

**Zeitschrift:** L'Enseignement Mathématique  
**Herausgeber:** Commission Internationale de l'Enseignement Mathématique  
**Band:** 38 (1992)  
**Heft:** 3-4: L'ENSEIGNEMENT MATHÉMATIQUE

**Rubrik:** BULLETIN BIBLIOGRAPHIQUE

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## BULLETIN BIBLIOGRAPHIQUE

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**Representations of algebras and related topics.** — Edited by H. Tachikawa and S. Brenner. — London Mathematical Society lecture note series, vol. 168. — Un vol. broché,  $15 \times 22,5$ , de 291 p. — Prix: £24.95. — Cambridge University Press, Cambridge, 1992.

Prior to the International Congress of 1990 in Japan, a workshop on algebra was held in Tsukuba which included some of the best known figures in this field. Many of the expository surveys given at this workshop by distinguished mathematicians are included here. Researchers into representation theory will find this volume contains interesting and stimulating contributions to the development of the subject.

Paul KOOSIS. — **The logarithmic integral II.** — Cambridge studies in advanced mathematics, vol. 21. — Un vol. relié,  $16 \times 23,5$ , de xxvi, 574 p. — Prix: £75.00. — Cambridge University Press, Cambridge, 1992.

The theme of this unique work, the logarithmic integral, lies athwart much of twentieth century analysis. It is a thread connecting many apparently separate parts of the subject, and so is a natural point at which to begin a serious study of real and complex analysis. Professor Koosis' aim is to show how, from simple ideas, one can build up an investigation which explains and clarifies many different, seemingly unrelated problems; to show, in effect, how mathematics grows. The presentation is straightforward and by following the theme, the author has produced a work that can be read as a whole. He has brought together here many results, some unpublished, some new, and some available only in inaccessible journals.

Yuri BOYARINTSEV. — **Methods of solving singular systems of ordinary differential equations.** — Translated by Vassily Michalkowski. — Pure and applied mathematics. — Wiley-Interscience publication. — Un vol. relié,  $15,5 \times 24$ , de vi, 163 p. — Prix: £29.95. — John Wiley & Sons, Chichester, 1992.

The theory and methods of solving singular systems of ordinary differential equations are addressed in this volume. This book begins by considering sets of matrices which accompany singular systems. The important results presented in the first chapter provide an algebraic apparatus for use in the following chapters. The author proceeds by identifying classes of singular systems and then developing and substantiating difference schemes for them. General and effective ways to construct both analytic and stable numerical solutions of singular systems are outlined.

**Selected papers in combinatorics: a volume dedicated to R.G. Stanton.** — Edited by B.D. McKay, J.R. Seberry and S.A. Vanstone. — Topics in discrete mathematics, vol. 2. — Un vol. relié, de 452 p. — Prix: US\$151.50/Dfl. 265.00. — North-Holland, Amsterdam, 1992.

This volume is the second in a new series of books which concentrates on special topics in discrete mathematics. It is dedicated to Ralph Gordon Stanton, who has had a very illustrious career. His contributions to mathematics are varied and numerous. He has not only contributed

to the mathematical literature as a prominent researcher (over 200 research papers) but has also fostered mathematics through his teaching and guidance of young people, his organizational skills and his publishing expertise. In this volume, leading researchers present 38 papers, each of them personally dedicated to professor Stanton on the occasion of his 68th birthday.

**Numerical analysis 1991.** — Proceedings of the 14th Dundee Conference, June 1991. — Edited by D.F. Griffiths and G.A. Watson. — Pitman research notes in mathematics series, vol 260. — Un vol. broché,  $17 \times 25$ , de 292 p. — Prix: £25.00. — Longman Scientific and Technical, Harlow, Essex, 1992.

This book is a valuable guide to the direction being taken by current research in many areas of numerical analysis. It will be of interest to graduate students and research workers concerned with the use of numerical methods for solving differential and integral equations. It also contains important contributions to research into numerical methods for optimisation problems and curve and surface fitting. A range of topics in numerical linear algebra is also covered. Some of the contributions reflect the current trends in software design and in the use of parallel computers.

Robert G. BARTLE, Donald R. SHEBERT. — **Introduction to real analysis.** — Second edition. — Un vol. broché,  $15 \times 23$ , de XI, 404 p. — Prix: £16.95. — John Wiley & Sons, Inc., New York, 1992.

From the preface: "...Our goal is to provide an accessible, reasonably paced textbook in the fundamental concepts and techniques of real analysis for students in this area. Though very challenging, the study of real analysis proves to be rewarding in later work in mathematics and its applications. We restrict our attention here to functions of one variable; readers who wish to study functions of several variables are referred to the book "The elements of real analysis" by the first-named author... For the second edition, we examined every section, moved certain topics to new locations, and added a few new topics."

**Nonlinear hyperbolic equations and field theory.** — Edited by M.K.V. Murthy and S. Spagnolo. — Pitman research notes in mathematics series, vol. 253. — Un vol. broché,  $17 \times 24$ , de 227 p. — Prix: £24.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This Research Note collects together the texts of lectures by invited speakers at a Workshop of Nonlinear Hyperbolic Equations and Field Theory held at Villa Monastero, Lake Como, Italy during June 1990. The main topics discussed at the workshop were local and global existence for initial value problems, classical field equations, conservation laws of hyperbolic type, propagation and interaction of singularities, analytic solutions to weakly hyperbolic equations, and the Boltzmann and Vlasov equations.

**Wavelets and their applications.** — Edited by Mary Beth Ruskai, Gregory Beylkin, Ronald Coifman, Ingrid Daubechies, Stephane Mallat, Yves Meyer, Louise Raphael. — Jones and Bartlett books in mathematics. — Un vol. relié,  $16 \times 23,5$ , de XIII, 474 p. — Prix: £48.75. — Jones and Bartlett Publishers, Inc., Boston, 1992.

This book had its genesis in the NSF/CBMS Conference on Wavelets held at the University of Lowell in June, 1990. Wavelets have become a major new tool in many areas ranging from signal analysis to theoretical physics. This is the first edited collection of state of the art surveys that covers a diverse number of the most important applications. It provides an overview and in-depth guidance to further research and development.

A.G. RAMM. — **Multidimensional inverse scattering problems.** — Pitman monographs and surveys in pure and applied mathematics, vol. 51. — Un vol. relié, 16 × 24, de 379 p. — Prix: £65.00. — Longman Scientific and Technical, Harlow, Essex, 1992.

A large part of the material included in this book has not been available in book form until now and many applications are discussed. The author's results are presented in this self-contained volume. The exposition is based on the concept of property C (completeness of the set of products of solutions to linear PDE). Contents: Introduction. Statement of the inverse problems. Uniqueness theorems. Analytical solution to some inverse problems. Numerical methods for solving inverse problems. Related problems of signal processing. Three-dimensional inverse scattering problems. One-dimensional inverse problems. Other results. Low frequency asymptotics. Stability of the solution to the 3D fixed-energy inverse scattering problem.

John R. DURBIN. — **Modern algebra : an introduction.** — Third edition. — Un vol. broché, 18 × 25,5, de XIV, 348 p. — Prix: £16.95. — John Wiley & Sons, Inc., New York, 1992.

From the preface: "This book is an introduction to modern (abstract) algebra for undergraduates who may not have had a previous course in linear algebra. The first third of the book presents the core of the subject; the remainder of the book is designed to be as flexible as possible...". Contents: Mappings and operations, introduction to groups, equivalence-congruence-divisibility, groups, introduction to rings, the familiar number systems, group homomorphisms, applications of permutation groups, symmetry, polynomials, quotient rings, field extensions, polynomial equations, geometric constructions, algebraic coding, lattices and boolean algebras.

Harold S. SHAPIRO. — **The Schwarz function and its generalizations to higher dimensions.** — University of Arkansas lecture notes in the mathematical sciences, vol. 9. — Un vol. relié, 16 × 24,5, de XI, 108 p. — John Wiley & Sons, Inc., New York, 1992.

From the preface: "...Although the Schwarz function originates in classical complex analysis and potential theory, I have favored a mode of treatment which, as far as possible, unites the subject with the modern theory of distributions and partial differential equations"... Contents: The Schwarz principle of reflection. — The logarithmic potential, balayage, and quadrature domains. — Examples of "quadrature identities". — Quadrature domains: basic properties. — Projectors. — The Friedrichs operator. — Concluding remarks.

Moshe SNIEDOVICH. — **Dynamic programming.** — Pure and applied mathematics, vol. 154. — Un vol. relié, 16 × 23,5, de VIII, 410 p. — Prix: US\$99.75 (U.S.A. et Canada), US\$114.50 (Tout autre pays). — Marcel Dekker, Inc., New York, 1992.

