14.95 (broché), £25.00/US\$49.50 (relié). — Cambridge University Press, Cambridge, 1990.

This book presents the papers arising from the ICMI study seminar held at the University of Leeds, during September 1989. Inspired by the discussion document prepared by Howson, Kahane and Pollak, the symposium consisted of talks followed by sessions discussing the problems faced in the popularization through particular media. Members were present from a variety of backgrounds and discussion groups devoted to specific themes, such as the image of mathematicians, TV and films and mathematics in different cultures were also held.

Daniel J. RUDOLPH. — **Fundamentals of measurable dynamics: ergodic theory on Lebesgue spaces.** — Oxford Science Publications. — Un vol. relié,  $16 \times 24$ , de x, 168 p. — Prix: £25.00. — Clarendon Press, Oxford, 1990.

The author's aim is to present a technically complete account which offers an in-depth understanding of the techniques of the field, both classical and modern. Thus, the basic structure theorems of Lebesgue spaces are given in detail as well as complete accounts of the ergodic theory of a single transformation, ergodic theorems, mixing properties, and entropy. Subsequent chapters extend the earlier material to the areas of joinings and representation theorems, in particular the theorems of Ornstein and Krieger.

Joseph MECKE, *et al.* — **Stochastische Geometrie.** — DMV Seminar, Band 16. — Un vol. broché,  $24 \times 17$ , de 216 p. — Prix: SFr. 48.00. — Birkhäuser, Basel, 1990.

Das Ziel dieser Veranstaltung war es, die Stochastische Geometrie, die sich in den letzten Jahren lebhaft entwickelt hat und die auch für Anwendungen in der Bildverarbeitung, der Stereologie und der Statistik von räumlichen Daten eine grundlegende Bedeutung bekommen hat, einem breiteren Kreis von Mathematikern nahe zu bringen. Dabei sollte auch das Zusammenwirken geometrischer Ideen und stochastischer Modelle exemplarisch aufgezeigt werden.

**Topics in operator theory: Ernest D. Hellinger Memorial Volume.** — Volume editors: L. de Branges, I. Gohberg, J. Rovnyak. — Operator theory: advances and applications, vol. 48. — Un vol. relié,  $17 \times 24$ , de 448 p. — Prix: SFr. 118.00. — Birkhäuser, Basel, 1990.

This volume is dedicated to the memory of E.D. Hellinger, recognized for his distinguished work in mathematics and pioneering breakthroughs in operator theory and modern analysis. The main part of the volume comprises selected papers covering a broad spectrum of topics in operator theory and related fields. The papers are concerned with the theory of Hankel and Toeplitz operators, differential and difference operators, contractions and shifts, operators acting in Krein spaces, as well as topics bordering on complex function theory. All of the papers deal with important problems of modern operator theory and its applications.

A.D. WENTZELL. — **Limit theorems on large deviations for Markov stochastic processes.** — Mathematics and its applications (Soviet series), vol. 38. — Un vol. relié, 16,5 x 25, de XIII, 176 p. — Prix: Dfl. 150.00/US\$ 79.00/£ 53.00. — Kluwer, Dordrecht, 1990.

Limit theorems for stochastic processes are the natural modern generalization of limit theorems for sums of independent random variables, and yield many important applications. This volume examines this generalization by considering wide classes of families of stochastic processes instead of those based on independent random variables, and also by investigating distributions in functional spaces.

Alexei B. VENKOV. — **Spectral theory of automorphic functions and its applications.** — Mathematics and its applications (Soviet series), vol. 51. — Un vol. relié, 16,5 x 25, de XIV, 176 p. — Prix: Dfl. 160.00/US\$ 98.00/£ 56.00. — Kluwer, Dordrecht, 1990.

This volume presents a comprehensive survey of the most vigorously developing areas of research involving the spectral theory of automorphic functions. Topics covered include the expansion of automorphic eigenfunctions of Laplacians defined on symmetric (weakly symmetric) Riemann spaces and the study of their spectra, Eisenstein series theory, Selberg zeta-function theory with applications to global systems in number theory, the theory of geometric and topological invariants of Riemannian manifolds, and classical monodromy theory.

B.L. ROZOVSKII. — **Stochastic evolution systems: linear theory and applications to non-linear filtering.** — Mathematics and its applications (Soviet series), vol. 35. — Un vol. relié, 16,5 x 25, de XVIII, 315 p. — Prix: Dfl. 210.00/US\$ 129.00/£ 73.00. — Kluwer, Dordrecht, 1990.

Among the main topics discussed in this volume are stochastic differential calculus and the general theory of stochastic linear differential equations in Hilbert spaces; the theory of linear evolution stochastic partial differential equations; and filtering theory for diffusion processes. Special attention is given to second-order parabolic stochastic differential equations and their applications to the statistics of random dynamical systems. This volume is the first to present a comprehensive account of developments in the theory of stochastic partial differential equations.

Xiang-qun YANG. — **The construction theory of denumerable Markov processes.** — Wiley series in probability and mathematical statistics. — Un vol. relié, 16 x 23,5 de XVIII, 395 p. — Prix: £ 45.00. — Hunan Science and Technology Publishing House, Changsha, distr. by John Wiley & Sons, Chichester, 1990.

The construction theory is a key subject within the theory of Markov processes. This book sets out the basic framework of the theory of such Markov chains, and later develops more recent advances by Yang and some other Chinese writers. Many of these results are published in English for the first time and include complete solutions to two key construction problems, for birth-death processes and for two-sided birth-death processes.