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BULLETIN BIBLIOGRAPHIQUE

Arithmetic algebraic geometry. — Editors: G. van der Geer, F. Oort, J. Steenbrink. — Progress in mathematics, vol. 89. — Un vol. relié, 16 × 24, de x, 444 p. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1991.

Representative of recent developments in arithmetic algebraic geometry is the notion of Arakelov geometry, a way of "completing" a variety over the ring of integers of a number field by adding fibres over the archimedean places. Another is the appearance of the relation between diophantine approximation theory and the value distribution theory of holomorphic maps. Inspired by these developments, the editors organized a meeting at Texel in 1989 and invited a number of mathematicians to write papers for this volume. Topics include: arithmetic surfaces, Chern functors, modular curves and modular varieties, elliptic curves, Kolyvagin's work, K-theory and Galois representations.

Les Ondelettes en 1989 : séminaire d'analyse harmonique, Université de Paris-Sud, Orsay. — P.G. Lemarié, ed. — Lecture notes in mathematics, vol. 1438. — Un vol. broché, 16,5 × 24, de IV, 212 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

This book surveys the recent theory of wavelet transforms and its applications in various fields both within mathematics (singular integrals, localization of singularities) and beyond it, in computer vision, the physics of fractals, time-frequency analysis.

E. BUJALANCE, J.J. ETAYO, J.M. GAMBOA, G. GROMADZKI. — **Automorphism groups of compact bordered Klein surfaces: a combinatorial approach.** — Lecture notes in mathematics, vol. 1439. — Un vol. broché, 16,5 × 24, de XIII, 201 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

This research monograph provides a self-contained approach to the problem of determining the conditions under which a compact bordered Klein surface S and a finite group G exist, such that G acts as a group of automorphisms in S. The cases dealt with here take G cyclic, abelian, nilpotent or supersoluble and S hyperelliptic or with connected boundary.

Topology and combinatorial group theory: proceedings of the Fall Foliage Topology Seminars held in New Hampshire 1986-1988. — P. Latiolais, editor. — Lecture notes in mathematics, vol. 1440. — Un vol. broché, 16,5 × 24, de VI, 207 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

This book demonstrates the lively interaction between algebraic topology, very low dimensional topology and combinatorial group theory. Many of the ideas presented here are still in their infancy, and it is hoped that the work here will spur others to new developments. Among the many techniques discussed are the use of obstruction groups to distinguish certain exact sequences and several graph theoretic techniques with applications to the theory of groups.

S.P. NOVIKOV and A.T. FOMENKO. — **Basic elements of differential geometry and topology.** — Mathematics and its applications (Soviet series), vol. 60. — Un vol. relié, 17 × 24,5 de x, 490 p. — Prix: DFl. 260.00/US$ 164.00/£ 90.00. — Kluwer, Dordrecht, 1990.

This volume has arisen from a course of lectures given by the authors at Moscow State University on the fundamentals of geometry and topology based on a growing recognition that classical differential geometry had become outdated and that there was a need for a course which presented those parts of modern geometry which are absolutely essential today. In addition to the traditional geometry of curves and surfaces, the course included the fundamental principles of tensor analysis, and Riemannian geometry and topology.

Michael STRUWE. — **Variational methods: applications to nonlinear partial differential equations and Hamiltonian systems.** — Un vol. relié, 16 × 24, de XIV, 244 p. — Prix: DM 78.00. — Springer-Verlag, Berlin, 1990.

The first modern treatment of a variational problem is attributed to Fermat. With the development of the calculus by Newton and Leibnitz, the basis was laid for a more systematic development of the calculus of variations. The brothers Johann and Jakob Bernoulli, and Leonhard Euler were to become the "founding fathers" of this new discipline. The book gives a concise introduction to a variational method and presents an overview of areas of current research in this field.

R.W.H.T. HUDSON. — **Kummer's quartic surface.** — Cambridge Mathematical Library series. — Reprint of the 1905 edition. — 15 × 23, de XXIV, 222 p. — Prix: £ 15.00/US$ 24.95. — Cambridge University Press, Cambridge, 1990.

The theory of surfaces has reached a certain stage of completeness and major efforts concentrate on solving concrete questions rather than developing further the formal theory. Many of these questions are touched upon in this classic volume, such as the classification of quartic surfaces, the description of moduli spaces for abelian surfaces, and the automorphism group of a Kummer surface. First printed in 1905 after the untimely death of the author, this work has stood for most of this century as one of the classic reference works in geometry.

Ein Jahrhundert Mathematik, 1890-1990: Festschrift zum Jubiläum der DMV. — Hrsg. von G. Fischer, F. Hirzebruch, W. Scharlau und W. Törnig. — Dokumente zur Geschichte der Mathematik, Band 6. — Un vol. relié, 16,5 × 23, de XII, 830 p. — Prix: DM 198.00 (DM 158.00 pour les membres de la DMV). — Deutsche Mathematiker-Vereinigung/Friedrich Vieweg & Sohn, Braunschweig, 1990.

Zum Anlass des 100. Geburtstages der Deutschen Mathematiker-Vereinigung erscheint diese Festschrift, bestehend aus neunzehn Beiträgen, in denen anerkannte Fachwissenschaftler die Entwicklung ihres jeweiligen mathematischen Fachgebietes beschreiben und dabei auch kritische Rückschau auf die Geschichte der Deutschen Mathematiker-Vereinigung seit ihrer Gründung 1890 halten. Insbesondere der erste Beitrag setzt sich intensiv mit der Historie der Mathematik und der Mathematiker im Dritten Reich auseinander.

Jean-Yves GIRARD. — **Proof theory and logical complexity. Vol.1.** — Studies in proof theory monographs. — Un vol. relié, 18 × 25,5, de 503 p. — Prix: US$ 102.50/Dfl. 200.00. — Bibliopolis, Napoli, 1987 (Distr. outside Italy: Elsevier, Amsterdam and New York).

This volume is the first in a series which will, in the future, be published jointly by Bibliopolis and Elsevier. It is also the first of a two-part work covering the main ideas and techniques of

proof theory. This volume is introductory, starting with Hilbert, describing Hilbert's program and its demise at the hands of Gödel. It then proceeds with Gentzen's result and improvements and generalizations to *w*-logic.

Algebraic geometry: proceedings of the Conference at Berlin, 9-15 March 1988. — Ed. by H. Kurke and J.H.M. Steenbrink. — Reprinted from "Compositio mathematica", vol. 76, Nos 1 & 2, 1990. — Un vol. relié, 16 × 24,5 de 305 p. — Prix: DFl. 160.00/US$99.00/£55.00. — Kluwer, Dordrecht, 1990.

This volume contains some of the lectures presented at the Conference on Algebraic Geometry held in Berlin, March 1988, together with articles on related subjects. The collection of papers focuses on actual themes in algebraic geometry and singularity theory, such as vector bundles, arithmetic algebraic geometry, intersection theory, moduli and Hodge theory.

Carl de Boor. — **Splinefunktionen.** — Lectures in mathematics, ETH Zürich. — Un vol. broché, 17 × 24, de 184 p. — Prix: SFr. 32.00. — Birkhäuser Verlag, Basel, 1990.

In klar aufgebauten Schritten wird der Leser von einer Übersicht über die Theorie der „gewöhnlichen" Splinefunktionen einer Veränderlichen zum aktuellen Forschungsgebiet der multivariaten *B*-Splines geführt. Der Text bietet die Vorzüge einer sorgfältigen Vorlesungsausarbeitung und ist eine wertvolle Ergänzung zur Standardliteratur.

A tribute to Paul Erdös. — Edited by A. Baker, B. Bollobás, A. Hajnal. — Un vol. relié, 16 × 23,5, de xiv, 478 p. — Prix: £55.00. — Cambridge University Press, Cambridge, 1990.

This volume is dedicated to Paul Erdös, who has profoundly influenced mathematics this century, with over 1200 papers in number theory, complex analysis, probability theory, geometry, interpretation theory, algebra set theory and combinatorics. One of Erdös' hallmark is the host of stimulating problems and conjectures ... A feature of this volume is a collection of some 50 outstanding unsolved problems, together with their "value". Eminent mathematicians from around the world have contributed articles to this volume that reflect the diversity of Erdös' interests, and it will be a source of inspiration for number theorists, combinatorialists, set theorists and analysts.

***K*-theory and homological algebra: a seminar held at the Razmadze Mathematical Institute in Tbilisi, Georgia, USSR 1987-88.** — H. Inassaridze, editor. — Lecture notes in mathematics, vol. 1437. — Un vol. broché, 16,5 × 24, de 313 p. — Prix: DM 53.00. — Springer-Verlag, Berlin, 1990.

T. Datuashvili: Homological dimension of extensions of abelian categories and rings. — J. Gubeladze: Classical algebraic *K*-theory of monoid algebras. — H. Inassaridze: *K*-theory of special normed rings. — G. Janelidze: Cohomology and extensions of internal modules. — M. Jibiladze: Coefficients for cohomology of large categories. — T. Kandelaki: *K*-theory of *Z*2-graded Banach categories. — D. Pataraia: On Quillen's plus construction of perfect groups. — T. Pirashvili: Cohomology of small categories in homotopical algebra. — M. Uridia: *U*-theory of exact categories.

Euclide d'Alexandrie. — Les éléments. Vol. 1: Introduction générale (par Maurice Caveing). Livres I-IV: Géométrie plane (par Bernard Vitrac). Traduits du texte de Heiberg. — Bibliothèque d'histoire des sciences. — Un vol. broché, 15 × 22, de 531 p. — Prix: FF 480.00. — Presses Universitaires de France, Paris, 1990.

Les «Eléments» d'Euclide font partie des textes fondateurs: source de traditions mathématiques depuis l'Antiquité jusqu'à l'époque moderne, ils ont toujours été aussi un banc d'essai des pouvoirs de la raison théoricienne, l'un des textes propédeutiques à l'exercice de la pensée. La traduction nouvelle qui est ici proposée de l'original grec, dans la version qui fait autorité, le restitue dans son intégralité, en évitant de l'adapter, de le simplifier ou de le moderniser, comme ce fut le cas trop souvent. Elle veut ainsi répondre à l'exigence de fidélité scrupuleuse, qui est de nos jours la règle... Ainsi éclairé et respecté dans sa littéralité comme dans sa signification, l'ouvrage d'Euclide est enfin accessible en français à tous ceux que ne peuvent laisser indifférents les oeuvres maîtresses de l'esprit.

Handbook of applied mathematics: selected results and methods. — Second edition. — Edited by Carl E. Pearson. — Un vol. broché, 15 × 22,5 de XIII, 1307 p. — Prix: £26.00. — Van Nostrand Reinhold, New York, London, 1990 (distributed by Chapman and Hall, London).

In this revised and expanded "Handbook of applied mathematics", twenty leading authorities in applied mathematics explain practical analytic methods and the results that follow from each one. Illustrations and worked-out examples, drawn from engineering, oceanography, physics, and other fields, enhance understanding of those methods. The handbook begins with a thorough review of algebra, trigonometry, analytic geometry, and the elements of analysis. Then it proceeds to more complex subjects, emphasizing initial and boundary value problems. Specific topics covered include singularities and perturbation expansions, wave phenomena, nonlinear equations, boundary layers, eigenvalues and extremal fields.

M.J. COLLINS. — **Representations and characters of finite groups.** — Cambridge studies in advanced mathematics, vol. 22. — Un vol. relié, 15,5 × 23,5 de XII, 242 p. — Prix: £30.00/US$59.50. — Cambridge University Press, Cambridge, 1990.

Representation theory and character theory have proved essential in the study of finite simple groups since their early development by Frobenius. The author begins by presenting the foundations of representation theory and character theory in a style accessible to advanced undergraduates. This theme is then expanded in a self-contained account providing an introduction to the applications of ordinary character theory to the classification of finite simple groups.

Joseph GRIFONE. — **Algèbre linéaire.** — Un vol. broché, 17 × 24, de VIII, 439 p. — Prix: FF 190.00. — CEPADUES-Editions, Toulouse, 1990.

Cet ouvrage présente un cours complet d'algèbre linéaire recouvrant les programmes du 1er cycle des Universités et des classes préparatoires. L'auteur s'est efforcé de rédiger un ouvrage qui présente les différents sujets avec clarté et simplicité. En particulier: le support géométrique est toujours souligné et le cas échéant, illustré par des exemples et des dessins; les différentes notions — les plus géométriques comme les plus abstraites — sont introduites en mettant en évidence leurs raisons d'être et leur intérêt; les définitions et les énoncés sont toujours suivis d'exemples et d'exercices résolus.