This monograph examines dynamic programming as a problem-solving methodology-emphasizing its role as an optimization method and focusing on the modeling and solution of deterministic multistage decision problems. It explains the meaning and role of the concept of state in dynamic programming, examines the purpose, aim and function of the principle of optimality, including Bellman's conception of dynamic programming, outlines solution strategies for problems defiant of conventional treatment, ... etc.

Selman AKBULUT, Henry KING. — **Topology of real algebraic sets.** — Mathematical Sciences Research Institute publications, vol. 25. — Un vol. relié, 16 × 24, de X, 249 p. — Prix: DM 78.00. — Springer-Verlag, New York, 1992.

This book is intended to cover real algebraic varieties emphasizing the author's program to classify them topologically. The first chapter gives an overview of the classification program;

the second provides background material for the rest of the book (from the elementary properties of real algebraic sets through the recent solution of the Nash Conjecture). Chapters three and four, develop the theory of resolution towers. Chapter five shows how to obtain algebraic sets from resolution towers which are basic topologically defined objects generalizing the notion of manifold and enable us to study singular spaces in an organized way. The two last chapters explain how to put resolution tower structures on real or complex algebraic sets, and apply this theory to real algebraic sets of dimensions less than four by giving their complete topological characterization.

Leonid PASTUR, Alexander FIGOTIN. — **Spectra of random and almost-periodic operators.** — Grundlehren der mathematischen Wissenschaften, Bd. 297. — Un vol. relié, 16 × 24, de VIII, 587 p. — Prix: DM 178.00. — Springer-Verlag, Berlin, 1992.

The study of the spectra and related characteristics of random and almost periodic operators of various types is a lively field of research lying at the intersection of mathematical physics, spectral theory of operators and probability theory. This book by two of the leading researchers having contributed to this field is the first systematic treatment of the fundamental problems and the large body of mathematical results known. It highlights the important ideas and recently developed concepts and methods, and provides a large number of exercises to guide the reader towards improvements and generalizations.

**Higher algebraic K-theory: an overview.** — E. Lluís-Puebla, J.L. Loday, H. Gillet, C. Soulé, V. Snaith. — Lecture notes in mathematics, vol. 1491. — Un vol. broché, 16,5 × 24, de IX, 164 p. Prix: DM 42.00. — Springer-Verlag, Berlin, 1992.

The papers presented in this book are based on several series of lectures delivered during a seminar held at the Universidad Nacional Autónoma de México in 1985. Their purpose is to introduce students to this important field. — Contents: Emilio Lluís-Puebla: Introduction to algebraic  $K$ -theory. — Jean-Louis Loday: Introduction to algebraic  $K$ -theory and cyclic homology. — Henri Gillet: Comparing algebraic and topological  $K$ -theory. — Christophe Soulé: Algebraic  $K$ -theory of the integers. — Victor Snaith: Applications of group cohomology to bilinear forms.

Kazuaki TAIRA. — **Boundary value problems and Markov processes.** — Lecture notes in mathematics, vol. 1499. — Un vol. broché, 16,5 × 24, de IX, 132 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

From the preface: “This monograph is devoted to the functional analytic approach to a class of degenerate boundary value problems for second-order elliptic differential operators which includes as particular cases the Dirichlet and Neumann problems. We prove that this class of boundary value problems provides a new example of analytic semigroups both in the  $L_p$  topology and in the topology of uniform convergence. As an application we show that there exists a strong Markov process corresponding to such a diffusion phenomenon ... Further we study a class of initial boundary value problems for semilinear parabolic differential equations”.

Jean-Pierre SERRE. — **Lie algebras and Lie groups: 1964 lectures given at Harvard University.** — 2nd edition. — Lecture notes in mathematics, vol. 1500. — Un vol. broché, 16,5 × 24, de VIII, 168 p. — Prix: DM 42. — Springer-Verlag, Berlin, 1992.

The aim of Professor Serre’s lectures at Harvard in 1964 (reproduced here as a book) was to introduce the reader to the “Lie dictionary”: Lie algebras, Lie groups. Special features of

the presentation are its emphasis on formal groups (in the Lie group part) and the use of analytic manifolds on  $p$ -adic fields. Some knowledge of algebra and calculus is required of the reader, but the text is easily accessible to graduate students and to mathematicians at large.

Anna DE MASI, Errico PRESUTTI. — **Mathematical methods for hydrodynamic limits.** — Lecture notes in mathematics, vol. 1501. — Un vol. broché,  $16,5 \times 24$ , de IX, 196 p. — Prix: DM 39.00. — Springer-Verlag, Berlin, 1991.

Hydrodynamic limits for independent particles. — Hydrodynamics of the zero range process. — Particles models for reaction diffusion equations. — Particle models for the Carleman equation. — The Glauber + Kawasaki process. — Hydrodynamic limits in kinetic models. — Phase separation and interface dynamics. — Escape from an unstable equilibrium. — Estimates on the  $\nu$ -functions.

Adelchi AZZALINI. — **Inferenza statistica: un'introduzione basata sul concetto di verosimiglianza.** — Springer-Collana di statistica. — Un vol. broché,  $16,5 \times 24$ , de XIV, 276 p. — Prix: DM 38.00. — Springer-Verlag, Berlin, 1992.

Questo libro costituisce un'introduzione all'inferenza statistica parametrica, sviluppata privilegiando il ruolo del concetto di verosimiglianza e dei metodi a questa connessi. Esso si prefigge di introdurre il lettore alla teoria statistica presentandola come un corpo per quanto possibile unificato e di fornire, nel contempo, un adeguato numero di metodi operativi. I capitoli fondamentali della Statistica — stima e verifica d'ipotesi sono spesso percepiti come eterogenei da chi affronta questi temi per la prima volta: questo libro si propone di evidenziarne le profonde interrelazioni utilizzando ampiamente il concetto di verosimiglianza come strumento unificante.

**Bifurcation and symmetry: cross influence between mathematics and applications.** — Edited by E. Allgower, K. Böhmer, M. Golubitsky. — International series of numerical mathematics, vol. 104. — Un vol. relié,  $17 \times 24$ , de VI, 327 p. — Prix: SFr. 118.00. — Birkhäuser Verlag, Basel, 1992.

The conference "Bifurcation and symmetry" was held at Philipps-University of Marburg, Germany in June, 1991, in the hope of stimulating interactions between applications, bifurcation theory and numerical analysis. The present volume contains most of the papers presented at the conference.

Klaus W. ROGGENKAMP, Martin J. TAYLOR. — **Group rings and class groups.** — DMV Seminar, Bd. 18. — Un vol. broché,  $17 \times 24$ , de 210 p. — Prix: SFr. 68.00. — Birkhäuser Verlag, Basel, 1992.

The first part of the book centers around the isomorphism problem for finite groups. This part is the proof of the subgroup rigidity theorem (Scott-Roggencamp; Weiss) which says that a finite subgroup of the  $p$ -adic integral group ring of a finite  $p$ -group is conjugate to a subgroup of the finite group. The second part of the book is concerned with various aspects of the structure of rings of integers as Galois modules. Examples are used throughout both for motivation, and also to illustrate new ideas.

Hans TRIEBEL. — **Theory of function spaces II.** — Monographs in mathematics, vol. 84. — Un vol. relié,  $17,5 \times 24$ , de VIII, 370 p. — Prix: SFr. 158.00. — Birkhäuser Verlag, Basel, 1992.

This volume deals with the theory of function spaces as it stands at the end of the 1980s. Two scales of spaces cover many well-known function spaces such as Hölder-Zygmund spaces,

(fractional) Sobolev spaces, Besov spaces, inhomogeneous Hardy spaces, spaces of BMO-type and local approximation spaces which are closely connected with Morrey-Campanato spaces. This monograph is self-contained, although it may be considered an update of the author's earlier book of the same title.

Sergei Yu. PILYUGIN. — **Introduction to structurally stable systems of differential equations.** — Translated by the Author. — Un vol. relié, 17 × 24, de IX, 188 p. — Prix: SFr. 84.00. — Birkhäuser Verlag, Basel, 1992.

The book provides an introduction to the theory of structural stability, one of the most important branches of modern theory of dynamical systems. It contains a description of main ideas of the theory and proofs of such fundamental results as the stable manifold theorem, the Kupka-Smale theorem and the Omega-stability theorem. Geometry of Morse-Smale systems, transversal homoclinic points and the analytic strong transversality condition are treated in detail. The book is intended for a wide variety of readers: graduate student in mathematics, mathematically educated engineers and specialists in applied mathematics.

**General inequalities 6.** — 6th International Conference on General Inequalities, Oberwolfach, Dec. 9-15, 1990. — Edited by W. Walter. — International series of numerical mathematics, vol. 103. — Un vol. relié, 17 × 24, de XXXIII, 505 p. — Prix: SFr. 148.00. — Birkhäuser Verlag, Basel, 1992.

