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## BULLETIN BIBLIOGRAPHIQUE

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George LUSZTIG. — **Introduction to quantum groups.** — Progress in mathematics, vol. 110. — Un vol. relié,  $16 \times 25$ , de IX, 337 p. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1993.

The quantum groups discussed in this book are the quantized enveloping algebras introduced by Drinfeld and Jimbo in 1985, or variations thereof. It is shown that these algebras have natural integral forms which can be specialized at roots of 1 and yield new objects which include quantum versions of the semisimple groups over fields of positive characteristic. The theory of quantum groups has led to a new, extremely rigid structure, in which the objects of the theory are provided with canonical bases with rather remarkable properties. The book contains an extensive treatment of the theory of canonical bases, in the framework of perverse sheaves. The theory developed in the book includes the case of quantum affine enveloping algebras and, more generally, the quantum analogs of the Kac-Moody Lie algebras. Divided into six parts the topics covered include: The Drinfeld-Jimbo algebra  $U$ . — Geometric realization of  $f$ . — Kashiwara's operators and applications. — Canonical basis of  $U$ . — Change of rings. — Braid group action.

Daniel SIMSON. — **Linear representations of partially ordered sets and vector space categories.** — Algebra, logic and applications series, vol. 4. — Un vol. relié,  $15,5 \times 24$ , de xv, 499 p. — Prix: US\$85.00, £46.00. — Gordon and Breach, Philadelphia PA, 1992.

This volume provides an elementary yet comprehensive introduction to representations of partially ordered sets and bimodule matrix problems, and their use in representation theory of algebras. It includes a discussion of representation types of algebras and partially ordered sets. Various characterizations of representation-finite and representation-tame partially ordered sets are presented and a description of their indecomposable representations is given. Auslander-Reiten theory is detailed together with a computer accessible algorithm for determining indecomposable representations and the Auslander-Reiten quiver of any representation-finite partially ordered set. The application of the theory to representations of algebras and lattices over orders is discussed.

Thomas J. LORENZEN, Virgil L. ANDERSON. — **Design of experiments: a no-name approach.** — Statistics: textbooks and monographs, vol. 139. — Un vol. relié,  $16 \times 23,5$ , de XI, 414 p. — Prix: US\$59.75. — Marcel Dekker, New York, 1993.

This practical reference-text offers a simple, complete way to specify and evaluate all possible balanced designs without restrictions to classes of named designs. Introducing four fundamental concepts that can be used to create a unique mathematical model for any design requirements, this volume reveals a novel scientific design method from the recognition stage to implementation and summarization... discusses terminology, assumptions, and tests on assumptions... describes the factorial concept and gives step-by-step instructions on how to set up the mathematical model... explains how to use the model to determine design combinations



and run order, evaluate designs, and analyze data collected from experiments... delineates the nesting concept and restrictions on randomization... examines fractionation for two-level, three-level, and mixed-level factors... etc.

Josef SAURER. — **Bases of special functions and their domains of convergence.** — Mathematical research, vol. 73. — Un vol. broché,  $17 \times 24$ , de 158 p. — Prix: DM 64.00. — Akademie Verlag, Berlin, distributed by VCH Verlagsgesellschaft, Weinheim, Germany, 1993.

From the preface: "This book presents a systematic approach to expansions of analytic functions in series of special functions of mathematical physics. Many expansions of this kind, for example, expansions in series of Bessel, Whittaker or hypergeometric functions, are identified with eigenfunction expansions for second order differential equations in the complex domain. In general the corresponding eigenvalue problems are nonlinear in the eigenvalue parameter, but can be transformed to equivalent problems for first order  $2 \times 2$  systems of differential equations which are linear in the eigenvalue parameter".

Bernard GOSTIAUX. — **Cours de mathématiques spéciales, vol. 1: Algèbre.** — Collection «Mathématiques». — Un vol. broché,  $15 \times 22$ , de x, 468 p. — Prix: FF 198.00. — Presses universitaires de France, Paris, 1993.

Du langage mathématique ou des tautologies. Les ensembles. Relations, relations d'ordre, d'équivalence. Lois de composition. Construction des entiers naturels. Groupes, construction de  $\mathbb{Z}$ . Anneaux, corps, constructions de  $\mathbb{Q}$ . Espaces vectoriels. Polynômes: construction de  $\mathbb{C}$ . Calcul matriciel. Algèbre extérieure, déterminants. Réduction des endomorphismes. Formes quadratiques. Formes sesquilinéaires, formes hermitiennes.

Bernard GOSTIAUX. — **Cours de mathématiques spéciales, vol. 2: Topologie, analyse réelle.** — Collection «Mathématiques». — Un vol. broché,  $15 \times 22$ , de vii, 403 p. — Prix: FF 192.00. — Presses universitaires de France, Paris, 1993.

Topologie générale. La compacité. La connexité. Espaces métriques. Construction de  $\mathbb{R}$ . Espaces vectoriels normés. Fonctions de variable réelle, à valeurs réelles. Intégrale de Riemann. Extension des intégrales simples. Suites à valeurs dans  $E$ , espace vectoriel.

Bernard GOSTIAUX. — **Cours de mathématiques spéciales, vol. 3: Analyse fonctionnelle et calcul différentiel.** — Collection «Mathématiques». — Un vol. broché,  $15 \times 22$ , de vi, 443 p. — Prix: FF 198.00. — Presses universitaires de France, Paris, 1993.

Séries numériques, séries dans les espaces vectoriels normés. Espaces fonctionnels. Séries entières. Espaces préhilbertiens réels, espaces euclidiens. Séries de Fourier. Calcul différentiel. Difféomorphismes, fonctions implicites. Equations différentielles.

A.N. SHARKOVSKY, Yu.L. MAISTRENKO and E.Yu. ROMANENKO. — **Difference equations and their applications.** — Translated by D.V. Malyshev, P.V. Malyshev and Y.M. Pestryakov. — Mathematics and its applications, vol. 250. — Un vol relié,  $16 \times 24,5$ , de xii, 358 p. — Prix: Dfl. 260.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This monograph consists of four parts. The first part deals with one-dimensional dynamical systems, the second treats nonlinear scalar difference equations of continuous argument. Parts three and four describe relevant applications in the theory of difference-differential equations and in the nonlinear boundary problems formulated for hyperbolic systems of partial differential equations.

B.D. BOJANOV, H.A. HAKOPIAN and A.A. SAHAKIAN. — **Spline functions and multivariate interpolations.** — Mathematics and its applications, vol. 248. — Un vol. relié,  $16 \times 24,5$ , de IX, 276 p. — Prix: Dfl. 210.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This book has thirteen chapters dealing, respectively, with interpolation by algebraic polynomials, the space of splines,  $B$ -splines, interpolation by spline functions, perfect splines, monosplines, periodic splines, multivariate  $B$ -splines and truncated powers, multivariate spline functions and divided differences, box splines, multivariate mean value interpolation, multivariate polynomial interpolations arising by hyperplanes, and multivariate pointwise interpolation.

Dragoslav S. MITRINOVIC and Jovan D. KECKIC. — **The Cauchy method of residues, vol. 2: Theory and applications.** — Mathematics and its applications, vol. 259. — Un vol. relié,  $16 \times 23,5$ , de X, 191 p. — Prix: Dfl. 145.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This volume is a sequel to "The Cauchy method of residues" published in 1984. Volume 1 surveyed the main results published in the period 1814-1982. The present volume contains various results which were omitted from the first volume, some results mentioned briefly in Volume 1 and discussed here in greater detail, and new results published since 1982. It also contains short expositions, by various authors, dealing with new and interesting aspects of the theory and applications of residues.