Michael D. POTTER. — **Sets: an introduction.** — Oxford science publications. — Un vol. broché, 15,5 × 23,5, de X, 241 p. — Prix: £35.00 (relié)/£15.00 (broché). — Clarendon Press (distr. by Oxford University Press), Oxford, 1990.

This textbook provides a first course in set theory suitable for final year undergraduates of mathematics. The author develops the subject from first principles and presupposes little more

than an elementary grounding in logic. Throughout, much attention is paid to the historical and philosophical background which illuminates the subject's development. This book differs from most textbooks of set theory by providing a particularly elegant and intuitive approach based on Scott's formulation of standard set theory in which sets are built up stage by stage. This approach has the advantage of introducing the axioms of set theory in a natural way and shows how they come to take the form they do.

P.M. COHN. — **Algebra. Vol. 3.** — Second edition. — Un vol. relié, 15,5 × 23,5 de XII, 474 p. — Prix: £55.00. — John Wiley, Chichester, 1990.

In this revised edition, the material originally covered in the second volume of the author's successful algebra textbook series has been divided into two. This volume contains the more advanced parts from the former volume 2, the more basic material being found in volume 2. There are several new chapters on groups, skew fields and universal algebra, as well as additional sections on Morita equivalence, linear groups, generalized polynomial identities and others.

Reliable numerical computation. — Ed. by M.G. Cox and S. Hammarling. — Oxford science publications. — Un vol. relié, 16 × 24, de XVI, 339 p. — Prix: £40.00. — Clarendon Press (distr. by Oxford University Press), Oxford, 1990.

This book is based on papers from a conference in honour of James Hardy Wilkinson. Research papers were invited from twenty of the world's best-known numerical mathematicians in the areas of linear algebra, error analysis, computer arithmetic, and mathematical software, in all of which JHW made many distinguished contributions. Contributors include: B. Parlett, C.L. Lawson, J.K. Gupta, J. Demmel, T. Beelen, P. van Dooren, C.C. Paige, M.G. Cox, G.W. Stewart, A. Björck *et al.*

Volker PECKHAUS. — **Hilbertprogramm und Kritische Philosophie.** — Studien zur Wissenschafts-, Sozial- und Bildungsgeschichte der Mathematik, Bd. 7. — Un vol. broché, 15,5 × 23, de IX, 291 p. — Vandenhoeck und Ruprecht, Göttingen, 1990.

De la préface: „... Ich habe in der hier vorgelegten Untersuchung versucht, das methodologische Konzept der Sozialgeschichte der Logik auf die Geschichte der mathematischen Grundlagenforschung in Göttingen in den ersten beiden Jahrzehnten dieses Jahrhunderts zu übertragen. Ich knüpfe aber auch inhaltlich an die Projektarbeit an und führe sie gleichsam durch Ausweitung des Untersuchungszeitraums fort, denn die Entwicklung des frühen axiomatischen Programms in Göttingen war auch von zentraler Bedeutung für die Geschichte der formalen Logik..."

Béla BOLLOBAS. — **Linear analysis : an introductory course.** — Cambridge Mathematical Textbooks. — Un vol. broché, 15 × 22,5 de XI, 240 p. — Prix: £11.95 (relié: £35.00). — Cambridge University Press, Cambridge, 1990.

This introduction to functional analysis is intended for advanced undergraduate students who have had some background in real analysis. The author's aim is not just to cover the standard material in a standard way, but to present results of application in contemporary mathematics and to show the relevance of functional analysis to other areas. Unusual topics covered include the geometry of finite-dimensional spaces, invariant subspaces, fixed-point theorems, and the Bishop-Phelps theorem.

Statistics in science : the foundations of statistical methods in biology, physics and economics. — Edited by Roger Cooke and Domenico Costantini. — Boston Studies in the

Philosophy of Science, vol. 122. — Un vol. relié, 15,5 × 23, de IX, 184 p. — Prix: Dfl. 135.00/ US$80.00/£46.00. — Kluwer Academic Publishers, Dordrecht, 1990.

These are the proceedings of the International Conference on Statistics, held in Luino, Italy, organized by the Società italiana di logica e filosofia della scienza and the Istituto Ludovico Geymonat. Contributions by L. Krüger, A. Shimony, M.C. Galavotti and G. Gambetta, R.M. Cooke, E. Marubini, T. Calinski, E. Ottaviano and M.S. Gorla, A. Piazza, L. Accardi, A. Bach, D. Costantini and U. Garibaldi.

S. SHELAH. — **Classification theory and the number of non-isomorphic models.** — Revised edition. — Studies in logic and the foundations of mathematics, vol. 92. — Un vol. relié, 16 × 23, de XXX, 705 p. — Prix: US$242.75/Dfl. 425.00. — North-Holland, Amsterdam, 1990.

In this research monograph, the author's work on classification and related topics are presented. This revised edition brings the book up to date with the addition of four new chapters as well as various corrections to the 1978 text. The additional chapters present the solution to countable first order T of what the author sees as the main test of the theory.

A.J. CHORIN, J.E. MARSDEN. — **A mathematical introduction to fluid mechanics.** — Second edition. — Texts in applied mathematics, 4. — Un vol. relié, 16 × 24, de IX, 168 p. — Prix: DM 58.00. — Springer-Verlag, New York, 1990.

The text presents some selected highlights of currently interesting topics in fluid mechamics in a compact form, as well as providing a concise and appealing exposition of the basic theory. The first chapter contains an elementary derivation of the equations, and the concept of vorticity is introduced. The second chapter contains a discussion of potential flow, vortex motion, and boundary layers. The third chapter contains an analysis of one-dimensional gas flow from a mildly modern point of view. Weak solution, Riemann problems, Glimm's scheme, and combustion waves are covered.

B.A. DUBROVIN, A.T. FOMENKO, S.P. NOVIKOV. — **Modern geometry: methods and applications, part 3: introduction to homology theory.** — Graduate texts in mathematics, vol. 124. — Un vol. relié, 16 × 24, de IX, 416 p. — Prix: DM 138.00. — Springer-Verlag, New York, 1990.

The three volumes of "Modern geometry: methods and applications" contain a concrete exposition of the geometrical and topological methods of the theory of manifolds. This volume, presented in highly accessible languages, concentrates in homology theory. It contains introductions to the contemporary methods for the calculation of homology groups and the classification of manifolds.

Klaus JAENICH. — **Topologie.** — 3. Aufl. — Springer-Lehrbuch. — Un vol. broché, 16,5 × 24, de IX, 215 p. — Prix: DM 32.00. — Springer-Verlag, Berlin, 1990.

Das erklärte Ziel des Autors war es, von der mengentheoretischen Topologie in leicht fasslicher und anregender Form „gerade so viel zu bringen, wie ein Mathematik-Student beherrschen sollte". Natürlich musste dazu eine strenge Selektion der zu behandelnden Themen getroffen werden: Grundbegriffe, topologische Vektorräume, Quotiententopologie, Vervollständigung metrischer Räume, Homotopie, Abzählbarkeitsaxiome, CW-Komplexe, stetige Funktionen, Überlagerungen, der Satz von Tychonoff, Mengenlehre.

Klaus JAENICH. — **Analysis für Physiker und Ingenieure. Funktionentheorie, Differentialgleichungen, Spezielle Funktionen: ein Lehrbuch für das zweite Studienjahr.** — 2. Auflage. — Springer-Lehrbuch. — Un vol. broché, 16,5 × 24, de XI, 419 p. — Prix: DM 54.00. — Springer-Verlag, Berlin, 1990.

Inhaltsverzeichnis: Ein Grundkurs in Funktionentheorie: Die komplexen Zahlen. Analytische Funktionen. Komplexe Integration. Eine grundlegende Sätze der Funktionentheorie. Der Residuenkalkül. — Ein Grundkurs über gewöhnliche Differentialgleichungen: Einfache Beispiele von Differentialgleichungen. Dynamische Systeme. Lineare Differentialgleichungen und Systeme. Rand- und Eigenwert-Aufgaben. Greensche Funktionen und die delta-,,Funktion''. — Spezielle Funktionen der Mathematischen Physik. Eine Einführung: Gleichungen aus Separationsansätzen. Differentialgleichungen in der komplexen Ebene. Kugelfunktionen. Zylinderfunktionen.

Stochastic analysis and related topics II. — Proceedings of a Second Workshop held in Silivri, Turkey, July 18-30, 1988. — Ed. by H. Korezlioglu, A.S. Ustunel. — Lecture notes in mathematics, vol. 1444. — Un vol. broché, 16,5 × 24, de V, 268 p. — Prix: DM 45.00. — Springer-Verlag, Berlin, 1990.

The Second Silivri Workshop functioned as a short summer school and a working conference, producing lecture notes and research papers on recent developments of Stochastic Analysis in Wiener Space. The topics of the lectures concern short time asymptotic problems and anticipative stochastic differential equations. Research papers are mostly extensions and applications of the techniques of anticipative stochastic calculus.

Séminaire de théorie des nombres, Paris 1988-1989. — Ed. by Catherine Goldstein. — Progress in mathematics, vol. 91. — Un vol. relié, 16 × 24, de X, 252 p. — Prix: SFr. 62.00. — Birkhäuser Verlag, Basel, 1990.

This is the 10th annual volume of papers based on lectures given at the Séminaire de théorie des nombres de Paris in 1988-1989, including some additional papers of widespread interest and a paper on a historical subject. Contributors: C. Bachoc, R. Balasubramanian, J. Buchmann, J.-L. Colliot-Thélène, T. Ekedahl, E.U. Gekeler, H. Hida, M. Hindry, N. Hirata-Kohno, V. Kumar Murty, M. Ram Murty, N. Schappacher, R. Schoof, J.H. Silverman, A.N. Skorobogatov, G. Tenenbaum.

G.G.A. BAEUERLE, E.A. DE KERF. — **Lie algebras. Part 1: Finite and infinite dimensional Lie algebras and applications in physics.** — Studies in mathematical physics, vol. 1. — Un vol. relié, 16 × 23, de XVI, 394 p. — Prix: US$ 105.75/Dfl. 185.00. — North-Holland, Amsterdam, 1990.

The structure of the laws in physics is largely based on symmetries. This book is on Lie algebras, the mathematics of symmetry. It has grown from lectures for undergraduates in theoretical and mathematical physics and gives a thorough mathematical treatment of finite dimensional Lie algebras and Kac-Moody algebras. Concepts such as Cartan matrix, root system, Serre's construction are carefully introduced. Experience has shown that students who followed the lectures are well-prepared to take on research in the realms of string-theory, conformal field-theory and integrable systems.

A.A. PANKOV. — **Bounded and almost periodic solutions of nonlinear operator differential equations.** — Mathematics and its applications (Soviet series), vol. 55. — Un vol. relié, 16,5 × 24,5 de X, 220 p. — Prix: Dfl. 170.00/US$ 99.00/£ 59.00. — Kluwer, Dordrecht, 1990.

This volume deals with bounded and almost-periodic solutions of various evolution problems, as well as with certain stationary problems. Topics covered include: theory of almost-periodic functions, Bohr compactification, estimates for solutions of certain integral inequalities, superposition operators, bounded and almost-periodic solutions of variational inequalities, evolution equations, spatially almost-periodic problems, Besicovitch solutions.

A.S. DAVYDOV. — **Solitons in molecular systems.** — Second edition. — Mathematics and its applications (Soviet series), vol. 61. — Un vol. relié, 16,5 × 24,5 de XIII, 413 p. — Prix: Dfl. 250.00/US$ 149.00/£ 87.00. — Kluwer, Dordrecht, 1991.

Since the publication of the first edition of this book in 1985, the theory of solitons in molecular systems has developed considerably. This new edition has been greatly modified and supplemented to take account of these latest developments. In addition, great attention is paid to a discussion of the physical results of the theory and its applications. A considerable part of the book is devoted to modern approaches in the study of energy transduction and electrons in quasi-one-dimensional molecular systems and of protons in macromolecules with hydrogen bonds.

V.I. ARNOLD. — **Singularities of caustics and wave fronts.** — Mathematics and its applications (Soviet series), vol. 62. — Un vol. relié, 16,5 x 24,5 de XIII, 259 p. — Prix: Dfl. 160.00/US$ 99.00/£ 56.00. — Kluwer, Dordrecht, 1990.