This volume continues a series of books on new results and methods in inequalities. The articles reflect a wide range of subjects and applications where inequalities play a significant role. Contents: Inequalities for sums, series and integrals. Inequalities in analysis and approximation. Inequalities of functional analysis and functional equations and inequalities. Inequalities for differential operators. Inequalities for optimization and applications. Notes, problems and remarks.

Lennart LJUNG, Georg PFLUG, Harro WALK. — **Stochastic approximation and optimization of random systems.** — DMV Seminar, Bd. 17. — Un vol. broché, 17 × 24, de 113 p. — Prix: SFr. 38.00. — Birkhäuser Verlag, Basel, 1992.

The goal of the book is to give an approach to theory and application of stochastic approximation in view of optimization problems, especially in engineering systems. The notes are based on DMV seminar lectures. They consist of three parts: I: Foundation of stochastic approximation (H. Walk); II: Applicational aspects of stochastic approximation (G. Pflug); III: Applications to adaptation algorithms (L. Ljung). Topics are: almost sure convergence, rate of convergence, especially invariance principles, optimizations under stochastic constraints, stochastic methods of optimization and control of stochastic systems.

**Time-variant systems and interpolation.** — Edited by I. Gohberg. — Operator theory: advances and applications, vol. 56. — Un vol. relié, 17 × 24, de VIII, 299 p. — Prix: SFr. 98.00. — Birkhäuser Verlag, Basel, 1992.

This volume consists of six papers dealing with the theory of time-varying analogues of interpolation problems. All papers are dedicated to generalizations to the time-variant setting of results and theorems from operator theory, complex analysis and system theory, well-known for the time-invariant case. All papers deal with interrelated problems of modern operator theory, complex analysis and system theory, and will appeal to a wide group of mathematicians and engineers.

Jeffrey ADAMS, Dan BARBASCH, David A. VOGAN, Jr. — **The Langlands classification and irreducible characters for real reductive groups.** — Progress in mathematics, vol. 104. — Un vol. relié, 16 × 24, de XII, 318 p. — Prix: SFr. 82.00. — Birkhäuser, Boston, 1992.

This monograph explores the geometry of the local Langlands conjecture. The conjecture predicts a parametrization of the irreducible representations of a reductive algebraic group over a local field in terms of the complex dual group and the Weil-Deligne group. In the case of real groups, the predicted parametrization of representations was proved by Langlands himself. Unfortunately, most of the deeper relations suggested by the  $p$ -adic theory (between real representation theory and geometry on the space of real Langlands parameters) are not true. The purpose of this book is to redefine the space of real Langlands parameters so as to recover these relationships; informally, to do “Kazhdan-Lusztig theory on the dual group”. The new definitions differ from the classical ones in roughly the same way that Deligne’s definition of a Hodge structure differs from the classical one.

**Free resolutions in commutative algebra and algebraic geometry: Sundance 90.** — Edited by David Eisenbud and Craig Huneke. — Research notes in mathematics, vol. 2. — Un vol. broché, 15 × 23, de XII, 146 p. — Prix: £19.95. — Jones and Bartlett Publishers, Boston, 1992.

Free resolutions and questions related to them occur in many areas of commutative algebra and algebraic geometry. The selected contributions in this volume originated at the Sundance conference. The conference was devoted to discussions of the current state of work on some of the central problems in the area. The papers include write-ups that develop groups of current problems which seem likely to influence future developments of the field, basic expositions of some areas, and new research, not otherwise published, related to the basic areas surveyed.

Jean-Pierre SERRE. — **Topics in Galois theory.** — Notes written by Henri Damon. — Research notes in mathematics, vol. 1. — Un vol. broché, 15 × 23, de XVI, 117 p. — Prix: £19.95. — Jones and Bartlett Publishers, Boston, 1992.

These notes are based on “Topics in Galois theory”, a course given by the author at Harvard University in the fall semester of 1988 and written down by Henri Damon. In the first part of the book, classical methods and results, such as the Scholz and Reichardt construction for  $p$ -groups,  $p$  unequal 2, as well as Hilbert’s irreducibility theorem and the large sieve inequality, are presented. The second half is devoted to rationality and rigidity criteria and their application in realizing certain groups as Galois groups of regular extensions of  $Q(T)$ .

**Matroid applications.** — Edited by Neil White. — Encyclopedia of mathematics and its applications, vol. 40. — Un vol. relié, 15 × 25, de XII, 361 p. — Prix: £45.00/US\$79.95. — Cambridge University Press, Cambridge, 1992.

This volume, the third in a sequence that began with “Theory of matroids” and “Combinatorial geometries”, concentrates on the applications of matroid theory to a variety of topics from geometry (rigidity and lattices), combinatorics (graph, codes and designs) and operations research (the greedy algorithm). As with its predecessors, the contributors to this volume have written their articles to form a cohesive account so that the result is a volume that will be valuable reference for research workers.

AMOS HARPAZ. — **Relativity theory: concepts and basic principles.** — Un vol. relié, 16 × 23,5, de VIII, 224 p. — Prix: £20.95. — Jones and Bartlett Publishers, Boston, 1992.

This book is a bold attempt to give a scientific explanation of the central ideas of general relativity for readers with very modest backgrounds in mathematics and physics. A minimum

of mathematical machinery is developed — somewhat informally — as the exposition proceeds. The book is strong on the physical side: the main ideas are there, the standard terms are well defined, evidence supporting the theory is discussed, and the main applications are presented. The author works through important chains of reasoning in detail and, while the prerequisites for the book are slight, “Relativity theory” requires thoughtful study that will be rewarded with a thorough understanding of the subject.

Kristina SMITALOVA, Stefan SUJAN. — **A mathematical treatment of dynamical models in biological science.** — Translation editor, B. Sleeman. — Ellis Horwood series in mathematics and its applications. — Un vol. relié, 17,5 × 24,5, de xx, 183 p. — Prix: US\$80.00 — Ellis Horwood, New York, 1991.

Providing a comprehensive introduction to mathematical modelling in biology and ecology, this book presents numerous new results and developments. The basic mathematical facts on the theory of the dynamics of biological communities are treated in a unified form, with emphasis placed on the quantitative aspects, and on rigorous mathematical results. Further analysis of the principles of stochastic behaviour, and the problems of small accidental perturbations are included; the problems of stochastic models are looked at in detail.

Alexandru BUIUM. — **Differential algebraic groups of finite dimension.** — Lecture notes in mathematics, vol. 1506. — Un vol. broché, 16,5 × 24, de xvi, 145 p. — Prix: DM 42.00. — Springer-Verlag, Berlin, 1992.

First properties: Basic spaces and maps. Prolongations and embeddings. Local finiteness and splitting. — Affine D-group schemes: The analytic method. The algebraic method: direct and semidirect products. — Commutative algebraic D-groups: Logarithmic Gauss-Manin connection. Duality theorem. Descent. Regularity. — General Algebraic D-groups: Local finiteness criterion. Representing the automorphism functor. Products of Abelian varieties by affine groups. — Applications to differential algebraic groups.

Leonard M. ADLEMAN, Ming-Deh A. HUANG. — **Primality testing and Abelian varieties over finite fields.** — Lecture notes in mathematics, vol. 1512. — Un vol. broché, 16,5 × 24, de vii, 142 p. — Prix: DM 34.00. — Springer-Verlag, Berlin, 1992.

The existence of a random polynomial time algorithm for the set of primes is proved. The techniques used are from algebraic geometry, algebraic number theory and analytic number theory. Particular use is made of the theory of two dimensional Abelian varieties over finite fields. The result complements the well known result of Solovay and Strasse that there exists a random polynomial time algorithm for the set of composites.

L.S. BLOCK, W.A. COPPEL. — **Dynamics in one dimension.** — Lecture notes in mathematics, vol. 1513. — Un vol. broché, 16,5 × 24, de viii, 249 p. — Prix: DM 62.00. — Springer-Verlag, Berlin, 1992.

The behaviour under iteration of unimodal maps of an interval, such as the logistic map, has recently attracted considerable attention. It is not so widely known that a substantial theory has by now been built up for arbitrary continuous maps of an interval. The purpose of the book is to give a clear account of this subject, with complete proofs of many strong, general properties. In a number of cases these have previously been difficult of access. The analogous theory for maps of a circle is also surveyed.

Jack K. HALE, Hüseyin KOÇAK. — **Dynamics and bifurcations.** — Texts in applied mathematics, vol. 3. — Un vol. relié,  $16 \times 24,5$ , de XIV, 568 p. — Prix: DM 98.00. — Springer-Verlag, New York, 1992.