Takeyuki HIDA, Hui-Hsiung KUO, Jürgen POTTHOFF and Ludwig STREIT. — **White noise: an infinite dimensional calculus.** — Mathematics and its applications, vol. 253. — Un vol. relié,  $16 \times 24,5$ , de XIII, 516 p. — Prix: Dfl. 340.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This monograph presents a framework for infinite dimensional analysis based on white noise. This approach is both intuitive and efficient. Among the concepts and structures generalized to an infinite dimensional setting in this book are: spaces of test and generalized functions, differential calculus, Laplacian and Fourier transforms and Dirichlet forms and their Markov processes. A multitude of concepts, such as Brownian motion functionals, falls into the framework.

Olaf MANZ, Thomas R. WOLF. — **Representations of solvable groups.** — London Mathematical Society lecture note series, vol. 185. — Un vol. broché,  $15 \times 22,5$ , de XI, 302 p. — Prix: £25.00. — Cambridge University Press, Cambridge, 1993.

The authors begin by studying modules over finite fields, which arise naturally as chief factors of solvable groups. The information obtained can then be applied to infinite modules, and in particular to character theory (ordinary and Brauer) of solvable groups. The authors include proofs of Brauer's height zero conjecture and the Alperin-McKay conjecture for solvable groups. Gluck's permutation lemma and Huppert's classification of solvable two-transitive permutation groups finite groups play important roles in the applications and a new proof is given of the latter.

N.I. FISHER. — **Statistical analysis of circular data.** — Un vol. relié,  $18 \times 25$ , de XVIII, 277 p. — Prix: £35.00. — Cambridge University Press, Cambridge, 1993.

Data measured in the form of angles or two-dimensional orientations are to be found almost everywhere throughout science. Statistical methods for handling such data have developed rapidly in the last 20 years, with emphasis on problems of data display, and the correlation, regression and analysis of data with temporal or spatial structure. Some developments in

general statistical methodology, particularly nonparametric smoothing methods and bootstrap-based methods, have contributed significantly to the data analyst's ability to make progress with problems that have been relatively intractable.

Yoshiyuki KITAOKA. — **Arithmetic of quadratic forms.** — Cambridge tracts in mathematics, vol. 106. — Un vol. relié,  $16 \times 23,5$ , de x, 268 p. — Prix: £35.00. — Cambridge University Press, Cambridge, 1993.

The aim of this book is to provide an introduction to quadratic forms that builds from basics up to the most recent results. The author is well known for his work in this area, and in this book he covers many aspects of the subject, including lattice theory, Siegel's formula, and some results involving tensor products of positive definite quadratic forms. The reader is required to have only an elementary knowledge of algebraic number fields.

Rémi VAILLANCOURT. — **Complément de mathématiques pour ingénieurs.** — Un vol. broché,  $17 \times 25$ , de xiv, 197 p. — Les Publications CRM, Université de Montréal, Montréal, 1993.

Introduction. Problèmes en coordonnées cartésiennes. Problèmes en coordonnées sphériques. Approximation en norme quadratique. Problèmes en coordonnées polaires. Solutions analytiques. La méthode de Frobenius. L'équation de Bessel. Le problème de Sturm-Liouville. Exemple d'examen final avec solutions. Formulaire et tables.

Philip D. LOEWEN. — **Optimal control via nonsmooth analysis.** — CRM proceedings & lecture notes, vol. 2. — Un vol. broché,  $18 \times 25,5$ , de ix, 153 p. — American Mathematical Society, Providence, RI, 1993.

Motivation. — Existence of solutions. — Variational principles. — The geometry of nonsmooth analysis. — Subgradient calculus. — Necessary conditions in dynamic optimization. — Dynamic programming.

V. Kumar MURTY. — **Introduction to Abelian varieties.** — CRM monograph series, vol. 3. — Un vol. relié,  $18 \times 26$ , de xiii, 112 p. — American Mathematical Society, Providence, RI, 1993.

Riemann surfaces. Riemann-Roch theorem. Abel-Jacobi theorem and period relations. Divisors and theta functions. Dimension of the space of theta functions. Projective embedding and theta functions. Elliptic curves as the intersection of two quadrics. The Fermat curve. Discrete subgroups of  $SL_2(R)$ . Riemann surface structure. The modular curve  $X(N)$ . Generalities on Abelian varieties. The conjecture of Tate. Finiteness of isogeny classes. Mordell's conjecture.

Enore GUADAGNINI. — **The link invariants of the Chern-Simons field theory: new developments in topological quantum field theory.** — De Gruyter expositions in mathematics, vol. 10. — Un vol. relié, de xiv, 312 p. — Prix: DM 148.00. — Walter de Gruyter, Berlin, 1993.

This is the first example of a non trivial gauge theory which is exactly solvable in any 3-manifold and provides the only intrinsically 3-dimensional interpretation of the Jones invariants of knots. The resulting theory is at the forefront of the recent interaction between geometry and physics demonstrating the impact of quantum field theory on geometry and topology in dimensions 2, 3 and 4. The text is essentially self-contained and includes some elementary reviews on knot theory and surgery on 3-manifolds.

Peter GIBLIN. — **Primes and programming : an introduction to number theory with computing.** — Un vol. broché,  $15 \times 22,5$ , de x, 235 p. — Prix: £12.95 (relié: £30.00). — Cambridge University Press, Cambridge, 1993.

The author describes, in the context of an introduction to the theory of numbers, some of the more elementary methods for factorization and primality testing. Everything is developed from scratch so the mathematical prerequisites are minimal. An essential feature of the book is the large number of computer programs (written in Pascal) and a wealth of computational exercises and projects. The theoretical development includes continued fractions and quadratic residues, directed always towards the two fundamental problems of primality testing and factorization.

D.J. BENSON. — **Polynomial invariants of finite groups.** — London Mathematical Society lecture note series, vol. 190. — Un vol. broché,  $15 \times 23$ , de ix, 118 p. — Prix: £19.95. — Cambridge University Press, Cambridge, 1993.

The author avoids recourse to the technical machinery of algebraic groups, and he develops the necessary results from commutative algebra as he proceeds. The book contains an account of invariant theory for the action of a finite group on the ring of polynomial functions on a linear representation, both in characteristic zero and characteristic  $p$ . Special attention is paid to the role played by pseudoreflections. Also included is a new proof by Crawley-Boevey and the author of the Carlisle-Kropholler conjecture.

George R. KEMPF. — **Algebraic varieties.** — London Mathematical Society lecture note series, vol. 172. — Un vol. broché,  $15 \times 23$ , de x, 163 p. — Prix: £22.95. — Cambridge University Press, Cambridge, 1993.

In this book the author gives an introduction to the theory of algebraic functions on varieties from a sheaf theoretic standpoint. By taking this view he is able to give a clean and lucid account of the subject which will be easily accessible to all newcomers to algebraic varieties, graduate students or experts from other fields alike.

Serge LEVENDORSKII. — **Degenerate elliptic equations.** — Mathematics and its applications, vol. 258. — Un vol. relié,  $16,5 \times 24,5$ , de xi, 431 p. — Prix: Dfl. 320.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This volume is the first to be devoted to the study of various properties of wide classes of degenerate elliptic operators of arbitrary order and pseudo-differential operators with multiple characteristics. Conditions for operators to be Fredholm in appropriate weighted Sobolev spaces are given, a priori estimates of solutions are derived, inequalities of the Garding type are proved, and the principal term of the spectral asymptotics for self-adjoint operators is computed. A generalization of the classical Weyl formula is proposed. An analogue of the Boutet de Monvel calculus is developed and the index is computed.

J. de VRIES. — **Elements of topological dynamics.** — Mathematics and its applications, vol. 257. — Un vol. relié,  $16,5 \times 24,5$ , de xvi, 748 p. — Prix: Dfl. 395.00. — Kluwer Academic Publishers, Dordrecht, 1993.

The first part of the book is devoted to a broad overview of the topological aspects of the theory of dynamical systems (including shift systems and geodesic and horocycle flows). The second part is more specialized and presents in a systematic way the fundamental techniques and methods for the study of compact minima flows and their morphisms. It brings together many results which are scattered throughout the literature.