Caustics and wavefronts of ray systems have been the subject of study since ancient times. Much more recently it has been recognized that singularities which occur in ray systems are governed by the theory of Euclidean reflection groups and Weyl groups of simple Lie algebras. This unexpected and somewhat mysterious relation between, on the one hand, geometrical optics, variational calculus and optimal control, and on the other hand, the invariant theory of Lie groups and algebras, and algebraic differential geometry and topology, has lead to significant advances in the theory of wave propagation. These advances are described in this book in a self-contained, comprehensive way.

B.M. LEVITAN and I.S. SARGSJAN. — **Sturm-Liouville and Dirac operators.** — Mathematics and its applications (Soviet series), vol. 59. — Un vol. relié, 16,5 × 24,5 de XI, 350 p. — Prix: Dfl. 240.00/US$ 149.00/£ 83.00. — Kluwer, Dordrecht, 1991.

This volume is devoted to the spectral theory of the Sturm-Liouville operator and the one-dimensional Dirac operator. Problems such as the asymptotic behaviour of eigenvalues and eigenfunctions, eigenfunction expansions, the asymptotic distribution of eigenvalues, the calculation of regularized traces, and the solution of inverse problems are considered comprehensively. Presented for the first time is a systematic treatment of the spectral theory of the Dirac systems.

Bernard R. GELBAUM, John M.H. OLMSTED. — **Theorems and counterexamples in mathematics.** — Problem books in mathematics. — Un vol. relié, 16 × 24,5, de XXXIV, 305 p. — Prix: DM 84.00. — Springer-Verlag, Berlin, 1990.

This text is intended to provide graduate and advanced undergraduate students as well as the general mathematical public with a modern treatment of various theorems and examples in mathematics. A carefully arranged mixture of theorems, examples, exercises, hints and discussions sharpens and highlights many of the fundamental aspects of the subject matter, and constitutes a rounding out and elaboration of the standard parts of algebra, analysis, geometry,

logic, probability, set theory, and topology. Essentially self-contained, the book presents this material with a treatment sensitive to the progress mathematics has made in the last 25 years.

Jean-Paul PIER. — **L'analyse harmonique: son développement historique.** — Un vol. broché, 16 × 24, de 344 p. — Prix: FF 370.00. — Masson, Paris, 1990.

Ce livre étudie l'apparition de la théorie des groupes topologiques, la mise en place des techniques de ces outils, l'introduction d'une mesure invariante sur les groupes localements compacts. Il fournit des informations sur l'origine des algèbres de Banach, des C^*-algèbres, des algèbres de von Neumann. Il examine le problème de la structure des groupes localement compacts et explicite longuement celui de leur représentation. Il passe en revue de nombreux groupes localement compacts spécifiques. L'ouvrage est complété par un index des noms, et un index des symboles.

Applied and industrial mathematics, Venice-1, 1989. — Edited by Renato Spigler. — Mathematics and its applications, vol. 56. — Un vol. relié, 16,5 × 24,5, de XIII, 374 p. — Prix: Dfl. 220.00/US$ 136.00/£ 77.00. — Kluwer Academic Publishers, Dordrecht, 1990.

This volume contains the invited papers and a selection of the contributed papers of the Venice-1 Symposium on Applied and Industrial Mathematics held in late 1989. The contents illustrate the state of the art in many areas. Invited contributions by: C. Cercignani, A. Chorin, Feng Kang, C.W. Gear, J.B. Keller, P.D. Lax, J.L. Lions, V.P. Maslov, S.K. Mitter, H. Neunzert, J.R. Ockendon, M. Primicerio, M. Pulvirenti, A. Quarteroni, S. Rionero.

Proceedings of the 4th European Conference on Mathematics in Industry, May 29-June 3, 1989, Strobl. — Edited by Hansjörg Wacker and Walter Zulehner. — European Consortium for Mathematics in Industry (ECMI), vol. 6. — Un vol. relié, 17 × 25, de X, 433 p. — Prix: Dfl. 240.00/US$ 148.00/£ 83.00. — Kluwer Academic Publishers, Dordrecht, 1990.

These proceedings contain 56 lectures and are divided in four sections. The first section consists in a selection of invited lectures, some of them on specific topics, such as the modelling for the crystallization of polymers or time division multiple access systems. The second and third section contain lectures of two minisymposia, one devoted to steel processing, the other to chemical engineering. The fourth section consists of contributed lectures, whose wide range of problems demonstrates the diversity of industrial mathematics.

Functional analysis, optimization, and mathematical economics : a collection of papers dedicated to the memory of Leonid Vital'evich Kantorovich. — Edited by Lev J. Leifman. — With a foreword by Wassily Leontief. — Un vol. relié, 16,5 × 24, de XIV, 341 p. — Prix: £ 60.00. — Oxford University Press, New York, Oxford 1990.

V.L. Makarov and S.L. Sobolev: Academician L.V. Kantorovich (19 January 1912 to 7 April 1986). — L.V. Kantorovich: My journey in science (supposed report to the Moscow Mathematical Society). — J.V. Rosenhead and Natalie Iljina-Kantorovich: Silver Medal. — 18 other scientific contributions by: Ya.I. Fet, M.G. Krein and B. Ya. Levin with A.A. Nudel'man, S.S. Kutateladze, A.I. Veksler, Y.A. Abramovich, V.L. Levin, G.L. Thompson, H. Hollatz, A. Prékopa, J.B. Rosen, O.L. Mangasarian, M. Dror and S.I. Gass, K.-H. Elster, H. Tuy, L.J. Leifman, M.L. Balinski and D. Gale, A.M. Vershik and A.G. Chernyakov, H. Uzawa.

The Grothendieck Festschrift : a collection of articles written in honor of the 60th birthday of Alexander Grothendieck, vol. 1. — P. Cartier, L. Illusie, N.M. Katz, G. Laumon, Y. Manin, K.A. Ribet, editors. — Progress in mathematics, vol. 86. — Un vol. relié (sur trois prévus), 16 × 23,5 de XX, 498 p. — Prix: SFr. 106.00. — Birkhäuser, Boston, 1990.

Jean Dieudonné: De l'analyse fonctionnelle aux fondements de la géométrie algébrique. — A.B. Altman and S.L. Kleiman: The presentation functor and the compactified Jacobian. — M. Artin, J. Tate, M. Van den Bergh: Some algebras associated to automorphisms of elliptic curves. — V. Balaji, C.S. Seshadri: Cohomology of a moduli space of vector bundles. — A. Beauville: Sur les hypersurfaces dont les sections hyperplanes sont à module constant. — A.A. Beilinson, A.B. Goncharov, V.V. Schechtman, A.N. Varchenko: Aomoto dilogarithms, mixed Hodge structures, and motivic cohomology of pairs of triangles on the plane. — P. Berthelot, W. Messing: Théorie de Dieudonné cristalline III: théorèmes d'équivalence et de pleine fidélité. — J.-M. Bismut, H. Gillet, C. Soulé: Complex immersions and Arakelov geometry. — S. Bloch, K. Kato: L-functions and Tamagawa numbers of motives. — L. Breen: Bitorseurs et cohomologie non abélienne. — J.-L. Brylinski: Non-commutative Ruelle-Sullivan type currents.

Nonlinear evolution equations that change type. — Barbara Lee Keyfitz, Michael Shearer, editors. — The IMA volumes in mathematics and its applications, vol. 27. — Un vol. relié, 16 × 24, de XIV, 284 p. — Prix: DM 68.00. — Springer-Verlag, New York, 1990.

This volume will be of interest to applied mathematicians, to researchers in partial differential equations, and to those involved in fluid dynamics and numerical analysis examining models for viscoelastic flows, porous medium and granular flows, and flows exhibiting phase transitions.

Friedmar SCHULZ. — **Regularity theory for quasilinear elliptic systems and Monge-Ampère equations in two dimensions.** — Lecture notes in mathematics, vol. 1445. — Un vol. broché, 16,5 × 24, de XV, 123 p. — Prix: DM 25.00. — Springer-Verlag, Berlin, 1990.

These lecture notes have been written as an introduction to the characteristic theory for two-dimensional Monge-Ampère equations, a theory largely developed by H. Lewy and E. Heinz which has never been presented in book form. Self-contained introductions to the regularity theory of elliptic systems, the theory of pseudoanalytic functions and the theory of conformal mappings are included.

Methods of nonconvex analysis. — Lectures given at the 1st Session of the Centro Internazionale Matematico Estivo (C.I.M.E.) held at Varenna, Italy, June 15-23, 1989. — Editor: A. Cellina. — Lecture notes in mathematics, vol. 1446. — Un vol. relié, 16,5 × 24, de V, 206 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

I. Ekeland: The epsilon-variational principle revisited. — P. Marcellini: Non convex integrals of the calculus of variations. — A. Marino, M. Tosques: Some variational problems with lack of convexity and some partial differential inequalities. — Cz. Olech: The Lyapunov theorem: its extensions and applications. — G. Pianigiani: Differential inclusions. The Baire category method. — R.T. Rockafeller: Nonsmooth analysis and parametric optimization. — M. Valadier: Young measures.

Non-commutative ring theory. — Proceedings of a Conference held in Athens, Ohio, Sept. 29-30, 1989. — Lecture notes in mathematics, vol. 1448. — Edited by S.K. Jain,

S.R. López-Permouth. — Un vol. broché, 16,5 × 824, de v, 166 p. — Prix: DM 30.00. — Springer-Verlag, Berlin, 1990.

The papers of this volume share as a common goal the structure and classification of noncommutative rings and their modules, and deal with topics of current research including: localization, serial rings, perfect endomorphism rings, quantum groups, Morita contexts, generalizations of injectivity, and Cartan matrices.

Wlodzimierz ODYNIEC, Grzegorz LEWICKI. — **Minimal projections in Banach spaces: problems of existence and uniqueness and their application.** — Lecture notes in mathematics, vol. 1449. — Un vol. broché, 16,5 × 24, de VIII, 168 p. — Prix: DM 30.00. — Springer-Verlag, Berlin, 1990.

The book is devoted to the two natural problems: first, the existence, and then, the unicity of minimal projections in Banach space. Connections are established between the latter and unicity in mathematical programming problems and also with the problem of the characterisation of Hilbert spaces. The book also contains a Kolmogorov type criterion for minimal projections and detailed description of the Fourier operators.

Functional-analytic methods for partial differential equations. — Proceedings of a Conference and a Symposium, held in Tokyo, Japan, July 3-9, 1989. — H. Fujita, T. Ikebe, S.T. Kuroda, editors. — Lecture notes in mathematics, vol. 1450. — Un vol. broché, 16,5 × 24, de VII, 252 p. — Prix: DM 45.00. — Springer-Verlag, Berlin, 1990.

The study of Schrödinger operators, from the viewpoints of evolution equations and spectral theory, is one major subject of these meetings held in honour of Prof. Tosio Kato, while functional analytic study of nonlinear PDEs, including Navier-Stokes, KdV, and other equations, constitutes another main theme.

Global geometry and mathematical physics. — Lectures given at the 2nd Session of the Centro Internazionale Matematico Estivo (C.I.M.E.) held at Montecatini Terme, Italy, July 4-12, 1988. — Lecture notes in mathematics, vol. 1451. — Un vol. broché, 16,5 × 24, de IX, 197 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1990.

The summer school was devoted to methods of global differential geometry and algebraic geometry in field theory, with the main emphasis on: instantons, vortices and other similar structures in gauge theories, Riemann surfaces and conformal field theories, geometry of supermanifolds and applications to physics. The papers are mainly survey and tutorials.

L.P. HUGHSTON, K.P. TOD. — **An introduction to general relativity.** — London Mathematical Society student texts, vol. 5. — Un vol. broché, 15 × 23, de 183 p. — Prix: £8.95/US$19.95 (relié: £25.00/US$49.50). — Cambridge University Press, Cambridge, 1991.

After a review of Cartesian tensor notation and special relativity the concepts of Riemannian differential geometry are introduced. General relativity is then presented as a relativistic theory of gravity reducing in the appropriate limits to Newtonian gravity or special relativity. The Schwarzschild solution is derived and the gravitational redshift, time dilation and classic tests of general relativity are discussed. There is a brief account of gravitational collapse and black holes. Other vacuum solutions are described, motivated by their counterparts in linearised general relativity. The book ends with chapters on cosmological solutions to the field equations. There are exercises attached to each chapter.