This book consists of ideas and examples about the geometry of dynamics and bifurcations of ordinary differential equations. The subject of differential and difference equations is an old chapter in science. In recent year, due primarily to the extension of the use of computers, dynamical systems has once more turned to its roots in applications. It is the aim of this book to provide a foundation of knowledge for undergraduate and beginning graduate students.

Albert BOGGESS. — **CR manifolds and the tangential Cauchy-Riemann complex.** — Studies in advanced mathematics. — Un vol. relié,  $16 \times 24$ , de XVII, 364 p. — Prix: £ 36.50. — CRC Press, Boca Raton, 1991.

Preliminaries: Analysis on Euclidean space. Analysis on manifolds. Complexified vectors and forms. The Frobenius theorem. Distribution theory. Currents. — CR manifolds: CR manifolds. The tangential Cauchy-Riemann complex. CR functions and maps. The Levi form. — The holomorphic extension of CR functions: An approximation theorem. The analytic disc technique. The Fourier transform technique. Further results. — Solvability of the tangential Cauchy-Riemann complex: Kernel calculus. Fundamental solutions for the exterior derivative and Cauchy-Riemann operators. The kernel of Henkin. Fundamental solutions for the tangential Cauchy-Riemann complex on a convex hypersurface. A local solution to the tangential Cauchy-Riemann equations. Local nonsolvability of the tangential Cauchy-Riemann complex. Further results.

Thomas E. CECIL. — **Lie sphere geometry: with applications to manifolds.** — Universitext. — Un vol. broché,  $15,5 \times 23,5$ , de XII, 207 p. — Prix: DM 48.00. — Springer-Verlag, New York, 1992.

The book provides a modern treatment of Lie's geometry of spheres and its recent applications to the study of submanifolds of Euclidean space. The volume begins with Lie's construction of the space of spheres including the fundamental notions of oriented contact, parabolic pencils of spheres and Lie sphere transformations. Of particular interest are isoparametric, Dupin and taut submanifolds. These have recently been classified up to Lie sphere transformations in certain special cases through the introduction of natural Lie invariants.

Alexandru DIMCA. — **Singularities and topology of hypersurfaces.** — Universitext. — Un vol. broché,  $15,5 \times 23,5$ , de XIII, 263 p. — Prix: DM 118.00. — Springer-Verlag, New York, 1992.

The volume aims to introduce its reader to topics in the topology of smooth and singular varieties of great subtlety and beauty. The author presents a large number of basic results on the topology of complex algebraic varieties. He uses information on local topology and geometry of singularities to compute global topological invariants such as homology and cohomology groups, fundamental groups, and Alexander polynomials.

Ravi P. AGARWAL. — **Difference equations and inequalities: theory, methods, and applications.** — Pure and applied mathematics, vol. 155. — Un vol. relié,  $15,5 \times 23,5$ , de XIII, 77 p. — Prix: US\$ 150.00. — Marcel Dekker, Inc., New York, 1992.

Focusing on a wide range of possible mathematical uses, the book offers various methods of solving linear and nonlinear difference equations... develops discrete versions of Rolle's,

mean value, and Kneser's theorems, Taylor's formula, and l'Hopital's rule... presents discrete interpretations of many classical differential equations, such as Duffing's, van der Pol's, and Hill's equations... reviews the theory of difference inequalities and various comparison results... displays a unified treatment of boundary value problems involving linear and nonlinear difference equations... etc.

Ian STEWART and Martin GOLUBITSKY. — **Fearful symmetry: is God a geometer ?** — Un vol. relié, 16 × 23,5, de XIX, 287 p. — Prix: £16.95. — Blackwell, Oxford, 1992.

This book will open your eyes to the broken symmetries that lie all around you, from the shapes of clouds to the drops of dew on a spider's web, from the glittering facets of a diamond to the hoofbeats of a galloping horse, from centipedes to corn circles. It will take you into the depth of the atom, where broken symmetry controls the four basic forces of nature; and to the farthest reaches of the universe, where unimaginably large structure formed by millions of galaxies cast doubt upon current theories of the cosmos. It will bring you face to face with some of the deepest questions of modern science: the arrow of time, the handedness of life, and the origins of biological form.

David B.A. EPSTEIN with James W. CANNON, Derek W. HOLT, Silvio V.F. LEVY, Michael S. PATERSON, William P. THURSTON. — **Word processing in groups.** — Un vol. relié, 16 × 23, de XI, 330 p. — Prix: £20.95. — Jones and Bartlett Publishers, Boston, 1992.

Using finite state automata, the authors have created the new theory of automatic groups, a branch of combinatorial group theory (the study of groups through generators and relations). This book is the first to develop this new theory, and even before publication it had already been widely cited in research articles by other mathematicians. This book also contains a readable introduction to the theory of regular languages, a discussion of related topics in combinatorial group theory, and connections between automatic groups and geometry, connections which largely motivated the development of the new theory.

Richard L. BOWERS, James R. WILSON. — **Numerical modeling in applied physics and astrophysics.** — Un vol. relié, 17 × 24, de XIII, 705 p. — Prix: £47.50. — Jones and Bartlett Publishers, Boston, 1991.

From the preface: "This volume is intended to be a self-contained introductory presentation of selected, practical computational methods which have been extensively and successfully applied to a wide range of astrophysical problems. It may be used as a primary text for a course on computational methods, or as a source for self-study by students in applied physics and astrophysics... we have chosen to present a relatively simple yet flexible approach to the solution of complex problems which has been found by experience to be easily modified to include new physics, or different problem geometries".

Jean-François GOUYET. — **Physique et structures fractales.** — Préf. de Benoît Mandelbrot. — Un vol. broché, 16 × 24, de XIV, 234 p. — Prix: FF 175.00. — Masson, Paris, 1992.

Les fractales ont depuis la fin des années 70 suscité des travaux dans de multiples domaines où elles se sont révélées pertinentes: physique des matériaux, mécanique des fluides, anatomie fonctionnelle, morphologie végétale, géomorphologie, astrophysique... Cet ouvrage met précisément en évidence les structures fractales présentes au sein des phénomènes étudiés dans ces disciplines: reliefs, turbulence, chaos, fractures, percolation, fronts de diffusion, agrégation, transitions de phases, trajectoire de particule... En outre, l'auteur décrit en détail plusieurs modèles de croissance, ainsi que les aspects dynamiques du transport dans les milieux

fractals. Destinée aux étudiants en physique et chimie des deuxième et troisième cycles, cette étude s'adresse également aux chercheurs et ingénieurs intéressés par une tendance essentielle de la physique contemporaine: la géométrisation du réel.

Lionel SALEM, Frédéric TESTARD, Coralie SALEM. — **The most beautiful mathematical formulas.** — Translated by James D. Wuest. — Un vol. relié, 16 × 24, de XIII, 141 p. — Prix: £12.95/US\$21.95. — John Wiley & Sons, Inc., New York, 1992.

From the author's introduction: "The goal of this book is to reveal the beauty of mathematical formulas. This beauty springs from the plasticity of mathematical symbols, the simplicity of mathematical statements, and the aesthetic appeal of their implications. Like all sciences, mathematics has its own special harmony. Our goal is to explore this harmony."

Colin McLARTY. — **Elementary categories, elementary toposes.** — Oxford logic guides, vol. 21. — Oxford science publications. — Un vol. relié, 16 × 24, de XIII, 265 p. — Prix: £45.00. — Clarendon Press, Oxford, 1992.

The book covers elementary aspects of category theory and topos theory. It has few mathematical prerequisites, and uses categorical methods throughout rather than beginning with set theoretic foundations. It works with key notions such as cartesian closedness, adjunctions, regular categories, and the internal logic of a topos. Full statements and elementary proofs are given for the central theorems, including the fundamental theorem of toposes, the sheafification theorem, and the construction of Grothendieck toposes over any topos as base. Three chapters discuss applications of toposes in detail, namely to sets, to basic differential geometry, and to recursive analysis.

Yves DIERS. — **Categories of commutative algebras.** — Oxford science publications. — Un vol. relié, 16 × 24, de IX, 271 p. — Prix: £40.00. — Clarendon Press, Oxford, 1992.

This book studies the universal constructions and properties in categories of commutative algebras. It shows that the concepts and constructions arising in commutative algebra and algebraic geometry are not bound to the universe of rings but possess a universality that can be interpreted in various domains of discourse. Contents: introduction, Zariski categories, classical objects, spectra, schemes, Jacobson ultraschemes, algebraic varieties, Zariski toposes, neat objects and morphisms, flatness properties, étale objects and morphisms, terminators, some constructions of Zariski categories.

Hala O. PFLUGFELDER. — **Quasigroups and loops: introduction.** — Sigma series in pure mathematics, vol. 7. — Un vol. relié, 17,5 × 24,5, de 147 p. — Prix: DM 68.00. — Heldermann Verlag, Berlin, 1992.