Mircea PUTA. **Hamiltonian mechanical systems and geometric quantization.** — Mathematics and its applications, vol. 260. — Un vol. relié,  $16,5 \times 24,5$ , de VIII, 278 p. — Prix: Dfl. 185.00. — Kluwer Academic Publishers, Dordrecht, 1993.

Symplectic geometry. Hamiltonian mechanics. Lie groups. Momentum mappings. Reduction. Hamiltonian-Poisson mechanics. Hamiltonian mechanical systems and stability. Geometric prequantization. Geometric quantization. Foliated cohomology and geometric quantization. Symplectic reduction. Geometric quantization. Constrained mechanical systems. Poisson manifolds and geometric prequantization.

**Computational algebraic geometry and commutative algebra, Cortona 1991.** — Edited by David Eisenbud, Lorenzo Robbiano. — Istituto nazionale di alta matematica Francesco Severi. Symposia mathematica, vol. 34. — Un vol. relié,  $15,5 \times 23,5$ , de x, 298 p. — Prix: £29.95. — Cambridge University Press, Cambridge, 1993.

The Cortona Conference on Computational Algebraic and Commutative Algebra took place June 17 to June 21, 1991. The book represents the state of the art in computational algebraic geometry. There are two articles on open problems, orienting the reader to the subject's direction, four surveys describing the most interesting current work, and four original research papers. There is also an introduction to the theory of Gröbner bases and their use in computation.

Seth WARNER. — **Topological rings.** — North-Holland mathematics studies, vol. 178. — Un vol. relié,  $17 \times 24,5$ , de x, 498 p. — Prix: Dfl. 250.00. — North-Holland, Amsterdam, 1993.

This text brings the reader to the frontiers of current research in topological rings. The exercises illustrate many results and theorems while a comprehensive bibliography is also included. The book is aimed at those readers acquainted with some very basic point-set topology and algebra, as normally presented in semester courses at the beginning graduate level or even at the advanced undergraduate level.

**Handbook of convex geometry.** — Edited by P.M. Gruber, J.M. Wills. — 2 vol. reliés,  $17 \times 24,5$ , de XXII, 1438 p. — Prix: vol. 1, Dfl. 295.00 and vol.2, Dfl. 285.00. — North-Holland, Amsterdam, 1993.

The aims of this handbook are to survey convex geometry and to give a high-level introduction to most branches of convexity and its applications. Topics covered are organized in five parts which in some sense reflect the fact that convexity is situated between analysis, geometry and discrete mathematics. — Contents: Volume A: Classical convexity. Combinatorial aspects of convexity. — Volume B: Discrete aspects of convexity. Analytic aspects of convexity. Stochastic aspects of convexity.

**Contributions to operator theory and its applications: the Tsuyoshi Ando anniversary volume.** — Edited by T. Furuta, I. Gohberg, T. Nakazi. — Operator theory, advances and applications, vol. 62. — Un vol. relié,  $17 \times 24$ , de 231 p. — Prix: SFr. 92.00. — Birkhäuser, Basel, 1993.

Tsuyoshi Ando is a foremost expert in operator theory, matrix theory, complex analysis, and their applications. The book opens with his biography and list of publications. It contains a selection of papers covering a broad spectrum of topics ranging from abstract operator theory to various concrete problems and applications. The majority of the papers deal with topics in modern operator theory and its applications.



Israel GOHBERG, Seymour GOLDBERG, Marinus A. KAASHOEK. — **Classes of linear operators, vol. II.** — Operator theory, vol. 63. — Un vol. relié,  $17 \times 24$ , de x, 1020 p. — Prix: SFr. 198.00. — Birkhäuser, Basel, 1993.

This book 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. — Contents: Triangular representations, classes of Toeplitz operators, contractive operators and characteristic operator functions, Banach algebras and algebras of operators, and extension and completion problems.

**New aspects in interpolation and completion theories.** — Edited by I. Gohberg. — Operator theory, vol. 64. — Un vol. relié,  $17 \times 24$ , de 217 p. — Prix: SFr. 92.00. — Birkhäuser, Basel, 1993.

Emphasis is placed on different interpolation and completion problems when the interpolant is estimated in two different norms. The book also focusses on the study of the spectra of different completions of  $2 \times 2$  block matrices when originally all entries are specified except the lower left corner. A third theme concerns twosided tangential interpolation problems for real rational matrix functions, and also for the time varying case.

**New approaches and concepts in turbulence.** — Edited by Th. Dracos, A. Tsinober. — Monte Verità: proceedings of the Centro Stefano Frascini, Ascona. — Un vol. relié,  $17 \times 24$ , de 426 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1993.

This book contains the proceedings of a colloquium held in Monte Verità from September 9-13, 1991. Scientists from all over the world presented their views on the importance of kinematic properties, topology and fractal geometry, and on the dynamic behaviour of turbulent flows. They debated the importance of coherent structures and the possibility to incorporate these in the statistical theory of turbulence.

**Computation and control III.** — Proceedings of the third Bozeman Conference, Bozeman, Montana, August 5-11, 1992. — Edited by K.L. Bowers and J. Lund. — Progress in systems and control theory, vol. 15. — Un vol. relié,  $16 \times 24$ , de 408 p. — Prix: SFr. 178.00. — Birkhäuser, Boston, 1993.

The present volume contains a collection of papers addressing issues ranging from noise abatement via smart material technology, robotic vision, and parameter identification to feedback design challenges in fluid control and other areas of topical interest. The area of feedback design challenges in fluid control spawns computational challenges in the form of Burgers' equation which is addressed both with standard numerical methods as well as new computational procedures.

**Optimal control: calculus of variations, optimal control theory and numerical methods.** — Edited by R. Bulirsch, A. Miele, J. Stoer, K.H. Well. — International series of numerical mathematics, vol. 111. — Un vol. relié,  $17 \times 24$ , de XIII, 349 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1993.

The book reports on new theoretical and practical advances essential for analysing and synthesizing optimal controls of dynamical systems governed by partial and ordinary differential equations. New necessary and sufficient conditions for optimality are given. Recent advances in numerical methods are discussed. The book also focuses on the construction of feedback controls for nonlinear systems and highlights advances in the theory of problems with uncertainty.

**Numerical integration IV.** — Proceedings of the Conference at the Mathematical Research Institute, Oberwolfach, November 8-14, 1992. — Edited by H. Brass, G. Hämmerlin. — International series of numerical mathematics, vol. 112. — Un vol. relié,  $17 \times 24$ , de 382 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1993.

The contributions give a survey of the latest results in quadrature and cubature. Since the subject matter lies somewhere between practical mathematics and analysis, a wide spectrum of topics is discussed. One main theme is the construction of rules, especially for integrands with singularities. Further focal points are error estimation in various classes of functions, structure of general rules of interpolatory type, lattice rules, and the many facets of the Gaussian rule.

L. QUARTAPELLE. — **Numerical solution of the incompressible Navier-Stokes equations.** — International series of numerical mathematics, vol. 113. — Un vol. relié,  $17 \times 24$ , de x, 291 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Boston, 1993.

This book presents different formulations of the equations governing incompressible viscous flows, in the form needed for developing numerical solution procedures. The conditions required to satisfy the no-slip boundary conditions in the various formulations are discussed in detail. For each formulation, a complete statement of the mathematical problem is provided.

André WEIL. — **Lehr- und Wanderjahre eines Mathematikers.** — Aus dem Französischen von Theresia Übelhör. — Lebensgeschichten aus der Wissenschaften. — Un vol. relié,  $15,5 \times 23$ , de 212 p. — Prix: SFr. 52.00. — Birkhäuser Verlag, Basel, 1992.

„Es ist nur der intellektuelle Werdegang eines Mathematikers, den ich hier zurückzuverfolgen versuche“, schreibt André Weil bescheiden im Vorwort seiner Autobiografie. Doch was er dann dem Leser erzählt, ist die abenteuerliche Geschichte eines Lebens, das von unerschöpflichem Bildungsdrang und wissenschaftlicher Neugier, von Abenteuerlust und den schrecklichen Zeitläuften der Nazizeit geprägt ist.