P. WOJTASZCZYK. — **Banach spaces for analysts.** — Cambridge studies in advanced mathematics, vol. 25. — Un vol. relié, 16 × 23,5 de XIII, 382 p. — Prix: £50.00/US$79.50. — Cambridge University Press, Cambridge, 1991.

The author begins with a discussion of weak topologies, weak compactness and isomorphisms of Banach spaces. The orthonormal Franklin system is constructed and its behaviour in certain of the spaces considered. Basic results about projection are presented and applied in approximation theory and function theory. Schatten-von Neumann and p-absolutely summing p-nuclear operators are introduced and used in the study of power bounded operators. The factorization results of Nikishin and Maurey are presented and their relevance to harmonic analysis and function theory is demonstrated. The author concludes with the results of Bourgain on absolutely summing operators on the disc algebra, which lead to a far-reaching generalisation of the classical Riesz projection.

S.W. GRAHAM and G. KOLESNIK. — **Van der Corput's method of exponential sums.** — London Mathematical Society lecture note series, vol. 126. — Un vol. broché, 15 × 23, de 119 p. — Prix: £11.95/US$22.95. — Cambridge University Press, Cambridge, 1991.

This book is a self-contained account of the one- and two-dimensional van der Corput method and its use in estimating exponential sums. These arise in many problems in analytic number theory. It is the first cohesive account of much of this material. The authors show how the method can be applied to problems such as upper bounds for the Riemann-Zeta function, the Dirichlet divisor problem, the distribution of square free numbers, and the Piatetski-Shapiro prime number theorem.

David WILLIAMS. — **Probability with martingales.** — Cambridge mathematical textbooks. — Un vol. broché, 15 × 23, de XV, 251 p. — Prix: £10.95/US$24.95 (relié: £30.00/US$59.50). — Cambridge University Press, Cambridge, 1991.

This book is a modern, lively and rigorous account which has Doob's theory of martingales in discrete time as its main theme. It proves important results such as Kolmogorov's strong law of large numbers and the three-series theorem by martingale techniques, and the central limit theorem via the use of characteristic functions. The book is written for students, not for researchers, and has evolved through several years of class testing. Exercises, interesting and challenging problems, some with hints, play a vital rôle.

C. CORDUNEANU. — **Integral equations and applications.** — Un vol. relié, 16 × 24, de IX, 366 p. — Prix: £45.00/US$89.50. — Cambridge University Press, Cambridge, 1991.

The author emphasises the role of Volterra equations as a unifying tool in the study of functional equations, and investigates the relation between abstract Volterra equations and other types of functional-differential equations. Applications are considered from a broad range of areas such as systems engineering, nuclear dynamics and stability, continuum mechanics and coagulation theory. The main prerequisites are a basic understanding of real and functional analysis.

V.I. GORBACHUK and M.L. GORBACHUK. — **Boundary value problems for operator differential equations.** — Mathematics and its applications (Soviet series), vol. 48. — Un vol. relié, 17 × 24,5 de XI, 347 p. — Prix: Dfl. 240.00/US$149.00/£82.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume is devoted largely to the spectral theory of boundary value problems for (mainly) second-order differential equations whose coefficients are unbounded operators in

some Hilbert space (differential operator equations). Many differential equations can be written in such a form. A main tool in these studies is the recent extension theory of symmetric operators with arbitrary deficiency index which appears here for the first time in book form.

Marc GUINOT. — **Le paradoxe de Banach-Tarski.** — Un vol. broché, 15 × 21, de 119 p. — Prix: FF 79.00. — ALEAS Editeur, Lyon, 1991.

Les problèmes de découpage dans le plan et dans l'espace. — Un exemple de figures équidécomposables dans le plan. — Généralités sur les ensembles équidécomposables. — L'équidécomposabilité dans le plan. — Définition des ensembles dédoublables. — Ensembles dédoublables sous l'action de groupes «exotiques». — Un exemple de dédoublement dans le plan n'utilisant que des isométries. — Dédoublement des groupes. — Groupes dédoublables et ensembles dédoublables. — Le paradoxe de la sphère. — Le paradoxe de Banach-Tarski: cas des petits pois, cas des ranidés. — Appendices: Le paradoxe de Banach-Tarski et le problème de la mesure universelle. Le paradoxe de la sphère et le problème de la mesure universelle. Mesures universelles dans le plan et sur la droite. Mesures universelles complètement additives.

Combinatorial designs and applications. — Edited by W.D. Wallis, H. Shen, W. Wei, L. Zhu. — Lecture notes in pure and applied mathematics, vol. 126. — Un vol. broché, 18 × 25,5 de VIII, 249 p. — Prix: US$ 89.75 (USA and Canada), US$ 107.50 (Autres pays). — Marcel Dekker, Inc., New York, 1990.

This book contains selected papers presented at the International Conference on Combinatorial Designs and Applications, held at Tunxi City, Anhui, People's Republic of China. The papers explore topics in design theory, including block designs, Abelian difference sets, counting geodesics, simple and labeled resolvable designs, simple 3-designs, Hadamard matrices, graph designs and theory, one-factorization of multigraphs, strongly chordal graphs, large sets of Kirkman or Mendelson systems and subsystems, etc...

Eugene L. ALLGOWER, Kurt GEORG. — **Numerical continuation methods : an introduction.** — Springer series in computational mathematics, vol. 13. — Un vol. relié, 16 × 24, de XIV, 388 p. — Prix: DM 128.00. — Springer-Verlag, Berlin, 1990.

Over the past fifteen years two new techniques have yielded extremely important contributions toward the numerical solution of nonlinear systems of equations. This book provides an introduction to an up-to-date survey of numerical continuation methods (tracing of implicitly defined curves) of both predictor-corrector and piecewise-linear types. It presents and analyzes implementations aimed at applications to the computation of zero points, fixed points, nonlinear eigenvalue problems, bifurcation and turning points, and economic equilibria. An appendix supplies five sample FORTRAN programs with numerical examples, a description of the program package SCOUT. An extensive bibliography is included.

Geometric analysis and computer graphics : proceedings of a workshop held May 23-25, 1988. — Edited by P. Concus, R. Finn, D.A. Hoffman. — With 60 illustrations, 30 in full color. — Mathematical Sciences Research Institute publications, vol. 17. — Un vol. relié, 16 × 24, de IX, 203 p. — Prix: DM 78.00. — Springer-Verlag, New York, 1991.

The meeting at the Mathematical Sciences Research Institute in Berkeley was structured around principal lectures given by Almgren, Callahan, Ericksen, Francis, Gulliver, Hanrahan, Kajiya, Polthier, Sethian, Sterling, Thomas, and Vogel. The divergent backgrounds of these and the many other participants, as reflected in their lectures at the meeting and in the papers presented here, testify to the unifying element of the workshop's central theme.

Ted PETRIE, John RANDALL. — **Connections, definite forms, and four-manifolds.** — Oxford mathematical monographs. — Un vol. relié, 16 × 24, de IX, 131 p. — Prix: £20.00. — Clarendon Press, Oxford, 1991.

De la préface: "This book is based on lectures given at Rutgers University during 1986-7. The topic was the recent flood of ideas and results on differentiable 4-manifolds coming from the study of self-dual connections on suitable bundles over 4-manifolds. The giant in the field is, of course, Donaldson, but some of the fundamental ideas go back to the work of Atiyah and his collaborators."

Proceedings of the Conference on Automorphic Forms and Analytic number theory, Montréal, June 6-10, 1989. — Edited by Ram Murty. — Les publications CRM. — Un vol. broché, 17 × 25, de 145 p. — Prix: $Can 25.00/US$23.00. — Université de Montréal-Centre de recherches mathématiques, Montréal, 1990.

The L-functions of automorphic forms and automorphic representations generalise the classical zeta and L-functions of Riemann, Dirichlet and Hecke. As such, the domain of applicability of the techniques of analytic number theory has been greatly expanded and enriched. Thus, analytic number theory has become inextricably intertwined with representation theory and algebraic geometry. The conference tried to explore this theme along with other developments in analytic number theory.

Daniel LEBORGNE. — **Calcul différentiel complexe.** — Que sais-je?, vol. 2560. — Un vol. broché, 11,5 × 17,5 de 127 p. — Presses universitaires de France, Paris, 1991.

Les fondements de la théorie de Cauchy. — Fonction logarithmique et fonction exponentielle. — Les fonctions analytiques. — Le théorème des résidus. — Prolongements géométriques et topologiques des chapitres précédents.

Juergen JOST. — **Two-dimensional geometric variational problems.** — Pure and applied mathematics. — Un vol. relié, 16 × 24, de X, 236 p. — Prix: £35.00. — John Wiley and Sons, Chichester, 1991.

The main topics in this book are the theories of minimal surfaces and conformal and harmonic maps of surfaces. The author, an acknowledged expert in the field, develops a general existence technique and gives several diverse applications. Particular emphasis is placed on the connections with complex analysis. The final chapter treats Teichmüller theory via harmonic maps. The book will be of interest to graduate students and researchers in Riemannian geometry, minimal submanifolds and harmonic maps of surfaces.

Robert L. DEVANEY. — **Chaos, fractals, and dynamics : computer experiments in mathematics.** — Un vol. broché, 16 × 23,5, de X, 181 p. — Prix: US$29.95. — Addison-Wesley Publishing Company, Menlo Park, Calif., 1990.

This book introduces chaos, fractals, and dynamics, using a combination of hands-on computer experimentation and precalculus mathematics. Students are led through a series of experiments that produce fascinating computer graphics images of Julia sets, the Mandelbrot set, and fractals. The basic ideas of dynamics (chaos, iteration, and stability) are illustrated via computer projects. Numerous full-color and black-and-white images convey the beauty of these mathematical ideas.

W.G. McKAY, J. PATERA, D.W. RAND. — **Tables of representations of simple Lie algebras, vol. 1: Exceptional simple Lie algebras.** — Les publications CRM. — Un vol. broché,

19 × 25,5, de v, 327 p. — Prix: $Can 50.00/US$46.00. — Université de Montréal, Centre de recherches mathématiques, Montréal, 1990.

This title contains basic information about all simple Lie algebras and about many irreducible finite dimensional representations of the exceptional simple Lie algebras. These are the largest existing tables of: branching rules (reductions of representations) for maximal reductive subalgebras, branching rules for the corresponding Weyl group orbits. Also included are: multiplicities of dominant weights, and smaller tables of maximal subjoinings, decompositions of tensor products of representations, decompositions of tensor products of Weyl group orbits.

Gerald KAISER. — **Quantum physics, relativity, and complex spacetime: towards a new synthesis.** — North-Holland mathematics studies, vol. 163. — Un vol. relié, 17 × 24,5 de XVI, 359 p. — Prix: US$85.75/Dfl. 150.00. — North-Holland, Amsterdam, 1990.

In this book, a new synthesis of the principles of quantum mechanics and relativity is proposed in the context of complex differential geometry. The positivity of the energy implies that wave functions and fields can be extended to complex spacetime, and it is shown that complexification has a solid physical interpretation as an extended phase space. The extended wave functions and fields form a relativistic generalization of the coherent-state representation. The resulting theory is more regular than the usual one.

Arnold NEUMAIER. — **Interval methods for systems of equations.** — Encyclopedia of mathematics and its applications, vol. 37. — Un vol. relié, 16,5 × 24, de XVI, 255 p. — Prix: £35.00/US$59.50. — Cambridge University Press, Cambridge, 1991.

An interval is a natural way of specifying a number that is specified only within certain tolerances. Interval analysis consists of the tools and methods needed to solve linear and nonlinear systems of equations in the presence of data uncertainties. Applications include the sensitivity analysis of solutions of equations depending on parameters, the solution of global nonlinear problems, and the verification of results obtained by finite-precision arithmetic. In this book emphasis is laid on those aspects of the theory which are useful in actual computations.

Computer-aided proofs in analysis. — Kenneth R. Meyer, Dieter S. Schmidt, editors. — IMA volumes in mathematics and its applications, vol. 28. — Un vol. relié, 16 × 24, de 251 p. — Prix: DM 64.00. — Springer-Verlag, New York, 1991.