This is a self-contained text written on an introductory level. Assuming as a prerequisite only an elementary course in abstract algebra, it develops from the beginnings the fairly young discipline of the theory of quasigroups. In geometry, it arose from the analysis of web structures; in algebra, from non-associative products; and in combinatorics, from Latin squares. This is the first textbook on the subject in the Western literature.

**Quasigroups and loops: theory and applications.** — Edited by O. Chein, H.O. Pflugfelder, J.D.H. Smith. — Sigma series in pure mathematics, vol. 8. — Un vol. relié, 17,5 × 24,5, de XII, 568 p. — Prix: DM 148.00/US\$98.00. — Heldermann Verlag, Berlin, 1992.

Contents: T. Evans: Varieties of loops and quasigroups. — O. Chein: Examples and methods of construction. — J.D.H. Smith: Centrality. — L. Bénéteau: Commutative Moufang

loops and related groupoids. — L. Bénéteau: Cubic hypersurface quasigroups. — M. Deza, G. Sabidussi: Combinatorial structures arising from commutative Moufang loops. — E. Goodaire, M.J. Kallaher: Systems with two binary operations and their planes. — A. Barlotti: Geometry of quasigroups. — K.H. Hofmann, K. Strambach: Topological and analytical loops. — V.V. Goldberg: Local differentiable quasigroups and webs. — T. Grundhöfer, H. Salzmann: Locally compact double loops and ternary fields. — P.O. Miheev, L.V. Sabinin: Quasigroups and differential geometry. — P.D. Gerber: LIP loops and quadratic differential equations. — F.B. Kalhoff, S.H.G. Priess-Crampe: Ordered loops and ordered planar ternary rings.

R.P. BURN. — **Numbers and functions: steps into analysis.** — Un vol. relié,  $16 \times 23,5$ , de XXII, 328 p. — Prix: £40.00/US\$69.95. — Cambridge University Press, Cambridge, 1992.

In this book, the author invites the student reader to tackle each of the key concepts in turn, progressing from the experience (using computers for graph drawing where appropriate) through a structured sequence of several hundred problems to concepts, definitions and proofs of classical real analysis. The novel approach to rigorous analysis offered here is designed to enable students to grow in confidence and skill and thus overcome the traditional difficulties. Lecturers in universities will be challenged to rethink their conventions about the best way to introduce the central ideas of analysis to undergraduates.

Laurent SCHWARTZ. — **Analyse I: théorie des ensembles et topologie.** — Avec la collaboration de K. Zizi. — Collection «Enseignement des sciences», vol. 42. — Un vol. broché,  $16,5 \times 24$ , de 404 p. — Prix: FF 240.00. — Hermann, Paris, 1991.

Ce cours célèbre a été entièrement restructuré et mis à jour par son auteur, en reprenant les plus récents développements du calcul intégral. — Contenu: Les cinq premiers axiomes de la théorie des ensembles. L'axiome du choix. Les entiers naturels: l'axiome de l'infini. Relation d'équivalence-ensembles quotient. Relation d'ordre. Lemme de Zorn. Opérations sur les ensembles infinis. Les nombres ordinaux et cardinaux. Espaces métriques et topologiques. Fonctions continues. Espaces compacts. Suites et filtres. Propriétés des fonctions continues sur un espace compact. Espaces localement compacts, connexes, métriques complets. Théorie élémentaire des espaces vectoriels normés et des espaces de Banach. Séries dans les espaces vectoriels normés. Espaces fonctionnels: convergence simple et uniforme. Théorie spectrale élémentaire. Produits infinis de nombres ou de fonctions réels ou complexes.

Jacques BARANGER. — **Analyse numérique.** — Avec la collaboration de C. Brezinski, C. Carasso, J.-M. Chassery, F. Chatelin, J.-F. Maitre, J. Roux, G. Wanner. — Collection «Enseignement des sciences», vol. 38. — Un vol. broché,  $16,5 \times 24$ , de 576 p. — Prix: FF 260.00. — Hermann, Paris, 1991.

Ce livre comporte une première partie présentant les connaissances de base et décrivant les principaux problèmes en analyse numérique et les méthodes associées. La seconde partie se compose de chapitres écrits chacun par un spécialiste: résolution numérique des grands systèmes linéaires creux, résolution des grands systèmes non linéaires et méthodes d'optimisation sans contraintes, calcul des valeurs et vecteurs propres, lissage des données à l'aide des fonctions splines, approximation de Padé, transformation de Fourier discrète, équations différentielles raides.

Bernard DACOROGNA. — **Introduction au calcul des variations.** — Cahiers mathématiques de l'Ecole polytechnique fédérale de Lausanne. — Un vol. broché,  $15 \times 21$ , de 228 p. — Prix: SFr. 58.00. — Presses polytechniques et universitaires romandes, Lausanne, 1992.

Le calcul des variations est un sujet classique, mais reste très vivant. Outre son lien avec d'autres branches comme les équations différentielles ou la géométrie, il faut mentionner ses nombreuses applications notamment à la physique, aux sciences de l'ingénieur, à la biologie ou à l'économie. Ce livre a pour but d'introduire le sujet, d'en donner une vue d'ensemble sans pour autant exposer de façon exhaustive le calcul des variations. Contenant de nombreux exercices avec leurs corrections, il peut être utilisé dans des cours de 2e et 3e cycles universitaires.

Philippe CHOQUARD. — **Mécanique analytique, vol. 1.** — Cahiers mathématiques de l'Ecole polytechnique fédérale de Lausanne. — Un vol. broché, 15 × 21, de 320 p. — Prix: SFr. 68.00. — Presses polytechniques et universitaires romandes, Lausanne, 1992.

Cet ouvrage expose le développement de la mécanique analytique en partant de Newton pour arriver à Moser et Arnold. Un second volume est consacré aux solutions des problèmes et exercices proposés dans le premier. Depuis les années 1950, cette discipline a connu un renouveau remarquable notamment grâce au progrès de la théorie des systèmes dynamiques. — Table des matières: Introduction. Systèmes munis de contraintes. Equations de Lagrange et équations d'Appel. Equations de Hamilton, principes variationnels et formalisme canonique. Calcul de perturbation. Application de Poincaré, théorie de KAM, théorie ergodique.

Andrew RANICKI. — **Lower  $K$ - and  $L$ -theory.** — London Mathematical Society lecture note series, vol. 178. — Un vol. broché, 15 × 23, de 174 p. — Prix: £ 17.95. — Cambridge University Press, Cambridge, 1992.

This is the first unified treatment in book form of the lower  $K$ -groups of Bass and the lower  $L$ -groups of the author. These groups arise as the Grothendieck groups of modules and quadratic forms which are components of the  $K$ - and  $L$ -groups of polynomial extensions. They are important in the topology of non-compact manifolds such as Euclidean spaces, being the value groups for Whitehead torsion, the Siebenmann end obstruction and the Wall finiteness and surgery obstructions. Some of the applications to topology are included, such as the obstruction theories for splitting homotopy equivalences and for fibering compact manifolds over the circle.

Walter A. STRAUSS. — **Partial differential equations : an introduction.** — Un vol. broché, 15 × 23, de IX, 425 p. — Prix: £ 16.95 (relié: £ 51.00). — John Wiley & Sons, Inc., Chichester, 1992.

Where PDEs come from. Waves and diffusions. Reflections and sources. Boundary problems. Fourier series. Harmonic functions. Green's identities and Green's functions. Computation of solutions. Waves in space. Boundaries in the plane and in space. General eigenvalue problems. Distributions and transforms. PDE problems from physics. Nonlinear PDEs. Answers and hints to selected exercises.

Saunders MAC LANE, Ieke MOERDIJK. — **Sheaves in geometry and logic : a first introduction to topos theory.** — Universitext. — Un vol. broché, 15,5 × 23,5, de XII, 627 p. — Prix: DM 98.00. — Springer-Verlag, New York, 1992.

This introduction to topos theory begins with a number of illustrative examples that explain the origin of these ideas and then describes the sheafification process and the properties of an elementary topos. The applications to axiomatic set theory and the use in forcing are then described. Geometric morphisms and the construction of classifying topoi, for example those related to local rings and simplicial sets, next appear, followed by the use of locales (pointless spaces) and the construction of topoi related to geometric languages and logic.

Andrzej DERDZINSKI. — **Geometry of the standard model of elementary particles.** — Texts and monographs in physics. — Un vol. relié, 16 × 24, de XII, 199 p. — Prix: DM 68.00. — Springer-Verlag, Berlin, 1992.