Wilderich TUSCHMANN, Peter HAWIG. — **Sofja Kowalewskaja: ein Leben für Mathematik und Emanzipation.** — Lebensgeschichten aus der Wissenschaft. — Un vol. relié,  $15,5 \times 23$ , de 184 p. — Prix: SFr. 52.00. — Birkhäuser Verlag, Basel, 1993.

Die Verfasser verfolgen minutiös und lebendig in der Darstellung den Lebensweg dieser ungewöhnlichen Frau. Sofja Kowalewskaja war jedoch nicht nur eine bedeutende Mathematikerin, sie galt auch als überaus begabte Schriftstellerin, sie engagierte sich für den Sozialismus, sie kämpfte für die Frauenemanzipation. Für mathematisch Interessierte werden in zwei Kapiteln ihre wissenschaftlichen Arbeiten ausführlich gewürdigt.

**Theory of radicals.** — Edited by L. Marki and R. Wiegandt. — Colloquia mathematica Societatis Janos Bolyai, vol. 61. — Un vol. relié,  $17,5 \times 24,5$ , de 310 p. — Prix: Dfl. 290.00. — North-Holland Publishing Company, Amsterdam, 1993.

This volume is the result of a conference held in 1991 in Szekszard, Hungary. The most substantial progress of the foregoing three years was made in radicals of semigroup rings and graded rings as well as in radicals of near rings. A new aspect of the theory became manifest in R. Göbel's survey on radicals of Abelian groups, where logical considerations play an eminent part.

**Functional analysis.** — Proceedings of the Essen conference. — Edited by Klaus D. Bierstedt, Albrecht Pietsch, Wolfgang M. Ruess, Dietmar Vogt. — Lecture notes in pure and applied mathematics, vol. 150. — Un vol. broché,  $18 \times 25$ , de xviii, 526 p. — Prix: US\$ 150.00. — Marcel Dekker, New York, 1994.

This volume presents the proceedings of the Symposium on Functional Analysis held in Essen, Germany — exploring current advances in the usually separated areas of semigroups of operators and evolution equations, geometry of Banach spaces and operators ideals, and Fréchet spaces with applications to partial differential equations.

Yves MEYER. — **Wavelets: algorithms and applications.** — Translated and revised by Robert D. Ryan. — Un vol. broché,  $17,5 \times 25$ , de xi, 133 p. — Prix: US\$ 19.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1993.

In the expanding field of signal and image processing, this book provides a clear set of concepts, methods, and algorithms adapted to a variety of nonstationary signals and numerical image processing problems. The author, expert in wavelet research, presents with equal skill and clarity the mathematical background and the major wavelet applications, ranging from the digital telephone to galactic structure and creation of the universe.

Pierre DELIGNE and G. Daniel MOSTOW. — **Commensurabilities among lattices in  $PU(1, n)$ .** — Annals of mathematics studies, vol. 132. — Un vol. broché,  $15,5 \times 23,5$ , de 183 p. — Prix: US\$ 19.95. — Princeton University Press, Princeton, 1993.

Picard group and cohomology. Computations for  $Q$  and  $Q^+$ . Lauricella's hypergeometric functions. Gelfand's description of Lauricella's hypergeometric functions. Strict exponents. Characterization of hypergeometric-like local systems. Preliminaries on monodromy groups. Background heuristics. Some commensurability theorems. Another isogeny. Commensurability and discreteness. An example. Orbifold. Elliptic and Euclidean  $[\mu]$ 's, revisited. Livne's construction of lattices in  $PU(1, 2)$ . Line arrangements of complex reflection groups: questions.

**Bifurcations and periodic orbits of vector fields.** — Edited by Dana Schlomiuk. — NATO ASI series. Series C, Mathematical and physical sciences, vol. 408. — Un vol. relié,  $16,5 \times 24,5$ , de xv, 472 p. — Prix: Dfl. 296.00. — Kluwer Academic Publisher, Dordrecht, 1993.

The 31st session of the Séminaire de mathématiques supérieures held at the Université de Montréal in July 1992 was on dynamical systems having as its central theme "Bifurcations and periodic orbits of vector fields". One of the aims of the ASI was to bring together methods from real and complex dynamical systems. In the choice of the speakers an attempt was made to provide a coverage of the main developments in the subject and at the same time to have as much interactions as possible among the subjects covered.

**Finite and infinite combinatorics in sets and logic.** — Edited by N.W. Sauer, R.E. Woodrow and B. Sands. — NATO ASI series. Series C, Mathematical and physical sciences, vol. 411. — Un vol. relié,  $17 \times 25$ , de xvii, 453 p. — Prix: Dfl. 350.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This book highlights the newly emerging connections between problems in finite combinatorics and graph theory on the one hand and the more foundational subjects of logic and set theory on the other. The realization of the importance of homogeneous structures and their connection with logic, as well as with finite structure theory, is a good example of the connection between finite and infinite structures. Almost all of the articles in the present book touch in one way or another on homogeneous structures.

Andrej PAZMAN. — **Nonlinear statistical models.** — Mathematics and its applications, vol. 254. — Un vol. relié,  $17,5 \times 24,5$ . — Prix: Dfl. 195.00. — Kluwer Academic Publishers, Dordrecht, Ister Science Press, Bratislava, 1993.



This monograph presents mostly new results and methods concerning the nonlinear regression model. Among the aspects which are considered are linear properties of nonlinear models, multivariate nonlinear regression, intrinsic and parameter effect curvature, algorithms for calculating the  $L_2$ -estimator and both local and global approximation, nonlinear exponential families.

A.R. RAJWADE. — **Squares.** — London Mathematical Society lecture note series, vol. 171. — Un vol. broché,  $15 \times 23$ , de XII, 286 p. — Prix: £27.50. — Cambridge University Press, Cambridge, 1993.

Classical and modern results about quadratic forms are brought together in this book. The treatment is self-contained requiring only a basic knowledge of rings, fields, polynomials and matrices in order to be able to tackle the work of Pfister, Hilbert, Radon, Hurwitz, Pourchet and others as it relates to the study of numbers that can be expressed as squares, or sums of squares.

**Finite geometry and combinatorics.** — The second International Conference at Deince. — Edited by A. Beutelspachler, F. Buekenhout & J. Doyen, F. De Clerck & J.A. Thas and J.W.P. Hirschfeld. — London Mathematical Society lecture note series, vol. 191. — Un vol. broché,  $15 \times 23$ , de VII, 412 p. — Prix: £27.50. — Cambridge University Press, Cambridge, 1993.

“Finite geometry and combinatorics” is the art of counting phenomena that can be described by a diagram. This is the collection of 35 articles on covering topics such as finite projective spaces, generalised polygons, strongly regular graphs, diagram geometries and polar spaces. The papers contain new results, and the growing use of computer algebra packages is demonstrated.

Marek JARNICKI, Peter PFLUG. — **Invariant distances and metrics in complex analysis.** — De Gruyter expositions in mathematics, vol. 9. — Un vol. relié,  $17,5 \times 24,5$ , de XI, 408 p. — Prix: DM 178.00. — Walter de Gruyter, Berlin, 1993.

This is an exposition of the theory of holomorphically contractible objects on domains in  $C^n$ , e.g., the theory of the Carathéodory and the Kobayashi pseudodistances, the complex Green function, the Bergman distance and metric. Emphasis is on geometric and topological aspects: comparison theorems, completeness, Lempert's theorem, complex geodesics, product-property.

**Numerical linear algebra.** — Proceedings of the Conference in Numerical Linear Algebra and Scientific Computation, Kent (Ohio), USA, March 13-14, 1992. — Edited by Lothar Reichel, Arden Ruttan, Richard S. Varga. — Un vol. relié,  $18 \times 24$ , de v, 199 p. — Prix: DM 168.00. — Walter de Gruyter, Berlin, 1993.