This volume is the proceedings of a scientific conference on the use of computers to do exact mathematics which was held at the University of Cincinnati, March 22-25, 1989. Topics included are: the use of general algebraic processors like Macsyma, Reduce, Scratchpad, etc. to do precise computations in bifurcation analysis and related areas of analysis; the development of the software to solve equations exactly for these general software packages; the use of interval arithmetic algorithms and software to give rigorous proofs of mathematical theorems and give precise estimates of stability regions.

Ciprian FOIAS, Arthur E. FRAZHO. — **The commutant lifting approach to interpolation problems.** — Operator theory: advances and applications, vol. 44. — Un vol. relié, 17 × 24, de XXIII, 632 p. — Prix: SFr. 198.00. — Birkhäuser Verlag, Basel, 1990.

The aim of this monograph is to present a unified geometric approach, based on the commutant lifting theorem in operator theory, to a large array of classical and modern

interpolation problems arising in mathematics and engineering. For these interpolation problems, explicit formulas and algorithms are deduced from the geometric analysis of the commutant lifting theorem. Connections to geophysics, control theory and signal processing are also presented. The monograph also includes a course on the theory of the commutant lifting theorem and develops new Schur-type fractional representations in the general framework of the commutant lifting theorem.

Order, disorder and chaos in quantum systems. — Proceedings of a conference held at Dubna, USSR on Oct. 17-21, 1989. — Ed. by P. Exner, H. Neidhardt. — Operator theory: advances and applications, vol. 46. — Un vol. relié, 17 × 24, de XIV, 360 p. — Prix: SFr. 98.00. — Birkhäuser, Basel, 1990.

The main section of this volume adresses various new aspects of the theory of Schroedinger operators, motivated by physical problems. Special emphasis is placed on the theory of Schroedinger operators in complicated spatial domains appearing in some parts of solid-state physics, or various models using the concept of contact interactions. A smaller portion of the book deals with the theory of quantum chaos. The investigation is concentrated mostly on analysis of simple quantum models where the chaotic behaviour could be manifested.

Israel GOHBERG, Seymour GOLDBERG, Marinus A. KAASHOEK. — **Classes of linear operators. Vol. 1.** — Operator theory: advances and applications, vol. 49. — Un vol. relié, 17 × 24, de XIII, 468 p. — Prix: SFr. 178.00. — Birkhäuser Verlag, Basel, 1990.

This book presents a panorama of operator theory. It treats a variety of classes of linear operators which illustrate the richness of the theory, both in its theoretical developments and its applications. For each of the classes various differential and integral operators motivate or illustrate the main results. The topics have been updated and enhanced by new developments, many of which appear here for the first time. Interconnections appear frequently and unexpectedly. The present volume consists of 4 parts: general spectral theory, classes of compact operators, Fredholm and Wiener-Hopf operators, and classes of unbounded operators.

Analytic number theory : proceedings of a Conference in honor of Paul T. Bateman. — Edited by Bruce C. Berndt, Harold G. Diamond, Heini Halberstam, Adolf Hildebrand. — Progress in mathematics, vol. 85. — Un vol. relié, 16 × 23,5 de 558 p. — Prix: SFr. 88.00. — Birkhäuser, Boston, 1990.

The articles in this volume were selected from papers contributed at a major Conference on Analytic Number Theory held at the University of Illinois Conference Center at Allerton Park, April 25-27, 1989. Topics include character sums and exponential sums, Riemann's zeta-function and L-functions, Fermat's last theorem, partitions, arithmetic functions and diverse properties of integer sequences, cyclotomic polynomials, and diophantine approximation, among others. Researchers and advanced students in number theory, as well as researchers in combinatorics and analysis will find much of interest in the many new results presented in this volume.

Jürgen PILZ. — **Bayesian estimation and experimental design in linear regression models.** — 2nd ed. — Wiley series in probability and mathematical statistics. — Un vol. relié, 16 × 23,5, de X, 296 p. — Prix: £24.95. — John Wiley, Chichester, 1991.

This edition represents an enlarged version of the 1st ed. which appeared in 1983 in the Teubner Publishing House in Leipzig. The volume includes new material on integral geometric

prior distributions, nonlinear modifications of the conjugate Bayes estimator, Bayes and admissible linear estimation, Bayesian robustness measures and restricted minimax optimality and also on Bayes and minimax linear estimation in inadequate models. A completely new part is included on minimax linear regression estimation in case of prior knowledge representable by some restricted compact parameter set.

Richard KAYE. — **Models of Peano arithmetic.** — Oxford logic guides, vol. 15. — Un vol. relié, 16 × 24, de x, 292 p. — Prix: £35.00. — Clarendon Press, Oxford, 1991.

Background model theory and recursion theory. — The standard model. — Discretely ordered rings. — Gödel incompleteness. — The axioms of Peano arithmetic. — Some number theory in Peano arithmetic. — Models of Peano arithmetic. — Collection. — Prime models. — Satisfaction. — Subsystems of Peano arithmetic. — Saturation. — Initial segments. — The standard system. — Indicators. — Recursive saturation.

Analye 1: formations supérieures technologiques. — P. Benichou, R. Benichou, N. Boy, J.P. Pouget. — Collection Demengel: Mathématiques. — Un vol. broché, 17,5 × 25,5, de VII, 359 p. — Dunod, Paris, 1991.

Cet ouvrage d'analyse est conforme au référentiel des classes de techniciens supérieurs du secteur industriel. Il intéressera tous les étudiants désireux d'entreprendre des études scientifiques à caractère technologique: BTS, IUT, premiers cycles universitaires, classes préparatoires, formation continue. On y trouvera non seulement un cours d'analyse clair et concis, mais aussi des exercices d'application simples ou d'entraînement et d'approfondissement, ainsi que des travaux pratiques (avec des éléments de correction) directement issus des disciplines techniques et technologiques.

H.-J. ZIMMERMANN. — **Fuzzy set theory and its applications.** — Second, revised edition. — Un vol. relié, 16 × 23,5 de XX, 399 p. — Prix: Dfl. 150.00/US$69.95/£42.95. — Kluwer Academic Publishers, Boston, 1991.

Applications of fuzzy set theory can be found in artificial intelligence, computer science, control engineering, decision theory, expert systems, logic, management science, operations research, pattern recognition, robotics, and others. Theoretical advances have been made in many directions. The primary goal of this second edition is to help to close this gap, to provide a textbook for courses in fuzzy set theory and a book that can be used as an introduction.

Ronald CHRISTENSEN. — **Linear models for multivariate, time series, and spatial data..** — Springer texts in statistics. — Un vol. relié, 16 × 24, de XII, 317 p. — Prix: DM 74.00. — Springer-Verlag, New York, 1991.

This is a book about linear models. It is not traditional multivariate analysis, time series, or geostatistics. Only brief introductions are given to topics related to linear model theory. This is a companion volume of a book from the same author entitled "Plane answers to complex questions: the theory of linear models". — Contents: Multivariate linear models. Discrimination and allocation. Principal components and factor analysis. Frequency analysis of time series. Time domain analysis. Linear models for spatial data: Kriging.

Leslie M. HOCKING. — **Optimal control: an introduction to the theory with applications.** — Oxford applied mathematics and computing science series. — Un vol. broché, 13,5 × 21,5, de XIV, 254 p. — Prix: £35.00 (relié)/£16.00 (broché). — Oxford University Press, Oxford, 1991.

Systems that evolve with time occur frequently in nature and modelling the behaviour of such systems provides an important application of mathematics. These systems can be completely deterministic, but it may be possible to control their behaviour by intervention through "controls". The theory of optimal control is concerned with determining such controls which, at minimum cost, either direct the system along a given trajectory or enable it to reach a given point in its state space. This textbook is an introduction to the theory of optimal control with an emphasis on presenting many different applications.

Marino WIDMER. — **Modèles mathématiques pour une gestion efficace des ateliers flexibles.** — Collection META. — Un vol. broché, 16 × 24, de VIII, 148 p. — Prix: SFr. 54.00. Presses polytechniques et universitaires romandes, Lausanne, 1991.

Les problèmes posés peuvent être regroupés en quatre catégories: la conception de l'atelier, la planification de la production, l'ordonnancement de la production et la gestion en temps réel du système. En analysant les interactions de ces quatre types de problèmes, l'auteur montre qu'ils constitutent les composantes actives d'une structure hiérarchico-cyclique de gestion de production. Cet ouvrage permet d'expliquer certains problèmes de l'industrie mécanique aux étudiants en mathématiques et en informatique, sans négliger de présenter des résolutions mathématiques compréhensibles pour les étudiants en mécanique et en microtechnique.

A.T. FOMENKO. — **Variational problems in topology: the geometry of length, area and volume.** — Un vol. relié, 16 × 23,5, de X, 225 p. — Prix: US$ 120.00. — Gordon and Breach, New York, 1990.

Many of the modern variational problems of topology arise in different but overlapping fields of scientific study: mechanics, physics and mathematics. In this work, the author offers an explanation of some of these problems (both solved and unsolved), using current methods of analytical topology. After an introduction to homology, cohomology and fibration, he investigates the role of Morse theory in modern aspects of the topology of smooth manifolds (especially those of three and four dimensions) and ends by discussing minimal surfaces and harmonic mappings and presenting a number of classic physical experiments that lie at the foundations of modern understanding of multidimensional variational calculus.

Y.S. SAMOILENKO. — **Spectral theory of families of self-adjoint operators.** — Mathematics and its applications (Soviet series), vol. 57. — Un vol. relié, 16,5 × 24,5, de XVI, 293 p. — Prix: Dfl. 220.00/US$ 129.00/£ 81.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume deals with structure theorems and models for finite and countable families of self-adjoint operators which satisfy commutative, noncommmutative, Lie and more general relations. Such families are studied because of their relation to mathematical models of quantum systems in theoretical physics, representation theory of Lie groups and Lie algebras, (in particular, "large" Lie algebras), and representation of infinitesimal objects of these supergroups and superalgebras. The methods employed are those of commutative and noncommutative probability theory.

Topics in computational algebra. — Ed. by G.M. Piacentini Cattaneo and E. Strickland. — Un vol. relié, 16 × 24,5, de 261 p. — Prix: Dfl. 160.00/US$ 99.00/£ 55.00. — Kluwer Academic Publishers, Dordrecht, 1990.

This work contains 10 papers, written by leading scientists in the field, which were presented at a Semester in Computational Algebra at the University of Rome II in the spring of 1990. Specific topics included are: computational aspects in group theory, commutative algebra,

algebraic geometry, representation theory, ring theory, invariant theory, and supersymmetric algebra. (Reprinted from "Acta applicandae mathematicae", vol. 21, no. 1 & 2, 1990).

Algebraic and structural automata theory. — Ed. by B. Mikolajczak. — Annals of discrete mathematics, vol. 44. — Un vol. relié, 17 × 24,5 de XXI, 402 p. — Prix: Dfl. 250.00 — North-Holland, Amsterdam, 1991.

Automata theory is part of computability theory which covers problems in computer systems, software, activity of nervous systems (neural networks), and processes of live organisms development. The result of over 10 years of research, this book presents work in the following areas of Automata Theory: automata morphisms, time-varying automata, automata realizations and relationships between automata and semigroups.

Satoru FUJISHIGE. — **Submodular functions and optimization.** — Annals of discrete mathematics, vol. 47. — Un vol. relié, 17 × 24,5, de IX, 270 p. — Prix: Dfl. 170.00. — North-Holland, Amsterdam, 1991.

The importance of submodular functions has been widely recognized in recent years in combinatorial optimization. This is the first book devoted to the exposition of the theory of submodular functions from an elementary technical level to an advanced one. A unifying view of the theory is shown by means of base polyhedra and duality for submodular and supermodular systems. Among the subjects treated are: neoflows, submodular analysis, nonlinear optimization with submodular constraints.

G.A. MARGULIS. — **Discrete subgroups of semisimple Lie groups.** — Ergebnisse der Mathematik und ihrer Grenzgebiete. 3. Folge, Band 17. — Un vol. relié, 17 × 25, de IX, 338 p. — Prix: DM 148.00. — Springer-Verlag, Berlin, 1991.

Discrete subgroups have played a central role throughout the development of numerous mathematical disciplines. Discontinuous group actions and the study of fundamental regions are of utmost importance to modern geometry. Flows and dynamical systems on homogeneous spaces have found a wide range of applications, and of course number theory without discrete groups is unthinkable. This book is primarily devoted to discrete subgroups of finite covolume in semi-simple Lie groups. Since the notion of "Lie group" is sufficiently general, the author not only proves results in the classical geometry setting, but also obtains theorems of an algebraic nature, e.g. classification results on abstract homomorphisms of semi-simple algebraic groups over global fields.