Dealing with the standard model of elementary particles, this book emphasizes the naturally geometric character of particle theories. Particles and their interactions are described in terms of vector bundles over spacetime and operations on them. The approach differs from the existing literature by very consistent use of the geometric language. No previous knowledge of physics is therefore assumed.

LI Ta-Tsien, CHEN Yunmei. — **Global classical solutions for nonlinear evolution equations.** — Pitman monographs and surveys in pure and applied mathematics, vol. 45. — Un vol. relié, 16 × 24, de XII, 209 p. — Prix: £47.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This text is devoted to the global existence and the lifespan of classical solutions to the Cauchy problem with small initial data for nonlinear heat equations, nonlinear wave equations and nonlinear Schrödinger equations. The presented method by which to obtain in a unified manner all recent results in the field, is simple and direct. The volume is self-contained, but assumes knowledge of the basic theory of Sobolev spaces and linear evolution equations.

Brian S. EVERITT, Graham DUNN. — **Applied multivariate data analysis.** — Un vol. broché, 15,5 × 23,5, de XII, 304 p. — Prix: £29.95. — Edward Arnold, London, 1992.

After an introduction to data analysis and the statistical knowledge required to use the book, the authors go on to explain the analysis of complex data sets in detail. The present text arises from an extensive revision of the author's previous book "Advanced methods of data exploration and modelling". The up-to-date text includes modern techniques such as multi-dimensional scaling, cluster analysis, generalized linear models and structural equation models. Special features include: emphasis on using methods of data analysis as exploratory tools, importance of searching for patterns in data stressed and exemplified, interpretation of the output from statistical software.

John L. PHILLIPS, Jr. — **How to think about statistics.** — Revised edition. — Un vol. broché, 15,5 × 23,5, de XIV, 201 p. — Prix: £11.95. — W.H. Freeman and Company, New York, 1992.

This new edition of "How to think about statistics" offers a common sense method for understanding the statistics that affect your decisions and performance in business, in school, as a consumer, and as a voter. Rather than focus on mathematics and computations, this volume familiarizes you with the understanding logic of statistical analysis and problem-solving. It reveals how empirical studies are conceived, gathered, reported, interpreted — and sometimes obscured and distorted.

Lisa LORENTZEN, Haakon WAADELAND. — **Continued fractions with applications.** — Studies in computational mathematics, vol. 3. — Un vol. relié, 17,5 × 24,5, de XVI, 606 p. — Prix: US\$ 157.00/Dfl. 275.00. — North-Holland, Amsterdam, 1992.

This book is aimed at two kinds of readers: firstly, people working in or near mathematics, who are curious about continued fractions; and secondly, senior or graduate students who would like an extensive introduction to the analytic theory of continued fractions. The book contains several recent results and new angles of approach and thus should be of interest to researchers throughout the field. An appendix present a large number of special continued fraction expansions. Examples and problems are included.

P. GRISVARD. — **Singularities in boundary value problems.** — Research notes in applied mathematics = Recherches en mathématiques appliquées, vol. 22. — Un vol. broché,  $16 \times 24$ , de XIV, 198 p. — Prix: FF 220.00. — Masson, Paris, 1992.

This book provides a comprehensive analysis of boundary value problems in domains with non smooth boundaries including corners, edges and vertices. The book is meant to be introductory, self-contained. To help potential users it is focused on the particular problems frequently met in applications namely various boundary problems for the Laplace equation, the elasticity system in two and three dimensions, the biharmonic equation and the Stokes problem in two dimensions. In considering evolution problems it is restricted to the heat and wave equations with Dirichlet boundary condition as model problems.

Charles SWARTZ. — **An introduction to functional analysis.** — Pure and applied mathematics, vol. 157. — Un vol. relié,  $16 \times 23,5$ , de XI, 600 p. — Prix: US\$55.00. Marcel Dekker, Inc., New York, 1992.

This textbook introduces the essential properties of topological vector spaces, establishes the uniform boundedness principle, closed graph/open mapping theorems and Hahn-Banach theorem, gives a version of the uniform boundedness principle with no completeness assumptions on the spaces and an application to the Nikodym boundedness principle, details locally convex and normed linear spaces and discusses duality and polar topologies, applies linear operators to the integration of vector-valued functions, Schwartz distributions, the Fredholm alternative and Dvoretzky-Rogers theorem, proves the spectral theorem for compact symmetric operators and uses this result to motivate the spectral theorem for Hermitian operators with Gelfand mapping...

Daniel ZWILLINGER. — **Handbook of integration.** — Un vol. relié,  $16 \times 23,5$ , de XV, 367 p. — Prix: US\$49.95. — Jones and Bartlett, Boston, 1992.

From the preface: "In performing mathematical analysis, analytic evaluation of integrals is often required.... This book is therefore divided into five sections: Applications of integration (which shows how integration is used in differential equations, geometry, probability and performing summations), concepts and definitions (which defines several different types of integrals and operations on them), exact techniques (which indicates several ways in which integrals may be evaluated exactly), approximate techniques (which indicates several ways in which integrals may be evaluated approximately), numerical techniques (which indicates several ways in which integrals may be evaluated numerically)."

Raghavan NARASIMHAN. — **Compact Riemann surfaces.** — Lectures in mathematics, ETH Zürich. — Un vol. broché,  $17 \times 24$ , de 120 p. — Prix: Sfr. 32.00. — Birkhäuser-Verlag, Basel, 1992.

The course was meant to provide an introduction to the function theory and the geometry of compact Riemann surfaces. The Riemann-Roch theorem is proved by the method of sheaves, vector bundles and the Serre duality theorem. This is then applied to the study of the geometry of algebraic curves in projective space and to the relationship between a compact Riemann surface and its Jacobian. In this latter part an attempt has been made to give proofs as close as possible to those given by Riemann himself in his classic papers on Abelian functions, showing that Riemann's methods are not very different from those used by many modern writers on the subject.

**Clifford algebras and their applications in mathematical physics.** — Proceedings of Second Workshop held at Montpellier, France, 1989. — Edited by A. Micali, R. Boudet and J. Helmstetter. — Fundamental theories of physics, vol. 47. — Un vol. relié,  $16,5 \times 25$ , de x, 523 p. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume contains selected papers presented at the Second Workshop on Clifford Algebras and their Applications in Mathematical Physics. These papers range from various algebraic and analytic aspects of Clifford algebras to applications in, for example, gauge fields, relativity theory, supersymmetry and supergravity, and condensed phase physics. Included is a biography and list of publications of Mario Schenberg, who, next to Marcel Riesz, has made valuable contributions to these topics. This volume will be of interest to mathematicians working in the fields of algebra, geometry or special functions.

Maks A. AKIVIS and Alexander M. SHELEKHOV. — **Geometry and algebra of multi-dimensional three-webs.** — Translated from Russian by Vladislav V. Goldberg. — Mathematics and its applications (Soviet series), vol. 82. — Un vol. relié,  $16,5 \times 24,5$ , de xi, 358 p. — Prix: Dfl. 290.00/US\$169.00/£99.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This monograph presents classical and up-to-date results of the theory, and those parts of geometry and algebra which are closely connected with it. Many problems of the theory of smooth quasigroups and loops are considered. In addition to the general theory of webs, important classes of special webs are studied also. This volume contains eight chapters dealing with geometric and algebraic structures associated with three-webs, transversally geodesic and isoclinic three-webs, Bol and Moufang three-webs, closed G-structures, automorphisms of three-webs, the geometry of the fourth-order differential neighborhood of a multidimensional three-web, and  $d$ -webs of codimension  $r$ .

Nikolai Mikhailovich KOROBOV. — **Exponential sums and their applications.** — Mathematics and its applications (Soviet series), vol. 80. — Un vol. relié,  $16,5 \times 24,5$ , de xv, 208 p. — Prix: Dfl. 165.00/US\$98.00/£57.00. — Kluwer Academic Publishers, Dordrecht, 1992.

The material in this volume is divided into three chapters which embrace the classical results of Gauss, and the methods of Weyl, Mordell and Vinogradov; the traditional applications of exponential sums to the distribution of fractional parts, the estimation of the Riemann zeta function; and the theory of congruences and Diophantine equations. Some new applications of exponential sums are also included.

Chuang-Gan HU and Chung-Chun YANG. — **Vector valued functions and their applications.** — Mathematics and its applications (Chinese series), vol. 3. — Un vol. relié,  $16,5 \times 24,5$ , de ix, 160 p. — Prix: Dfl. 120.00/US\$69.00/£42.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This book is the first to be devoted to the theory of vector-valued functions with one variable. The volume contains three chapters devoted to the theory of normal functions,  $H_p$ -space, and vector-valued functions and their applications. Among the topics dealt with are the properties of complex functions in a complex plane and infinite-dimensional spaces, and the solution of vector-valued integral equations and boundary value problems by complex analysis and functional analysis, which involve methods which can be applied to problems in operations research and control theory.