Topics covered by the eleven papers presented in this book include new iterative methods for the solution of large systems of linear equations, the computation of eigenvalues and eigenvectors of matrices, the  $qd$ -algorithm by Rutishauser, algorithms for computing the singular value decomposition, generalized  $M$ -matrices and symmetric ultrametric matrices.

Winfried BRUNS, and Juergen HERZOG. — **Cohen-Macaulay rings.** — Cambridge studies in advanced mathematics, vol. 39. — Un vol. relié,  $16 \times 23,5$ , de XI, 403 p. — Prix: £45.00. — Cambridge University Press, Cambridge, 1993.

This book meets the need for a thorough, self-contained introduction to the homological and combinatorial aspects of the theory of Cohen-Macaulay rings. Gorenstein rings, local cohomology, and canonical modules. A separate chapter is devoted to Hilbert functions (including Macaulay's theorem) and numerical invariants derived from them. Many examples and exercises are supplied.

Heinrich BEGEHR, Robert P. GILBERT. — **Transformations, transmutations, and kernel functions, vol. 2.** — Pitman monographs and surveys in pure and applied mathematics, vol. 59. — Un vol. relié,  $16,5 \times 24$ , de 268 p. — Prix: £45.00. — Longman Scientific and Technical, Harlow, Essex, 1993.

Complex analytic methods are now available to equations and systems as 1st-order systems of composite type generalized Beltrami equations, 2nd-order systems related to bianalytic functions, and evolutionary equations such as pseudo- and metaparabolic equations and systems. Recent results are presented as well as numerical treatment of singular integral equations, with Cauchy kernel closely related to complex analytic methods in PDE.

S.K. SEHGAL. — **Units in integral group rings.** — Pitman monographs and surveys in pure and applied mathematics, vol. 69. — Un vol. relié,  $16,5 \times 24$ , de 357 p. — Prix: £57.00. — Longman Scientific and Technical, Harlow, Essex, 1993.

This book provides a comprehensive account of the recent results on units in integral group rings. For fairly general classes of groups (including nilpotent groups), explicit generators of large subgroups of the unit group of the integral group ring and a solution of the Zassenhaus conjectures are given. A few unpublished results are included and 56 research problems are listed.

Antonio AMBROSETTI, Vittorio COTI ZELATI. — **Periodic solutions of singular Lagrangian systems.** — Progress in nonlinear differential equations and their applications, vol. 10. — Un vol. relié,  $16 \times 24$ , de XII, 157 p. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1993.

The authors present a summary and synthesis of recent research demonstrating that variational methods can be used to successfully handle systems with singular potential, the Lagrangian systems. The classical cases of the Kepler problem and the N-body problem are used as specific examples. These results give a functional frame for systems with singular potential.

Robert F. BROWN. — **A topological introduction to nonlinear analysis.** — Un vol. broché,  $15,5 \times 23$ , de VIII, 146 p. — Prix: SFr. 48.00. — Birkhäuser, Boston, 1993.

This book is highly recommended for self study for mathematicians and students interested in such areas as geometric and algebraic topology, functional analysis, differential equations, and applied mathematics. It is sharply focused and highly readable view of nonlinear analysis by a practicing topologist who has seen a clear path to understanding.

I.M. GELFAND, A. SHEN. — **Algebra.** — Un vol. broché,  $15,5 \times 23$ , de 153 p. — Prix: SFr. 36.00. — Birkhäuser, Boston, 1993.

"Algebra" is an elementary algebra text from one of the leading mathematicians of the world — a major contribution to the teaching of the very first high school level course in a centuries old topic — refreshed by the author's inimitable pedagogical style and deep understanding of mathematics and how it is taught and learned.

**The Gelfand mathematical seminars, 1990-1992.** — Edited by L. Corwin, I. Gelfand, J. Lepowsky. — Un vol. relié, 16,5 × 24, de 235 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1993.

The seminars have always been known for their breadth of topics and diversity of styles. Among the mathematicians represented in this edition are: J.L. Brylinski, L. Corwin, A. Gabrielov, I. Gelfand, A.B. Goncharov, D. Gorenstein, Y.-Z. Huang, M.M. Kapranov, D. Kazhdan, M. Kontsevich, J. Lepowsky, P. Shapira, V. Schechtman, M.M. Smirnov, Y. Soibelman, E.J. Taft, V.A. Vassiliev, I. Zakharevich.

Jan PRUESS. — **Evolutionary integral equations and applications.** — Monographs in mathematics, vol. 87. — Un vol. relié, 17,5 × 24, de xxvi, 366 p. — Prix: SFr. 168.00. — Birkhäuser, Boston, 1993.

This book deals with evolutionary systems whose equation of state can be formulated as a linear Volterra equation in a Banach space. The main feature of the kernels involved is that they consist of unbounded linear operators. The aim is a coherent presentation of the state of art of the theory with detailed proofs and its applications to problems from mathematical physics.

**Seminar on stochastic processes, 1992.** — Edited by E. Cinlar, K.L. Chung, M.J. Sharpe. — Progress in probability, vol. 33. — Un vol. relié, 16 × 24, de vi, 276 p. — Prix: SFr. 144.00. — Birkhäuser, Boston, 1993.

This is the twelfth in a series of annual volumes reporting on recent progress in stochastic processes. It contains a sample of the work discussed in a seminar that brought together distinguished researchers on such topics as: Brownian motion, superprocesses, potential theory, random walks, local times, branching processes.

Chongying DONG, James LEPOWSKY. — **Generalized vertex algebras and relative vertex operators.** — Progress in mathematics, vol. 112. — Un vol. relié, 16 × 24, de ix, 202 p. — Prix: SFr. 86.00. — Birkhäuser, Boston, 1993.

Relative untwisted vertex operators. Quotient vertex operators. A Jacobi identity for relative untwisted vertex operators. Generalized vertex operator algebras and their modules. Duality for generalized vertex operator algebras. Monodromy representations of braid groups. Generalized vertex algebras and duality. Tensor products. Intertwining operators. Abelian intertwining algebras, third cohomology and duality. Affine Lie algebras and vertex operator algebras. Z-algebras and parafermion algebras.

Mkhitar M. DJRBASHIAN. — **Harmonic analysis and boundary value problems in the complex domain.** — Operator theory, vol. 65. — Un vol. relié, 17 × 24, de xiii, 256 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1993.

The present book is a continuation of the large cycle of the author's investigations on harmonic analysis in the complex domain. For certain sets of segments in the complex domain, the elegant and explicit apparatus of biorthogonal Fourier type systems (basis systems in the Rieszian sense), is constructed by purely analytic methods of classical function theory.

Michael ARTIN. — **Algebra.** — Aus dem Englischen übersetzt von Annette A'Campo. — Birkhäuser advanced text: Basler Lehrbücher. — Un vol. relié, 18 × 24, de xiii, 705 p. — Prix: SFr. 78.00. — Birkhäuser Verlag, Basel, 1993.

Diese Einführung in lineare Algebra und Algebra ist über viele Jahren aus Vorlesungsnotizen des Autors gewachsen und zeichnet sich aus durch einen harmonischen Aufbau des

behandelten Stoffes. Als eine Besonderheit umfasst dieser nebst den üblichen Inhalten auch die Betonung spezieller Themen wie Symmetrie, lineare Gruppen und quadratische Zahlkörper. Zahlreiche Beispiele und Übungsaufgaben erhöhen seinen Wert als studienbegleitende Literatur.

T.J. WILLMORE. — **Riemannian geometry**. — Oxford science publications. — Un vol. relié, 16,5 × 24, de XI, 318 p. — Prix: £45.00. — Clarendon Press, Oxford, 1993.

The book includes an elementary account of twistor spaces. It contains recent developments in the theory of harmonic spaces, commutative spaces, and mean-value theorems. The final chapter gives the only account available in book form of manifolds known in the literature as "Wilmore surfaces". These surfaces are illustrated by a series of computer-generated pictures.