I.M. GEL'FAND, E.G. GLAGOLEVA, E.E. SHNOL. — **Functions and graphs.** — Un vol. broché, 14,5 × 20,5, de IX, 105 p. — Prix: SFr. 24.00. — Birkhäuser, Boston, 1990.

The need for improved mathematics education at the high school and college levels has never been more apparent than in the 1990s. As early as the 1960s, I.M. Gel'fand and his colleagues in the USSR thought hard about this same question and developed a style for presenting basic mathematics in a clear and simple form that engaged the curiosity and intellectual interest of thousands of school and college students. This book provides instruction in transferring fromulas and data into geometrical form. Thus, drawing graphs is shown to be one way to "see" formulas and functions and to observe the ways in which they change.

I.M. GEL'FAND, E.G. GLAGOLEVA, A.A. KIRILLOV. — **The method of coordinates.** — Un vol. broché, 14,5 × 20,5, de X, 73 p. — Prix: Sfr. 24.00. — Birkhäuser, Boston, 1990.

"The Method of Coordinates" is a way of transferring geometric shapes into formulas, a method for describing pictures by numbers and letters denoting constants and variables. It is fundamental to the study of calculus and other mathematical topics.

Representation of Lie groups and related topics. — Ed. by A.M. Vershik and D.P. Zhelobenko. — Advanced studies in contemporary mathematics, vol. 7. — Un vol. relié, 16 × 23,5 de XIV, 557 p. — Prix: US$118.00. — Gordon & Breach, New York, 1990 (distr. by Harwood Academic Publishers).

Contents: A.M. Vershik: "Metagonal groups of finite and infinite dimension", A.M. Vershik and S.V. Kerov: "The Grothendieck group of infinite symmetric group and symmetric functions", I.M. Gel'fand and M.I. Graev: "Principal representations of the group U(infinity), D.P. Zhelobenko: "An introduction to the theory of S-algebras over reductive Lie algebras", R.S. Ismagilov: "Representations of certain infinite-dimensional groups", Yu.A. Neretin: "Almost invariant structures and related representations of the diffeomorphism group of a circle", G.I. Ol'shanskii: "Unitary representations of infinite-dimensional pairs (G, K) and the formalism of R. Howe", B.L. Feigin and D.B. Fuchs: "Representations of the Virasoro algebra".

Carlos MORENO. — **Algebraic curves over finite fields.** — Cambridge tracts in mathematics, vol. 97. — Un vol. relié, 16 × 23,5, de IX, 246 p. — Prix: £30.00/US$49.50. — Cambridge University Press, Cambridge, 1991.

In this book, the author develops the theory of algebraic curves over finite fields, their zeta and L-functions, and, for the first time, the theory of algebraic Goppa codes on algebraic curves. Amongst the applications considered are: the problem of counting the number of solutions of equations over finite fields; Bombieri's proof of the Riemann hypothesis for function fields; Goppa's theory of error-correcting codes constructed from linear systems on algebraic curves; there is also a new proof of the Tsfasman-Vladut-Zink theorem.

B. GOLUBOV, A. EFIMOV and V. SKVORTSOV. — **Walsh series and transforms : theory and applications.** — Mathematics and its applications (Soviet series), vol. 64. — Un vol. relié, 17 × 24,5, de XIII, 368 p. — Prix: Dfl. 260.00/US$169.00/£89.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume presents an introduction to Walsh-Fourier analysis and its applications. Topics covered are: results concerning the uniqueness of representation of functions and questions about summability and convergence, multiplicative transforms, Walsh series with monotone coefficients and lacunary series, convergence and divergence of Walsh-Fourier series, approximation, methods for applying the Walsh system to digital information processing, digital filtering and to digital holograms.

Ergodic theory, symbolic dynamics, and hyperbolic spaces. — Ed. by Tim Bedford, Michael Keane, Caroline Series. — Oxford science publications. — Un vol. broché, 15,5 × 23,5, de XV, 369 p. — Prix: £13.95 (broché)/£40.00 (relié). — Oxford University Press, Oxford, 1991.

The aim of this volume is to explore the interplay between ergodic theory and hyperbolic geometry and to present some of the new directions that research has taken. Early chapters present an introduction to the fundamental concepts of these two topics. Subsequent chapters develop more advanced topics such as explicit coding methods, symbolic dynamics, the theory of nuclear operators as applied to the Ruelle-Perron-Frobenius operator, the Patterson

measure, and the connections with finiteness phenomena in the structure of hyperbolic groups and Gromov's theory of hyperbolic spaces.

Composite media and homogenization theory. — An International Centre for Theoretical Physics Workshop, Trieste, Italy, January 1990. — Ed. by G. Dal Maso, G.F. Dell'Antonio. — Progress in nonlinear differential equations and their applications, vol. 5. — Un vol. relié, 16 × 24, de XIV, 258 p. — Prix: SFr. 74.00. — Birkhäuser, Boston, 1991.

In recent years, substantial progress toward a rigorous mathematical treatment of composite materials has been made possible by the use of advanced mathematical techniques such as partial differential equations and the calculus of variations. This, in turn, has led to a deeper understanding of the overall behavior of composite structures as well as fruitful applications in physics and engineering. Many new results are presented in this volume, which contains 14 invited papers. Topics include homogenization of periodic and nonperiodic structures, porous media, asymptotic analysis for linear and nonlinear problems, optimal bounds for effective moduli, waves in composite materials, optimal design and relaxation, and random media.

Variational methods. Proceedings of a conference, Paris, June 1988. — Progress in nonlinear differential equations and their applications, Vol. 4. — Un vol. relié, 16 × 24, de IX, 477 p. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1990.

This volume contains the papers delivered at a conference in the framework of the "Année non linéaire", sponsored by the French National Center for Scientific Research (CNRS). It concentrates on 3 main areas: variational methods in partial differential equations in mathematical physics, variational problems in geometry, and Hamiltonian systems. It provides an overview of many variational methods of interest to research workers and graduate students in mathematical physics and mechanics.

Mappings of operator algebras. — Proceedings of the Japan-U.S. Joint Seminar, University of Pennsylvania, 1988. — Ed. by H. Araki, R.V. Kadison. — Progress in mathematics, vol. 84. — Un vol. relié, 16 × 24, de X, 307 p. — Prix: SFr. 68.00. — Birkhäuser, Boston, 1991.

This seminar was dedicated to one of the leaders of functional analysis, Shôichirô Sakai, on the occasion of his 60th birthday. The seminar was devoted to results and problems concerning mappings of operator algebras. Among the articles contained are papers dealing with actions of groups on C^*-algebras, completely bounded mappings, index and subfactor theory, and derivations of operator algebras.

V. SRINIVAS. — **Algebraic *K*-theory.** — Progress in mathematics, vol. 90. — Un vol. relié, 16 × 24, de XV, 448 p. — Prix. SFr. 88.00. — Birkhäuser, Boston, 1991.

Based on lecture notes from a course taught by the author at the Tata Institute, Bombay, India, this monograph presents a detailed exposition of the ideas of Quillen. Two applications are given: to the theorem of Mercurjev and Suslin relating $K2$ and the Brauer group of a field; and to modules of finite length and finite projective dimension over the local ring of a normal surface singularity. These results lead to interesting conclusions regarding the Chow groups of varieties.

Operator algebras, unitary representations, enveloping algebras, and invariant theory. — Actes du colloque en l'honneur de Jacques Dixmier. — Ed. by A. Connes, M. Duflo, A. Joseph,

R. Rentschler. — Progress in mathematics, vol. 92. — Un vol. relié, 16 × 24, de XVI, 596 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1991.

The 65th anniversary of Jacques Dixmier was celebrated by a Colloquium held in Paris during May 1989. Through the 22 articles contributed, one may trace the past achievements, present developments, and future aspirations of the interleaving disciplines of operator algebras, Lie group representations, enveloping algebras of Lie algebras, and invariant theory, whose inception and dissemination Dixmier inspired in the course of his career. The articles in this volume are the only published versions of certain important recent results of the authors and are given with full details of proofs.

Topics in matrix and operator theory. — Workshop on matrix and operator theory, Rotterdam (The Netherlands), June 26-29, 1989. — Edited by H. Bart, I. Gohberg, M.A. Kaashoek. — Operator theory: advances and applications, vol. 50. — Un vol. relié, 17 × 24, de VII, 378 p. — Prix: SFr. 118.00. — Birkhäuser Verlag, Basel, 1991.

The concrete classes of operators that are analyzed concern differential and difference operators, Toeplitz matrices (both finite and infinite), and Wiener-Hopf integral operators. Various interpolation problems for matrix functions, matrix completion problems, and inversion and perturbation are investigated. Model theory and its connection with mathematical systems theory is reviewed. System theoretical methods also appear in the applications of the state space method.

Olaf von GRUDZINSKI. — **Quasihomogeneous distributions.** — North-Holland mathematics studies, vol. 165. — Un vol. relié, 17,5 × 24,5, de VIII, 450 p. — Prix: US$128.00/ Dfl. 225.00. — North-Holland, Amsterdam, 1991.

This is a systematic exposition of the basics of the theory of quasihomogeneous (in particular homogeneous) functions and distributions (generalized functions). A major theme is the method of taking quasihomogeneous averages. It serves as the central tool for the study of the solvability of quasihomogeneous multiplication equations and of quasihomogeneous partial differential equations with constant coefficients.

Continued fractions and Padé approximants. — Edited by C. Brezinski. — Un vol. relié, 20 × 27, de VIII, 331 p. — Prix: Dfl.170.00/US$97.00. — North-Holland, Amsterdam, 1990.

Padé approximants and continued fractions are typical examples of old domains which are now in full vitality. This is due to their numerous applications in number theory, cryptography, statistics, numerical analysis, etc... This renewal of interest is also due to their intimate connections with other important topics such as orthogonal polynomials, solution of differential equations, etc... This book gathers carefully selected papers presenting the last results. It comes from a special issue of the journal "Applied numerical mathematics", plus some new contributions specially written for it.

Paths, flows, and VLSI-layout. — Edited by Bernhard Korte, László Lovász, Hans Jürgen Prömel, Alexander Schrijver. — Algorithms and combinatorics, vol. 9. — Un vol. relié, 17 × 25, de XXII, 383 p. — Prix: DM 128.00. — Springer, Berlin, 1990.

Amongst other striking aspects VLSI (very large scale integration) has turned out to be an excellent arena for applications of discrete mathematics and combinatorial optimization. The contributions to this volume develop from lectures delivered at a meeting held in Bonn in the

summer of 1988. The speakers were asked to formalize and extend their lectures into written surveys, giving a complete account of their topics.

Oscar BURLET. — **Géométrie.** — Un vol. relié, 17,5 × 24,5, de 299 p. accompagné de cartes de jeu, 7 × 10. — Editions L.E.P.(Loisirs et Pédagogie), Le Mont-sur-Lausanne, 1989.

De l'avant-propos: L'étude de la géométrie fait appel à des notions abstraites et requiert à la fois imagination, intuition et rigueur. Ces exigences ne vont pas sans difficulté pour de nombreux élèves. Ceux des classes littéraires, en particulier, butaient souvent sur la géométrie axiomatique, telle qu'elle leur était présentée depuis des décennies, à tel point que l'enseignement de la géométrie a été fondamentalement remis en question. C'est ainsi qu'en 1981, le service de l'enseignement secondaire donnait à une commission, composée de professeurs de la Faculté des sciences de l'Université de Lausanne et de l'Ecole polytechnique fédérale de Lausanne, ainsi que de maîtres secondaires, le mandat ... de créer de nouveaux moyens d'enseignement pour cette branche et pour les différentes catégories d'élèves... les élèves des sections littéraires de la division pré-gymnasiale étudieront la géométrie dans (ce) manuel conçu spécialement pour eux. L'auteur a réussi une présentation originale des principaux résultats de la géométrie euclidienne, moins formalisée que celle qui est proposée aux élèves scientifiques, mais sans toutefois renoncer à une construction théorique rigoureuse.

Sums, trimmed sums and extremes. — Ed. by M.G. Hahn, D.M. Mason, D.C. Weiner. — Progress in probability, vol. 23. — Un vol. relié, 16 × 24, de VIII, 416 p. — Prix: SFr. 64.00. — Birkhäuser, Boston, 1991.