Drumi BAINOV and Pavel SIMEONOV. — **Integral inequalities and applications.** — Mathematics and its applications (East European series), vol. 57. — Un vol. relié,  $16,5 \times 24,5$ , de xi, 245 p. — Prix: Dfl. 185.00/US\$110.00/£64.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This book is devoted to integral inequalities of the Gronwall-Bellman-Bihari type. Following a systematic exposition of linear and nonlinear inequalities, attention is paid to analogues including integro-differential inequalities, functional differential inequalities, and discrete and abstract analogues. Applications to the investigation of the properties of solutions of various classes of equations such as uniqueness, stability, dichotomy, asymptotic equivalence and behaviour is also discussed.

Lev Isaakovich RONKIN. — **Functions of completely regular growth.** — Mathematics and its applications, (Soviet series), vol. 1. — Un vol. relié, 16,5 × 24,5, de XII, 392 p. — Kluwer Academic Publishers, Dordrecht, 1992.

This monograph deals with functions of completely regular growth (FCRG), i.e. functions that have, in some sense, good asymptotic behaviour out of the exceptional set. The theory of entire functions of completely regular growth of one variable, developed in the late 1930s, soon found applications in both mathematics and physics. This volume describes this theory and presents recent developments based on the concept of weak convergence. This enables a unified approach and provides a comparatively simple presentation of the classical Levin-Pfluger theory. Emphasis is put on those classes of functions which are particularly important for applications — functions having a bounded spectrum and finite exponential sums.

André AVEZ. — **La leçon de géométrie à l'oral de l'agrégation.** — Un vol. broché, 16 × 24, de 210 p. — Prix: FF 160.00. — Masson, Paris, 1992.

L'oral de l'agrégation de mathématiques est constitué de deux leçons. L'une d'elles porte sur le programme d'algèbre et de géométrie. Cet ouvrage traite des leçons de géométrie. Chaque chapitre de ce livre est autonome. Il donne un plan détaillé d'une leçon; assorti de remarques qui permettent de répondre aux questions du jury. Ce plan est suivi de l'exposé détaillé de questions choisies pour leur pertinence et leur élégance, voire leur originalité, puis par une bibliographie courte mais suffisante. Un chapitre de conseils ouvre le livre.

Juan MARGALEF-ROIG, Enrique OUTERELO DOMINGUEZ. — **Differential topology.** — North-Holland mathematics studies, vol. 173. — Un vol. relié, 17,5 × 24,5, de xv, 603 p. — Prix: Dfl. 250.00/US\$ 143.00. — North-Holland, Amsterdam, 1992.

From the preface by Peter W. Michor: "This book fills the gap: whenever possible the manifolds treated are Banach manifolds with corners. Corners add to the complications and the authors have carefully fathomed the validity of all main results at corners. Even in finite dimensions some results at corners are more complete and better thought out here than elsewhere in the literature. The proofs are correct and with all details. I see this book as a reliable monograph of a well defined subject; the possibility to fall back to it adds to the feeling of security when climbing in the more dangerous realms of infinite differential geometry."

R. DELANGHE, F. SOMMEN, V. SOUCEK. — **Clifford algebra and spinor-valued functions: a function theory for the Dirac operator.** — Related REDUCE software by F. Brackx, D. Constaes. — Mathematics and its applications, vol. 53. — Un vol. relié, 17 × 24,5, de xvii, 485 p., une disquette 3'5. — Prix: Dfl. 295.00/US\$ 176.00/£ 102.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume describes the substantial developments in Clifford analysis which have taken place during the last decade, and, in particular, the role of the spin group in the study of null solutions of real and complexified Dirac and Laplace operators. — Contents: Clifford algebras over lower dimensional Euclidean spaces. Clifford algebras and spinor spaces. Monogenic functions. Special functions and methods. Monogenic differential forms and residues. Clifford analysis and the Penrose transform.

Yu.I. NEIMARK, P.S. LANDA. — **Stochastic and chaotic oscillations.** — Mathematics and its applications (Soviet series), vol. 77. — Un vol. relié, 17 × 24,5, de XII, 500 p. — Prix: Dfl. 320.00/US\$ 183.00/£ 109.00. — Kluwer Academic Publishers, Dordrecht, 1992.

Mathematical models of deterministic discrete and continuous dynamical systems. — Order and chaos as two general basic trends in the evolution of dynamical systems. — Stochasticity transformers, amplifiers and generators. — Brief survey of studies related to the appearance of the problem of chaotic and stochastic motions and to turbulence theory. — Local phase portraits of the simplest steady-state motions and their bifurcations. — Stochastic and chaotic attractors. — Bifurcations and routes to chaos and stochasticity. — Quantitative characteristics of stochastic and chaotic motions. — Some universal properties in order-chaos and inverse transitions. — Examples of mechanical, physical, chemical, and biological systems with chaotic and stochastic motions (one-third of the book).

**Survival analysis: state of the art.** — Proceedings of the NATO Advanced Research Workshop on Survival Analysis and Related Topics, Columbus Ohio, U.S.A, 23-28 June 1991. — Edited by John P. Klein and Prem K. Goel. — Nato ASI Series, serie E: applied sciences, vol. 211. — Un vol. relié, 17 × 24,5, de x, 451 p. — Prix: Dfl. 225.00/US\$ 138.00/£ 79.00. — Kluwer Academic Publishers, Dordrecht, 1992.

From the preface: "Survival analysis is a highly active area of research with applications spanning the physical, engineering, biological, and social sciences". — 27 papers are presented in this volume which represents recent advances in this highly active area of statistical research. The investigated topics are: Bayesian approach to reliability and survival analysis. Bio-medical applications of survival analysis. Engineering applications of survival analysis. Inference for survival models. Left truncation and censoring. Models for survivals analysis. Multivariate failure time analysis. Social science applications of survival analysis.

**Parallel computing '91.** — Proceedings of the International Conference on Parallel Computing '91, London, U.K., 3-6 September 1991. — Edited by D.J. Evans, G.R. Joubert, H. Liddell. — Advances in parallel computing, vol. 4. — Un vol. relié, 20 × 26,5, de XI, 628 p. — Prix: Dfl. 285.00/US\$ 163.00. — North-Holland, Amsterdam, 1992.

The aim of this proceedings volume is to provide an overview of new and recent developments, applications and trends in parallel computing. The emphasis is on applications, with the invited lectures covering thriving topics including: artificial intelligence, neural networks, parallel computer performance, parallel numerical and non-numerical algorithms. Contributed papers address a wider variety of topics. Main features: Surveys of recent work in parallel computing involving computer architectures, parallel software and algorithms, and applications. Recent work in parallel computing presented by active researchers. Information on parallel computing activities.

**Knots 90.** — Proceedings of the International Conference on Knot Theory and Related Topics held in Osaka (Japan), August 15-19, 1990. — Edited by Akio Kawauchi. — Un vol. relié, 17,5 × 24,5, de x, 641 p. — Prix: DM 248.00. — Walter de Gruyter, Berlin, 1992.

This volume contains 42 selected research or expository papers which arise from lectures presented in Osaka, Japan, at the International Conference on Knot Theory and Related Topics. The material in this book rest primarily on the pioneer work of Vaughan Jones and Edward Witten relating polynomial invariants of knots to a topological quantum field theory in 2 + 1 dimensions. Topics covered include Jones type link invariants and Witten's 3-manifold invariants, braids, 3-manifold and 4-manifold topology, geometric structures, spatial graphs, surfaces in the 4-sphere, and higher dimensional link theory.

Robert WISBAUER. — **Foundations of module and ring theory: a handbook for study and research.** — Revised and updated English edition. — Algebra, logic and applications, vol. 3. — Un vol. relié, 15,5 × 23,5, de XI, 606 p. — Prix: US\$55.00/£31.00. — Gordon and Breach Science Publishers, Philadelphia, 1991.

This volume provides a comprehensive introduction to module theory and the related part of ring theory, including original results as well as the most recent work. For a module  $M$ , the smallest Grothendieck category containing it denoted by  $\text{delta}[M]$  and module theory is developed in this category. Developing the techniques in  $\text{delta}[M]$  is no more complicated than in full module categories and the higher generality yields significant advantages: for example, module theory may be developed for rings without units and also for nonassociative rings. Numerous exercises are included in this volume to give further insight into the topics covered and to draw attention to related results in the literature.