Barry SIMON. — **The statistical mechanics of lattice gases, vol. 1**. — Un vol. relié, 17 × 25, de IX, 522 p. — Prix: US\$69.50 (U.S.A.), \$40.00 (tout autre pays). — Princeton University Press, Princeton, New Jersey, 1993.

This first volume addresses, among many topics, the mathematical background on convexity and Choquet theory, and presents an exhaustive study of the pressure including the Onsager solution of the two-dimensional Ising model, a study of the general theory of states in classical and quantum spin systems, and a study of high and low temperature expansions.

Ulrich RUEDE. — **Mathematical and computational techniques for multilevel adaptive methods**. — Frontiers in applied mathematics, vol.13. — Un vol. broché, 17,5 × 25, de XII, 140 p. — Prix: US\$23.00. — Society for Industrial and Applied Mathematics, Philadelphia, 1993.

This monograph presents a unified approach to adaptive methods, addressing their mathematical theory, efficient algorithms, and flexible data structures. The author introduces a well-founded mathematical theory that leads to intelligent, adaptive algorithms, and suggests advanced software techniques deeply rooted in the theory of function spaces.

Karlheinz SPINDLER. — **Abstract algebra with applications, vol. 1: Vector spaces and groups, et vol. 2: Rings and fields**. — 2 vol. reliés, 18,5 × 26, de XVII, 756, et xv, 531 p. respectivement. — Prix: US\$75.00 chaque volume (2 volumes US\$125.00). — Marcel Dekker, New York, 1992.

This textbook offers a comprehensive self-contained presentation of all major topics in abstract algebra and provides an in-depth treatment of the applications of algebraic techniques and the relationship of algebra to other disciplines such as number theory, combinatorics, geometry, topology, differential equations, and Markov chains. These volumes include thorough discussions of group actions, matrix groups, the correlation between ring theory, number theory, and algebraic geometry, Galois theory, and the applicability of linear algebra, etc.

Bernhelm BOOSS-BAVNBEK, Krzysztof P. WOJCIECHOWSKI. — **Elliptic boundary problems for Dirac operators**. — Mathematics. — Un vol. relié, 16 × 24, de XVIII, 307 p. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1993.

The book is about operators of Dirac type on manifolds with boundary. It focuses on elliptic differential operators of first order as the Cauchy-Riemann operator, the signature operator, the Dirac operator over spin manifolds, and generalized Dirac operators. It also deals with global boundary problems like Atiyah-Patodi-Singer condition, the Calderon projection.

**AI and computer power.** — Edited by David J. Hand. — UNICOM applied information technology, vol. 17. — Un vol. relié, 16 × 24, de vii, 212 p. — Prix: £59.00. — Chapman & Hall, London, 1994.

Recent developments in computer science have given statisticians access to powerful techniques for data analysis. The contributors show how computer power can best be used in statistics applications. A wide variety of topics is covered, from discussion of uncertainty representation to the use of genetic algorithms and more traditional artificial intelligence techniques.

**Differential equations, dynamical systems, and control science: a Festschrift in honor of Lawrence Markus.** — Edited by K.D. Elworthy, W. Norrie Everitt, E. Bruce Lee. — Lecture notes in pure and applied mathematics, vol. 152. — Un vol. broché, 18 × 25,5, de xl, 946 p. — Prix: US\$195.00. — Marcel Dekker, New York, 1994.

This book describes general results of stability, exponential stability, and Lyapunov functions for relating structural properties of differential equations... discusses approximate solutions for the Schrödinger and Navier-Stokes equations... considers theoretical questions for control systems with infinite dimensional state spaces or time delay and relates stabilizing solutions for Riccati inequalities to disturbance attenuation..., etc.

**Computational algebra.** — Edited by K.G. Fischer, Ph. Loustau, J. Shapiro, E.L. Green, D. Farkas. — Lecture notes in pure and applied mathematics, vol. 151. — Un vol. broché, 18 × 25,5, de x, 256 p. — Prix: US\$125.00. — Marcel Dekker, New York, 1994.

This book based on the fifth Mid-Atlantic Algebra Conference held at George Mason University, Fairfax, VA, demonstrates specific computer packages, including the use of CREP to study the representation of theory for finite dimensional algebras and axioms to study algebras of finite rank... introduces the theoretical concepts and problems of computational algebra... emphasizes the implementation of algorithms to compute classical algebraic results...

R.H. JONES. — **Longitudinal data with serial correlation: a state-space approach.** — Monographs on statistics and applied probability, vol. 47. — Un vol. relié, 14 × 22,5, de xi, 225 p. — Prix: £25.00. — Chapman & Hall, London, 1993.

The emphasis of this book is on methods for analysing unbalanced repeated measures or longitudinal data with possible serial correlation. — Contents: Introduction. A General linear mixed model. First order autoregressive errors. State space representations. The Laird-Ware model in state space form. Autoregressive moving average errors. Nonlinear models. Multivariate models. FORTRAN subroutines.

Karl-Eberhard HELLWIG, Bernd WEGNER. **Mathematik und theoretische Physik II: ein integrierter Grundkurs für Physiker und Mathematiker.** — De Gruyter Lehrbuch. — Un vol. broché, 15,5 × 23,5, de xii, 390 p. — Prix: DM 58.00 (relié DM 98.00). — Walter de Gruyter, Berlin, 1993.

Dieses zweibändige Lehrbuch ist Begleittext zu einem Curriculum in Mathematik für Physiker, das in Kooperation zwischen den Fachbereichen Mathematik und Physik der TU Berlin entwickelt wurde. In diesem und dem vorhergehenden ersten Band erfolgt eine Zusammenstellung von Grundwissen in theoretischer Physik und Mathematik, die den Stoff der viersemestrigen Grundvorlesung für Physiker in diesen Bereichen umfasst.



Alan RUEGG, Guido BURMEISTER. — **Méthodes constructives de la géométrie spatiale : perspective, axonométrie, méthode de Monge.** — Méthodes mathématiques pour l'ingénieur, vol. 8. — Un vol. broché,  $16 \times 24$ , de XIII, 134 p. — Prix: SFr. 44.00. — Presses polytechniques et universitaires romandes, Lausanne, 1993.

Pour décrire et étudier des objets spatiaux, on les représente couramment par des figures planes. Cet ouvrage se veut une introduction aux méthodes qui ont pour but de construire des images d'objets spatiaux au moyen de projections géométriques. Il expose les concepts et les constructions de l'axonométrie, de la perspective et de la méthode de Monge dans une optique pratique.

Marvin Jay GREENBERG. — **Euclidean and non-Euclidean geometries: development and history.** — Third edition. — Un vol. relié,  $16 \times 24$ , de XVI, 483 p. — Prix: £29.95. — W.H. Freeman, New York, 1993.

Euclid's geometry. Logic and incidence geometry. Hilbert's axioms. Neutral geometry. History of the parallel postulate. The discovery of non-Euclidean geometry. Independence of the parallel postulate. Philosophical implications. — Geometric transformations. Further results in hyperbolic geometry. Appendix: Elliptic and other Riemannian geometries.

R.K. SINGH, J.S. MANHAS. — **Composition operators on function spaces.** — North-Holland mathematics studies, vol. 179. — Un vol. relié,  $17,5 \times 24,5$ , de X, 315 p. — Prix: Dfl. 200.00. — North-Holland, Amsterdam, 1993.

This volume presents work done on composition operators during the last 25 years. Composition operators form a simple but interesting class of operators having interactions with different branches of mathematics and mathematical physics. — Contents: Introduction. Composition operators on  $L^p$ -spaces. Functional Banach spaces. Composition operators on the weighted locally convex function spaces. Some applications of composition operators.

M. CIARLETTA, D. IESAN. — **Non-classical elastic solids.** — Pitman research notes in mathematics series, vol. 293. — Un vol. broché,  $17 \times 24,5$ , de 346 p. — Prix: £39.00. — Longman Scientific and Technical, Harlow, Essex, 1993.