This volume presents the most significant and up-to-date approaches to the study of intermediate trimmed sums and illustrates these methods with a variety of new results. Part 1 explores the approaches which have evolved from classical analytical techniques (conditioning, Fourier methods, symmetrization, triangular array theory). Part 2 is based on the quantile transform technique and utilizes weak and strong approximations to the uniform empirical process. The advantages and disadvantages of the "analytic" and the quantile transform approaches are elucidated.

Seminar on stochastic processes, 1990. — Ed. by E. Cinlar. — Progress in probability, vol. 24. — Un vol. relié, 16 × 24, de 351 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1991.

This is the 10th volume in a series reporting on recent progress in stochastic processes. It presents a sample of the work discussed in a seminar that brought together distinguished researchers on Markov processes, potential theory, and stochastic analysis. Some of the topics included are: local times for Brownian motion, stochastic integral processes, and strongly symmetric Markov processes; self-intersections of stable processes in the plane; multiplicative symmetry groups of Markov processes; transormation of measure and stochastic integration in infinite dimensional spaces ...

Diffusion processes and related problems in analysis. Vol. 1: Diffusions in analysis and geometry. — Ed. by Mark A. Pinsky. — Progress in probability, vol. 22. — Un vol. relié, 16 × 24, de XIII, 519 p. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1991.

To demonstrate the "continuing richness of probability theory in its relations to analysis, geometry, and physics" is the goal of this volume. Containing a selection of reviewed papers from a conference hosted by Northwestern University during the week of October 23-27, 1989, the articles presented include problems of large deviations, stochastic geometry, and other areas of stochastic analysis in which diffusion processes play a leading role.

The Grothendieck Festschrift. Vol. 2. — A collection of articles written in honor of the 60th birthday of Alexander Grothendieck. — Progress in mathematics, vol. 87. — Un vol. relié, 16 × 24, de VIII, 563 p. — Prix: SFr. 318.00 les 3 vol. — Birkhäuser, Boston, 1990.

Contents: P. Cartier & A. Voros: Une nouvelle interprétation de la formule des traces de Selberg. C. Contou-Carrère: Jacobiennes généralisées globales relatives. P. Deligne: Catégories tannakiennes. T. Ekedahl: On the adic formalism. G. Faltings: F-isocrystals on open varieties: results and conjectures. J.-M. Fontaine: Représentations p-adiques des corps locaux. H.A. Hamm & Lé Dung Trang: Rectified homotopical depth and Grothendieck conjectures. Y. Ihara: Automorphisms of pure sphere braid groups and Galois representations. L. Illusie: Ordinarité des intersections complètes générales. M. Kashiwara: Kazhdan-Lusztig conjecture for a symmetrizable Kac-Moody Lie algebra. V.A. Kolyvagin: Euler systems. R. Langlands & D. Shelstad: Descent for transfer factors.

The Grothendieck Festschrift. Vol.3. — A collection of articles written in honor of the 60th birthday of Alexander Grothendieck. — Progress in mathematics, vol. 88. — Un vol. relié, 16 × 24, de VII, 495 p. — Prix: SFr. 318.00 les 3 vol. — Birkhäuser, Boston, 1990.

Contents: A. Lascoux: Anneau de Grothendieck de la variété de drapeaux. S. Lichtenbaum: New results on weight-two motivic cohomology. G. Lusztig: Symmetric spaces over a finite field. Z. Mebkhout: Le théorème de positivité de l'irrégularité pour les DX-modules. A. Ogus: The convergent topos in characteristic p. A.N. Parshin: Finiteness theorems and hyperbolic manifolds. M. Raynaud: p-groupes et réduction semi-stable des courbes. G.B. Shabat & V.A. Voevodsky: Drawing curves over number fields. L. Szpiro: Sur les propriétés numériques du dualisant relatif d'une surface arithmétique. R.W. Thomason and T. Trobaugh: Higher algebraic K-theory of schemes and of derived categories. A. Treibich & J.-L. Verdier, with an appendix by J. Oesterlé: Solitons elliptiques. Yu.G. Zarhin: Linear simple Lie algebras and ranks of operators.

Stephen WOLFRAM. — **Mathematica: a system for doing mathematics by computer.** — Second edition. — Un vol. broché, 20 × 23, de XXII, 961 p. — Addison-Wesley Publishing Company, Inc., Redwood City, Calif./Amsterdam, 1991.

This completely revised 2nd edition describes all the features of "Mathematica" version 2, and covers the use of "Mathematica" on Macintosh, PC, workstation and other computer systems. "Mathematica" has become a crucial tool for tens of thousands of researchers, engineers, and students. The system supports numerical, symbolic and graphical computation. It can be used both as an interactive problem-solving environment, and as a modern high-level programming language. New elements in this version 2 include: differential equations, linear programming, enhanced graphics, sound generation, enhanced string and file manipulation, expression compilation and programming language extensions.

Griffith Baley PRICE. — **An introduction to multicomplex spaces and functions.** — Pure and applied mathematics, vol. 140. — Un vol. relié, 16 × 23,5, de XIII, 402 p. — Prix: US$99.75 (USA et Canada), US$119.50 (autres pays). — Marcel Dekker, New York, 1991.

This book focuses on the class of Banach algebras known collectively as multicomplex spaces, examining the theory of holomorphic functions defined on theses spaces. Providing full explanations, worked out examples, and numerous exercises to illustrate and extend theory, this reference text features a brief history of functional work in the field, considers functions defined on a space that contains divisors of zero, employs linear and matrix algebra representa-

tions of multi-complex numbers, introduces a generalization of the absolute value of a complex number ... etc...

Geometry of Banach spaces. — Proceedings of the Conference held in Strobl, Austria, 1989. — Edited by P.F.X. Müller, W. Schachermayer. — London Mathematical Society lecture note series, vol. 158. — Un vol. broché, 15 × 23, de XIV, 270 p. — Prix: £19.50/US$29.95. — Cambridge University Press, Cambridge, 1991.

This volume reflects the progress made in many branches of recent research in Banach space theory. It is based on a conference attended by most of the leading figures in the area, and is intended to illustrate the interplay of Banach space theory with harmonic analysis, probability, complex function theory and finite dimensional convexity theory. The papers consist of a selection of original research papers.

Fouad EL ZEIN. — **Introduction à la théorie de Hodge mixte.** — Collection «Actualités mathématiques». — Un vol. broché, 17,5 × 24, de 235 p. — Prix: FF 240.00. — Hermann, Paris, 1991.

Cet ouvrage présente dans les quatre premiers chapitres la théorie de Hodge mixte de Deligne, inspirée par le travail de Grothendieck et son école sur les conjectures de Weil. Un aperçu de la théorie des variations de structures de Hodge de Griffiths se trouve dans les trois derniers chapitres. L'ouvrage présente aussi plusieurs résultats d'articles de recherche de pureté et la théorie des cycles évanescents. Les éléments communs à ces articles sont présentés dans des définitions communes, au début de chaque chapitre, afin de simplifier l'accès des non spécialistes à ce niveau de recherche.

Fractals: non-integral dimensions and applications. — Ed. by G. Cherbit, transl. by F. Jellett. — Un vol. relié, 15,5 × 23,5, de XV, 249 p. — Prix: £29.95. — John Wiley, Chichester, 1991.

In the past few years fractals have become of increasing interest in many different areas of science. This book contains contributions from authors from a variety of areas, surveying scientific problems and associated fractal behaviour. Topics covered in the book arose from those discussed in a series of seminars organised by the Biophysics Research Group at the University of Paris VII.

Theodore J. RIVLIN. — **Chebyshev polynomials: from approximation theory to algebra and number theory.** — Second edition. — Pure and applied mathematics. — Un vol. relié, 16,5 × 24, de XIII, 249 p. — Prix: US$45.50. — John Wiley, New York, 1990.

Chebyshev polynomials have become a valuable tool in numerical analysis and approximation theory used in computation. The revised and expanded second edition of this work includes new applications in addition to updated material on a number of topics. It features a new chapter which examines some algebraic and number theoretic properties of the Chebyshev polynomials, as well as a section explaining some observable properties of the graphs of the Chebyshev polynomials.

Differential equations : stability and control. — Edited by Saber Elaydi. — Lecture notes in pure and applied mathematics, vol. 127. — Un vol. broché, 18 × 25, de XVII, 532 p. — Prix: US$110.00 (USA et Canada), US$132.00 (autres pays). — Marcel Dekker, New York, 1991.

Reporting and expanding upon topics discussed at The International Conference on Differential Equations: theory and applications in stability and control held in Colorado

Springs, Colorado, this reference book presents recent advances in control, oscillation, and stability theories. The topics covered are evolution equations, differential inclusions, functional differential equations, pseudo-differential operators, equations with impulse, integral equations, difference equations ... etc.

Generators and relations in groups and geometries. — Edited by A. Barlotti, E.W. Ellers, P. Plaumann and K. Strambach. — NATO ASI series. Series C: mathematical and physical sciences, vol. 333. — Un vol. relié, 16,5 × 24,5, de xv, 447 p. — Prix: Dfl. 220.00/US$ 144.00/ £76.00. — Kluwer Academic Publishers, Dordrecht, 1991.

E.W. Ellers: Classical groups. H. Ishibashi: Generators of automorphism groups of modules. H. Lausch: Generators of automorphism groups of Cayley algebras. T.J. Laffey: Product of matrices. F. Knüppel: Reflection groups - On pre-Hjelmslev groups and related topics. M. Götzky: Unitary geometry. P. Plaumann: Lie and algebraic Johnsen groups. L. Di Martino, M.C. Tamburini: 2-generation of finite simple groups and some related topics. A.M. Cohen: Coxeter groups and three related topics. T.A. Springer: Geometric structure of conjugacy classes in algebraic groups. E. Musso, F. Tricerri: Groups with polynomial growth and differential geometry. A. Caranti: Analyticity and growth of pro p-groups. M. Jarden: Intersections of local algebraic extensions of a Hilbertian field. B. Zimmermann: Generators and relations for discontinuous groups.

Mary LUNN. — **A first course in mechanics.** — Oxford science publications. — Un vol. broché, 16,5 × 23,5, de x, 192 p. — Prix: £12.95 (relié: £30.00). — Oxford University Press, Oxford, 1991.

This textbook provides a simple introduction to mechanics for students coming to the subject for the first time. The text is based on courses given to first and second year undergraduates. Prerequisites are only a basic familiarity with vectors, matrices, and elementary calculus. The author's aim is to provide an understanding of Newtonian mechanics using the tools of modern algebra. Throughout, the theory is illustrated with many worked examples and numerous exercises (some with solutions) are provided.

Mechanics, analysis and geometry: 200 years after Lagrange. — Ed. by Mauro Francaviglia. — North-Holland Delta Series. — Un vol. relié, 17 × 24,5, de xi, 559 p. — Prix: Dfl. 240.00/US$ 137.00. — North-Holland, Amsterdam, 1991.

This volume consists of solicited articles written by eminent scientists from the international scientific community, on the occasion of the bicentennial of the publication by J.-Louis Lagrange of his treatise, "Mécanique analytique" (1788). This book opened a floodgate of contributions to mechanics by analysis. The resulting volume provides insight and perspective on various research problems in modern topics of physics, astrophysics, mathematics and the history of science. Furthermore it presents a balanced and authoritative account of the different branches and problems of mathematical physics that Lagrange originally studied and developed.

Bernard AUPETIT. — **A primer on spectral theory.** — Universitext. — Un vol. broché, 15,5 × 23,5, de xii, 193 p. — Prix: DM 48.00. — Springer-Verlag, Berlin, 1991.

The aim of this text is to provide an introduction to the new techniques of subharmonic functions and analytic multifunctions in spectral theory. Topics include the basic results of functional analysis, bounded operators on Banach and Hilbert spaces, Banach algebras, and

applications of spectral subharmonicity. Much of the subject matter, particularly in spectral theory, operator theory and Banach algebras is comprised of new results.

V. LAKSHMIKANTHAM, V.M. MATROSOV and S. SIVASUNDARAM. — **Vector Lyapunov functions and stability analysis of nonlinear systems.** — Mathematics and its applications, vol. 63. — Un vol. relié, 16,5 × 24,5, de x, 172 p. — Prix: Dfl. 120.00/US$79.00/£41.00. — Kluwer, Dordrecht, 1991.