K. GOPALSAMY. **Stability and oscillations in delay differential equations of population dynamics.** — Mathematics and its applications, vol. 74. — Un vol. relié, 16,5 × 24,5, de XII, 501 p. — Prix: Dfl. 295.00/US\$ 179.00/£ 103.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This monograph provides a definitive overview of recent advances in the stability and oscillation of autonomous delay differential equations. Topics include linear and nonlinear delay and integrodifferential equations, which have potential applications to both biological and physical dynamic processes. — Contents: The delay logistic equation. Delay induced bifurcation to periodicity. Methods of linear analysis. Global attractivity. Models of neutral differential systems.

Earl PERRY. — **Geometry: axiomatic developments with problems solving.** — Pure and applied mathematics, vol. 160. — Un vol. relié, 16 × 23, de x, 354 p. — Marcel Dekker, Inc. New York, 1992.

Examining topics in their natural order and stressing the axiomatic development of several geometric systems, this highly organized text presents: logic and techniques devoted to developing proofs, finite geometries of Young and Fano, the properties of an axiomatic system, an extensive geometry based on Hilbert's axioms, classical Euclidean geometry of triangles and circles, cross ratio and harmonic sets and applications, some topics in hyperbolic, non-Euclidean geometry, an introduction to transformation geometry, etc.

Kichoon YANG. — **Exterior differential systems and equivalence problems.** — Mathematics and its applications, vol. 73. — Un vol. relié, 16,5 × 24,5, de XI, 196 p. — Prix: Dfl. 130.00/US\$78.00/£45.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This monograph presents a concise, yet elementary account of exterior differential system theory. The first part of the monograph, chapters 1-5, deals with the general theory: the Cartan-Kaehler theorem is proved, the notions of involution and prolongation are carefully laid out, quasi-linear differential systems are examined in detail, and explicit examples of the Spencer cohomology groups and the characteristic variety are given. The second part of the monograph, chapters 6 and 7, deals with applications to problems in differential geometry: higher order  $G$ -structures, embeddings of  $G$ -structures.

Zofia SZMYDT, Bogdan ZIEMIAN. — **The Mellin transformation and Fuchsian type partial differential equations.** — Mathematics and its applications, (East European series), vol. 56. — Un vol. relié, 16,5 × 24,5, de XIV, 223 p. — Prix: Dfl. 150.00/US\$89.00/£52.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume provides a systematic introduction to the theory of the multidimensional Mellin transformation in a distributional setting. In contrast to the classical texts on the Mellin and Laplace transformations, this work concentrates on the local properties of the Mellin transforms, i.e. on those properties of the Mellin transforms of distributions  $u$  which are preserved under multiplication of  $u$  by cutoff functions (of various types). Chapter I contains the basic theorems and definitions of the theory of distributions and Fourier transformations which are used in the succeeding chapters. This material includes proofs which are partially transformed into exercises with hints. Chapter II presents a systematic treatment of the Mellin transform in several dimensions. Chapter III is devoted to Fuchsian-type singular differential equations.

Stanislaw KWAPIEN, Wojbor A. WOYCZYNSKI. — **Random series and stochastic integrals: single and multiple.** — Probability and its applications. — Un vol. relié,  $16,5 \times 24,5$ , de xvi, 360 p. — Prix: SFr. 148.00. — Birkhäuser, Boston, 1992.

This book studies the foundations of the theory of linear and nonlinear forms in single and multiple random variables including single and multiple random series and stochastic integrals, both Gaussian and non-Gaussian. Its topic is intimately connected with a number of classical problems of probability theory such as the summation of independent random variables, martingale theory and the Wiener theory of polynomial chaos, as well as with several application areas such as stochastic analysis, limit theorems for symmetric statistics, representation of random fields, partial differential equations and quantum field theory. The emphasis is on domination principles for comparison of sequences of random variables and on decoupling techniques.

**Approximation theory.** — Proceedings of the sixth Southeastern Approximation Theorists Annual Conference. — Edited by George A. Anastassiou. — Lecture notes in pure and applied mathematics, vol. 138. — Un vol. broché,  $18 \times 25,5$ , de xxi, 524 p. — Prix: US\$160.00. — Marcel Dekker, Inc., New York, 1992.

This valuable resource contains the papers presented at the Sixth Southeastern Approximation Theorists Annual Conference, held in 1991 at Memphis State University, Tennessee. Written by more than 50 mathematicians from around the world, the volume discusses such sub-topics of approximation theory as splines, radial functions, multivariate and monotone approximation, interpolation, and positive linear operators... emphasizes the connections approximation theory has to differential equations; functional, numerical, and real and complex analysis; summability, probability and statistics. Highlights classical as well as modern topics of approximation theory, ranging from polynomial approximation to wavelets, etc.

Arijit CHAUDHURI, Horst STENGER. — **Survey sampling: theory and methods.** — Statistics: textbooks and monographs, vol. 130. — Un vol. relié,  $15,5 \times 23,5$ , de xviii, 349 p. — Prix: US\$140.00. — Marcel Dekker, Inc., New York, 1992.

Discussing the survey sampling procedures, the book presents the concepts of likelihood, sufficiency, and the admissibility and minimaxity of estimators and strategies... examines the use of asymptotic analysis to achieve robustness against model mis-specifications... contains variance estimation methods involving non-linear estimators and complex survey designs, such as stratification, clustering, and selection in stages... describes recent progress in multi-stage, multi-phase, and repetitive sampling... treats problems of incomplete data, inadequate frames, and analytical studies covering categorical data and regression relationships... explains techniques of generating randomized data and their analyses when protected privacy is needed, etc.

A.M. MATHAI, Serge B. PROVOST. — **Quadratic forms in random variables: theory in applications.** — Statistics: textbooks and monographs, vol. 126. — Un vol. relié, 15,5 × 23,5, de XIX, 367 p. — Prix: US\$ 110.00. — Marcel Dekker, Inc., New York, 1992.

The book provides a wealth of distributional results on quadratic forms, including representations of their densities and distribution functions...examines the necessary and sufficient conditions for quadratic forms to be distributed as chi-square variates...generalizes results to quadratic forms in random matrices...indicates the broad areas in which application of the results are possible...and supplies an extensive bibliography.

Boris I. BOTVINNIK. — **Manifolds with singularities and the Adams-Novikov spectral sequence.** — London Mathematical Society lecture note series, vol. 170. — Un vol. broché, 15 × 22,5, de xv, 181 p. — Prix: £19.95. — Cambridge University Press, Cambridge, 1992.

Traditionally the Adams-Novikov spectral sequence has been a tool which has enabled the computation of generators and relations to describe homotopy groups. Here a natural geometric description of the sequence is given in terms of cobordism theory and manifolds with singularities. The author brings together many interesting results not widely known outside the USSR, including some recent work by Vershinin. This book will be of great interest to researchers into algebraic topology.

**Complex projective geometry.** — Edited by G. Ellingsrud, C. Peskine, G. Sacchiero, S.A. Stromme. — London Mathematical Society lecture note series, vol.179. — Un vol. broché, 15 × 22,5, de 340 p. — Prix: £22.95. — Cambridge University Press, Cambridge, 1992.

New methods have been developed for questions such as: what is the geometric content of syzygies and bundles derived from them? how can they be used for giving good compactifications of natural families? which differential techniques are needed for the study of families of projective varieties? These questions were addressed at successive conference held in Trieste and Bergen. New results, working progress, conjectures and modern accounts of classical ideas were presented. This collection represents a development of the work conducted at the conference; the editors have taken the opportunity to mould the papers into a cohesive volume.

**Discrete groups and geometry.** — Papers dedicated to A.M. Macbeath. — Proceedings of a conference at Birmingham University. — Edited by W.J. Harvey, in collaboration with C. Maclachlan. — London Mathematical Society lecture note series, vol. 173. — Un vol. broché, 15 × 22,5, de 248 p. — Prix: £22.95. — Cambridge University Press, Cambridge, 1992.

The papers of this book represent up-to-date work on a broad spectrum of topics in the theory of discrete group actions, ranging from presentations of finite groups through the detailed study of Fuchsian and crystallographic groups, to applications of group actions in low dimensional topology, complex analysis, algebraic geometry and number theory. For those wishing to pursue research in these areas, this volume offers a valuable summary of contemporary thought and a source of fresh geometric insights.

**Applications of categories in computer science.** — Proceedings of the LMS Symposium, Durham, 1991. — Edited by M.P. Fourman, P.T. Johnstone, A.M. Pitts. — London Mathematical Society lecture note series, vol. 177. — Un vol. broché, 15 × 22,5, de 248 p. — Prix: £24.95. — Cambridge University Press, Cambridge, 1992.

Category theory and related topics of mathematics have been increasingly applied to computer science in recent years. This book contains selected papers from the London Mathematical Society Symposium on the subject which was held at the University of Durham.

Participants at the conference were leading computer scientists and mathematicians working in the area and this volume reflects the excitement and importance of the meeting. All the papers have been refereed and represent some of the most important and current ideas.