This monograph is concerned with the boundary value problems of some theories of non-classical elastic bodies. Beginning with a study of nonsimple elastic bodies, there follows a treatment of the theory of elastic solids with microstructure. The authors conclude with a theory of elastic materials with voids. Relevant examples are given throughout the text.

**Mathematical approaches to neural networks.** — Edited by J.G. Taylor. — North-Holland mathematical library, vol. 51. — Un vol. relié,  $15,5 \times 23$ , de VII, 382 p. — Prix: Dfl. 190.00. — North-Holland, Amsterdam, 1993.

This book aims to strengthen the foundations in its presentation of mathematical approaches to neural networks. It is through these that a suitable explanatory framework is expected to be found. The approaches span a broad range, from single neuron details to numerical analysis, functional analysis and dynamical systems theory. Each of these avenues provides its own insights into the way neural networks can be understood.

Ivo SCHNEIDER. — **Johannes Faulhaber 1580-1635 : Rechenmeister in einer Welt des Umbruchs.** — Vita mathematica, Bd. 7. — Un vol. relié,  $16 \times 23$ , de IX, 271 p. — Prix: SFr. 88.00. — Birkhäuser, Basel, 1993.

Die Gruppe der Rechenmeister, der Johannes Faulhaber angehörte, war bis ins 19. Jahrhundert die für die Einführung und Verbreitung von elementaren Rechenkenntnissen in Europa

wichtigste Berufsgruppe. Die erstmals ausgewerteten ungedruckten Quellen, darunter einige hundert Briefe, erlauben eine für die Tätigkeit und Wirksamkeit der Rechenmeister repräsentative Darstellung der Lebensumstände von Faulhaber.

**Expanding graphs.** — Proceedings of a DIMACS Workshop, May 11-14, 1992. — Joel Friedman, Editor. — DIMACS series in discrete mathematics and theoretical computer science, vol. 10. — Un vol. relié,  $18 \times 26$ , de IX, 142 p. — Prix: £42.00. — American Mathematical Society, distributed by Oxford University Press, Oxford, 1993.

From the preface: "This volume contains much of the material covered at this workshop (22 talks), in the form of unrefereed papers or summaries of the talks. The field of expanding graphs involves a number of different fields of study..., including theoretical computer science, combinatorics, probability theory, representation theory, number theory and differential geometry".

Yuri BAHTURIN. — **Basic structures of modern algebra.** — Mathematics and its applications, vol. 265. — Un vol. relié,  $16,5 \times 24,5$ , de IX, 419 p. — Prix: Dfl. 320.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This volume has developed from courses given at Moscow State University. The main purpose of the material presented is to introduce the concepts, results and problems of contemporary algebra, assuming some knowledge of the standard theory of linear algebra and vector spaces. One important aspect is to demonstrate how the concepts discussed relate to each other and how they work in practice.

**Investigations in algebraic theory of combinatorial objects.** — Edited by I.A. Faradzev, A.A. Ivanov, M.H. Klin and A.J. Woldar. — Mathematics and its applications (Soviet series), vol. 84. — Un vol. relié,  $16,5 \times 24,5$ , de XI, 510 p. — Prix: Dfl. 395.00. — Kluwer Academic Publishers, Dordrecht, 1994.

This volume presents a collection of major surveys papers on algebraic combinatorics which originally appeared in Russian, augmented by four survey papers written specially for this book. The content is divided into three parts: the first deals with cellular rings; the second deals with distance-regular and distance-transitive graphs; and part 3 contains papers on the relatively new branch of amalgams and geometry.

J. SANCHEZ-HUBERT, E. SANCHEZ-PALENCIA. — **Exercices sur les méthodes asymptotiques et homogénéisation.** — Collection Mathématiques appliquées pour la maîtrise. — Un vol. broché,  $16 \times 24$ , XII, 177 p. — Prix: FF 125.00. — Masson, Paris, 1993.

Cet ouvrage complète le livre «Introduction aux méthodes asymptotique et à l'homogénéisation» de mêmes auteurs, paru dans la même collection. Certains exercices ou problèmes sont de simples applications de résultats généraux et méthodes exposés dans le livre, d'autres sont des vérifications de points non explicités. Certains exercices ou problèmes constituent des développements présentant un intérêt propre.

Gérard HIRSCH, Jocelyne ROUYER, avec la collaboration de Joseph ROUYER. — **Intégrales simples: formulaires commentés, 500 exercices corrigés.** — Collection «Comprendre et appliquer», série Mathématiques pratiques élémentaires, vol. 2. — 3e édition, révisée et augmentée. — Un vol. broché,  $17,5 \times 24$ , de VIII, 87 p. — Prix: FF 98.00. — Masson, Paris, 1993.

Les auteurs présentent un ouvrage d'initiation au calcul intégral, visant à familiariser l'étudiant avec les méthodes de calcul de base. Ce cours présente les notions élémentaires, les

applique dans divers cas de figure et permet au lecteur d'évaluer régulièrement sa compréhension du sujet. L'ouvrage totalise un ensemble de 500 exercices, dont tireront parti les étudiants des premiers cycles scientifiques, techniques et médicaux.

Takashi YOSHINO. — **Introduction to operator theory.** — Pitman research notes in mathematics series, vol. 300. — Un vol. broché,  $17 \times 24,5$ , de 143 p. — Prix: £22.00. — Longman Scientific & Technical, Harlow, Essex, 1993.

This volume presents an account of modern aspects of operators and spectral theory for normal operators. Chapter 1 sets out the basic definitions and general properties of bounded linear operators on Hilbert spaces and chapter 2 describes the structure of operators in a few classes of operators which in some sense are close to being normal.

Curtis TUCKEY. — **Nonstandard methods in the calculus of variations.** — Pitman research notes in mathematics series, vol. 297. — Un vol. broché,  $17 \times 24,5$ , de 94 p. — Prix: £20.00. — Longman Scientific & Technical, Harlow, Essex, 1993.

The bulk of the work is about Young's generalized curves, their representation as nonstandard polygonal curves with hyperfinitely many vertices, and their approximation by standard curves — the "Euler polygons" that arise in discretizing differential equations. Some contributions to the general development of Robinsonian analysis are gathered along the way.

**Nonlinear partial differential equations and their applications, Collège de France Seminar, vol. 11.** — Edited by H. Brezis and J.L. Lions and D. Cioranescu. — Pitman Research notes in mathematics series, vol. 299. — Un vol. broché,  $17 \times 24$ , de 311 p. — Prix: £32.00. — Longman Scientific and Technical, Harlow, Essex, 1994.

This book contains the texts of selected lectures delivered by leading international experts at the well-established weekly seminar held at the Collège de France. The emphasis is laid on applications to numerous areas, including control theory, theoretical physics, fluid and continuum mechanics, free boundary problems, dynamical systems, scientific computing, numerical analysis and engineering.

Richard ZIPPEL. — **Effective polynomial computation.** — The Kluwer international series in engineering and computer science, vol. 241. — Un vol. relié,  $16 \times 24$ , de XI, 363 p. — Prix: Dfl. 175.00. — Kluwer Academic Publishers, Boston, 1993.

This book discusses the basic algorithms for manipulating polynomials, including factoring polynomials, from both theoretical and practical perspectives. The work is unique in its detailed treatment of greatest common divisor and factoring algorithms for sparse multivariate polynomials, and its discussion of both deterministic and probabilistic algorithms for irreducibility testing of polynomials.

Donald M. DAVIS. — **The nature and power of mathematics.** — Un vol. broché,  $15,5 \times 23,5$ , de XI, 389 p. — Prix: US\$24.00 (relié: US\$60.00). — Princeton University Press, Princeton N.J., 1993.