Lyapunov's second method has become of increasing significance in the modern development of the stability theory of differential equations. The concept of the Lyapunov function together with the theory of differential and integral inequalities enable the properties of complicated nonlinear differential equations to be investigated more easily. Employing several Lyapunov functions offers still more flexibility and is known as the method of vector Lyapunov functions. This volume is the first to be devoted to a treatment of this method and presents in a unified way the concepts of Lyapunov stability, boundedness and practical stability.

Nematics: mathematical and physical aspects. — Ed. by Jean-Michel Coron, Jean-Michel Ghidaglia and Frédéric Hélein. — NATO ASI Series C: Mathematical and physical sciences, vol. 332. — Un vol. relié, 16,5 × 24,5, de XIII, 428 p. — Prix: Dfl. 215.00/US$140.00/£74.00. — Kluwer, Dordrecht, 1991.

This volume constitutes the Proceedings of the NATO Advanced Research Workshop on Defects, Singularities, and Patterns in Nematic Liquid Crystals: Mathematical and physical aspects, held in Orsay, France, in May 1990. The mathematical aspects considered were: Minima of relaxed energies associated with the first two models; Minima of the Ericksen functional; Solutions of evolution equations associated with the problem of harmonic maps. The physical aspects studied were: Nematic liquid crystal polymers; Defects in flows of nematic fluids; Experimental and theoretical studies of turbulence phenomena in nematics which are subjected to various excitations.

Kazimierz SOBCZYK. — **Stochastic differential equations, with applications to physics and engineering.** — Mathematics and its applications, East European series, vol. 40. — Un vol. relié, 16,5 × 24,5, de XVI, 400 p. — Prix: Dfl. 240.00/US$139.00/£88.00. — Kluwer, Dordrecht, 1991.

This book provides a unified treatment of both regular (or, random) and Itô stochastic differential equations. It focuses on solution methods, including some developed only recently. Special concern is devoted to giving an insight into both the mathematical structure, and the most efficient solution methods (analytical as well as numerical). Starting from basic notions and results of the theory of stochastic processes and stochastic calculus (including Itô's stochastic integral), many principal mathematical problems and results related to stochastic differential equations are expounded here for the first time.

Stéphane BALDO. — **Introduction à la topologie des ensembles fractals.** — Notes d'un cours gradué donné en 1990 à l'Ecole Polytechnique de Montréal par Claude Tricot. — Les publications CRM. — Un vol. broché, 16,5 × 25, de 72 p. — Centre de recherches mathématiques (CRM) de l'Université de Montréal, Montréal, 1991.

C. Tricot, professeur agrégé au département de mathématiques de l'Ecole Polytechnique de Montréal, a préparé, en 1990, un cours de niveau gradué portant sur l'analyse fractale. Ce cours de maîtrise, à l'intention des étudiants en sciences, avait comme seuls prérequis les cours de

calcul différentiel et intégral de niveau sous-gradué, ce qui permettait l'accessibilité aux ingénieurs, aux physiciens, aux informaticiens et aux mathématiciens.

David S. MOORE. — **Statistics: concepts and controversies.** — 3rd edition. — Un vol. relié, 12 × 23,5, de XVII, 439 p. — Prix: US$ 10.95. — W.H. Freeman, New York, 1991.

This is a statistics book for readers more interested in insights and ideas than in technique. It presents, in nontechnical form, important statistical concepts that are applied in public policy, the human sciences and everyday life. It will give nonmathematical readers critical insight into the uses and misuses of numbers and quantitative arguments, arguments that are increasingly being used in fields ranging from sociology to medicine to literary analysis.

Korrespondenz Felix Klein & Adolph Mayer: Auswahl aus den Jahren 1871-1907. — Hrsg., eingel. und komment. von R. Tobies und D.E. Rowe. — Teubner-Archiv zur Mathematik, Band 14. — Un vol. broché, 14,5 × 21,5, de 235 p. — Prix: DM 48.00. — B.G. Teubner, Leipzig, 1990.

La correspondance entre savants représente une source extrêmement riche si l'on veut connaître l'arrière-plan et les motivations du travail scientifique. Le présent volume contient un choix de lettre échangées entre les mathématicients Félix Klein et Adolph Mayer. Leur principal intérêt commun était la publication des «Mathematische Annalen», qui se développa sous leur direction à partir de 1875, pour devenir l'une des plus importantes revues scientifiques. Cette correspondance donne donc un aperçu sur des domaines essentiels de la recherche mathématique de cette époque. Les lettres, publiées ici pour la première fois, sont complétées par une introduction détaillée, des photographies et de nombreuses annotations.

Limit theorems in probability and statistics. — Edited by I. Berkes, E. Csáki and P. Révész. — Colloquia mathematica societatis János Bolyai, vol. 57. — Un vol. relié, 18 × 24,5, de 561 p. — Prix: US$ 200.00/Dfl. 350.00. — North-Holland, Amsterdam, 1990.

The third Hungarian Colloquium on Limit Theorems in Probability and Statistics of the Bolyai János Mathematical Society was organized in Pécs, Hungary during July 3-7, 1989. The present volume contains papers presented at the colloquium. The main topics covered are: limit theorems for partial sums of random variables, both dependent and independent case, extreme values, empirical processes, local times, time series, etc...

Bifurcation and chaos: analysis, algorithms, applications. — Ed. by R. Seydel, F.W. Schneider, T. Küpper, H. Troger. — International series of numerical mathematics, vol. 97. — Un vol. relié, 17 × 24, de X, 388 p. — Prix: SFr. 118.00. — Birkhäuser, Basel, 1991.

Bifurcation and chaos are two main themes in today's discussion of nonlinear phenomena. Mechanisms of bifurcation have been able to explain many of the abundant qualitative changes in the behavior of nonlinear dynamical systems, such as jump phenomena, loss of stability, and routes to chaos. The present volume includes 49 papers discussing a wide range of topics of bifurcation and chaos. New results on analytical methods and numerical algorithms represent systematic mathematical approaches. The models discussed in this volume reflect a wealth of phenomena; the applications range from climate to combustion to convection to the motion of ships. The book publishes new results that were presented at an interdisciplinary conference held in Würzburg, August 1990.

Roger A. HORN, Charles R. JOHNSON. — **Topics in matrix analysis.** — Un vol. relié, 15,5 × 23,5, de VIII, 607 p. — Prix: £45.00/US$59.50. — Cambridge University Press, Cambridge, 1991.

Building on the foundations of its predecessor volume "Matrix analysis", this book treats in detail several topics with important applications and of special mathematical interest in matrix theory not included in the previous text. These topics include the field of values, stable matrices and inertia, singular values, matrix equations and Kronecker products, Hadamard products, and matrices and functions. The authors assume a background in elementary linear algebra and knowledge of rudimentary analytical concepts.

Peter SARNAK. — **Some applications of modular forms.** — Cambridge tracts in mathematics, vol. 99. — Un vol. relié, 15,5 × 23,5, de X, 111 p. — Prix: £17.50/US$29.95. — Cambridge University Press, Cambridge, 1991.

The theory of modular forms and especially the so-called "Ramanujan conjectures" have recently been applied to resolve problems in combinatorics, computer science, analysis and number theory. This book, based on lectures given at Yale University, is concerned with describing some of these applications. Topics covered are: the Ruziewicz problem concerning finitely additive rotationally invariant measures on the sphere, the explicit construction of highly connected but sparse graphs, the Linnik problem concerning the distribution of integers that represent a given large integer as a sum of three squares.

Groups St. Andrews 1989. Vol. 1 & 2. — Ed. by C.M. Campbell and E.F. Robertson. — London Mathematical Society lectures notes series, vol. 159 & 160. — Deux volumes brochés, 15 × 23, de 494 p. en tout. — Prix: £19.50/US$32.50 par volume. — Cambridge University Press, Cambridge, 1991.

The themes of the St. Andrews conference were combinatorial and computational group theory; a number of leading group theorists gave courses whose content is reproduced here. Also included are refereed papers presented at this meeting. From the papers an extensive list of references may be built up and some of the diversity of group theory appreciated.

Anatoly A. ZHIGLJAVSKY. — **Theory of global random search.** — Mathematics and its applications (Soviet series), vol. 65. — Un vol. relié, 16,5 × 24,5, de XVIII, 341 p. — Prix: Dfl. 220.00/US$144.00/£76.00. — Kluwer, Dordrecht, 1991.

This volume presents the methods and theoretical results relating to the global optimization problem of a multivariate function. Global random optimization methods and statistical inferences concerning the maximum of a function and the endpoints of a distribution are studied in detail. Various related problems are also investigated. Topics discussed are: global optimization theory and techniques, global random search, auxiliary results and problems connected with global random search.

S. ZAIDMAN. — **Distributions and pseudo-differential operators.** — Pitman research notes in mathematics series, vol. 248. — Un vol. broché, 17 × 24,5, de 112 p. — Prix: £14.50. — Longman, Harlow, Essex, 1991.

The theory of distributions is an extension of classical analysis which has acquired a particular importance in modern mathematics and mathematical physics. This text presents some of its topics: fundamental definitions and properties, differentiation and multiplication by smooth functions, tempered distributions and their Fourier transform, distributions with compact support.

George R. KEMPF. — **Complex abelian varieties and theta functions.** — Universitext. — Un vol. broché, 16,5 × 24, de x, 110 p. — Prix: DM 48.00. — Springer, Berlin, 1991.

In this book, the author has focused on the analytic aspects of the geometry of abelian varieties, rather than taking the alternative algebraic or arithmetic points of view. His purpose is to provide an introduction to complex analytic geometry. Thus, he uses Hermitian geometry as much as possible. One distinguishing feature of Kempf's presentation is the systematic use of Mumford's theta group. This allows him to give precise results about the projective ideal of an abelian variety.

Günther HAEMMERLIN, Karl-Heinz HOFFMANN. — **Numerische Mathematik.** — 2. Auflage. — Grundwissen Mathematik, Band 7. — Un vol. broché, 16,5 × 24, de XIV, 449 p. — Prix: DM 42.00. — Springer, Berlin, 1991.

Dieser Band „Numerische Mathematik" hat Prinzipien des numerischen Rechnens, numerische lineare Algebra und Näherungsmethoden in der Analysis zum Inhalt. Der Begriff der Approximation zieht sich als roter Faden durch den gesamten Text. Die Betonung liegt dabei weniger auf der Bereitstellung möglichst vieler Algorithmen als vielmehr auf der Vermittlung mathematischer Überlegungen, die zur Konstruktion von Verfahren führen. Jedoch werden auch der algorithmische Aspekt und entsprechende Effizienzbetrachtungen gebührend berücksichtigt. Diese 2. Auflage wurde überarbeitet und ergänzt. Zu den Ergänzungen gehört eine Darstellung der Idee der schnellen Fouriertransformation.

J.D. DIXON, M.P.F. DU SAUTOY, A. MANN, D. SEGAL. — **Analytic pro-*p* groups.** — London Mathematical Society lecture note series, vol. 157. — Un vol. broché, 15 × 22,5, de VII, 251 p. — Prix: £19.50/US$34.50. — Cambridge University Press, Cambridge, 1991.

An analytic pro-*p* group can be viewed from the contrasting perspectives of Lie theory or the theory of pro-*p* groups. Each viewpoint gives rise to powerful results, and in this account the authors exploit both perspectives. While the first part develops several aspects of pro-*p* groups (with applications in group theory, including Lubotsky's characterisation of finitely generated linear groups), the second part develops the theory of *p*-adic analytic groups by building on the results of Part 1. The key link is the fact that a compact *p*-adic analytic group is virtually a pro-*p* group of finite rank. All the main features of *p*-adic Lie theory are then derived.

D.H. FOWLER. — **The mathematics of Plato's Academy: a new reconstruction.** — Oxford science publications. — Un vol. broché, XIX, 401 p. — Prix: £20.00. — Clarendon Press (Oxford University Press), Oxford, 1991 p.

This book presents a radically new interpretation of early Greek mathematics: its central theme is a mathematical and historical exploration of several different ways of characterising ratio. To set the reconstruction in context, David Fowler describes both how early Greeks wrote and how their writings have been transmitted to us. This leads also to descriptions of taxation and land-measurement in the Greek administration of Egypt, of the development of continued fractions from the 17th century, including a recent algorithm for arithmetic with continued fractions, and many other topics.