The author explains some of the most fascinating ideas in mathematics to the nonspecialist, highlighting their philosophical and historical interest, their often surprising applicability, and their beauty. The main topics discussed are non-Euclidean geometry, with its application to the theory of relativity; number theory, with its application to cryptography; and fractals.



C.A. BERENSTEIN, R. GAY, A. VIDRAS, A. YGER. — **Residue currents and Bezout identities.** — Progress in mathematics, vol. 114. — Un vol. relié,  $16 \times 24$ , de 158 p. Prix: SFr. 68.00. — Birkhäuser Verlag, Basel, 1993.

This monograph presents the role that analytic methods and, in particular, multi-dimensional residue have recently played in obtaining effective estimates for problems in commutative algebra. Bezout identities appear in many problems and one way to solve them is by using explicit interpolation formulas in  $C^n$  depending on the theory of multidimensional residues.

Colette MOEGLIN, Jean-Loup WALDSPURGER. — **Décomposition spectrale et séries d'Eisenstein: une paraphrase de l'écriture.** — Progress in mathematics, vol. 113. — Un vol. relié,  $16 \times 24$ , de XXIX, 341 p. — Prix: SFr.128.00. — Birkhäuser Verlag, Basel, 1994.

Hypothèses, formes automorphes, termes constants. Décomposition suivant les données cuspidales. Opérateurs Hilbertiens et formes automorphes. Prolongement des séries d'Eisenstein. Construction du spectre discret par résidus. Décomposition spectrale à l'aide du spectre discret des Levi. Relèvement des sous-groupes unipotents dans une extension centrale. Formes automorphes et séries d'Eisenstein sur un corps de fonctions.

V. KHATSKEVICH, D. SHOIKHET. — **Differentiable operators and nonlinear equations.** — Operator theory, vol. 66. — Un vol. relié,  $17,5 \times 24$ , de x, 280 p. — Prix: SFr. 148.00. — Birkhäuser Verlag, Basel, 1994.

This book is a first step towards establishing a bridge between nonlinear analysis, nonlinear operator equations and the theory of holomorphic mappings on Banach spaces. The work concludes with a brief exposition of the theory of spaces with indefinite metrics, and some relevant applications of the holomorphic mappings theory in this setting. A complete account of definitions and proofs is given.

**Seminar on dynamical systems: Euler International Mathematical Institute, St. Petersburg, 1991.** — Edited by S. Kuksin, V. Lazutkin, J. Poeschel. — Progress in nonlinear differential equations and their applications, vol. 12. — Un vol. relié,  $16,5 \times 24$ , de ix, 290 p. — Prix: SFr. 98.00. — Birkhäuser, Basel, 1994.

The aim of this collection is to give a wide picture of essential parts of the recent developments in qualitative theory of Hamiltonian equations such as new contributions to Kolmogorov-Arnold-Moser theory and the study of Arnold diffusion and cantori. New aspects on infinite dimensional dynamical systems are considered.

**Set-valued analysis and differential inclusions.** — A collection of papers resulting from a workshop held in Pamporovo, Bulgaria, September, 1990. — Edited by Alexander B. Kurzhanski, Vladimir M. Veliov. — Progress in systems and control theory, vol. 16. — Un vol. relié,  $16 \times 24$ , de x, 199 p. — Prix: SFr. 138.00. — Birkhäuser, Boston, 1993.

Set-valued analysis is an important component of the study of differential inclusions, which in turn provide an efficient tool for the modelling and analysis of dynamic phenomena which evolve from external actions, either under control or in a state of uncertainty. The editors offer this selection of papers as a distillation of some of the most important work in the field.

Gerald BEER. — **Topologies on closed and closed convex sets.** — Mathematics and its applications, vol. 268. — Un vol. relié,  $16,5 \times 25$ , de xi, 340 p. — Prix: Dfl. 240.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This monograph provides an introduction to the theory of topologies defined on the closed subsets of a metric space, and on the closed convex subsets of a normed linear space as well. The text includes for the first time anywhere an exposition of three topologies... : the Wijsman topology, the Attouch-Wets topology, and the slice topology. Particular attention is given to topologies on lower semicontinuous functions.

Daniel IAGOLNITZER. — **Scattering in quantum field theories: the axiomatic and constructive approaches.** — Princeton series in physics. — Un vol. relié, 16 × 24, de XXI, 290 p. — Prix: US\$ 49.50 (pour les U.S.A.), £ 37.50 (pour tout autre pays). — Princeton University Press, Princeton, 1993.

Axiomatic and constructive approaches to quantum field theory first aim to establish it on precise, nonperturbative bases: general axioms and rigorous definition of specific theories respectively. From the viewpoint of particle physics, the goal is then to develop a relativistic scattering theory, including particle analysis and the derivation of general properties of collision amplitudes.

G.M.L. GLADWELL. — **Inverse problems in scattering: an introduction.** — Solid mechanics and its applications, vol. 23. — Un vol. relié, 16,5 × 24,5, de x, 360 p. — Prix: Dfl. 225.00. — Kluwer Academic Publishers, Dordrecht, 1993.

Some simple wave phenomena. Layer-Peeling methods for discrete inverse problems. The inversion of discrete systems using non-causal solutions. Waves in non-uniform media. The inversion of continuous systems using causal solutions. Inversion of continuous systems using non-causal solutions. An introduction to the inverse scattering problem of quantum theory. The Schrödinger equation on the half line. The Lebesgue integral. Inverse scattering for the Schrödinger equation.

**Solution equations, control theory, and biomathematics.** — Proceedings of the Han-sur-Lesse conference. — Edited by Philippe Clément and Günter Lumer. — Lecture notes in pure and applied mathematics, vol. 155. — Un vol. broché, 18 × 25,5, de xxvi, 580 p. — Prix: US\$ 165.00. — Marcel Dekker, New York, 1994.

Examining important advances in evolution equations related to physical, engineering, and biological applications, this reference addresses population models, epidemic models, and diffusion models with shocks... control theory and optimal control... Riccati, Hamilton-Jacobi, and Korteweg-de Vries equations... asymptotic of spectral functions... viscosity solutions... Laplace transform and perturbation methods... stochastic analysis..., etc.

Michel SCHMITT, Juliette MATTIOLI. — **Morphologie mathématique.** — Logique, mathématiques, informatique. — Un vol. broché, 16 × 24, de xiii, 211 p. — Prix: FF 200.00. — Masson, Paris, 1994.

Introduction: Qu'est-ce que la morphologie mathématique? Théorie élémentaire des quatre opérations. Expression algébrique des opérateurs fondamentaux. Topologies et continuités. Squelettes. Transformations géodésiques. Ligne de partage des eaux. Mesures morphologiques. Métriques non euclidiennes. Modèles probabilistes. Conclusions et perspectives.

Paul MALLIAVIN, Hélène AIRAULT. — **Intégration et analyse de Fourier, probabilités et analyse gaussienne.** — 2e édition revue et augmentée. — Collection Maîtrise de mathématiques pures. — Un vol. broché, 16 × 24, de 226 p. — Prix: FF 220.00. — Masson, Paris, 1994.

La théorie de l'intégrale moderne, fondée au début du siècle par Borel et Lebesgue, est l'un des outils qui ont le plus profondément renouvelé l'analyse mathématique. Ce livre présente une exposé d'ensemble, avec des démonstrations complètes, de la théorie de Lebesgue et de tous ses prolongements.

David STIRZAKER. — **Elementary probability**. — Un vol. broché,  $17 \times 24,5$ , de x, 406 p. — Prix: £64.95 (relié), £15.95 (broché). — Cambridge University Press, Cambridge, 1994.

The aim of this book is to provide a straightforward introduction to the theory of probability. The topics covered illustrate the wide range and power of the subject, and include conditional probability, independence, random variables, generating functions, and an introduction to Markov chains.

Peter M. NEUMANN, Gabrielle A. STÖY, Edward C. THOMPSON. — **Groups and geometry**. — Oxford science publications. — Un vol. broché,  $15,5 \times 23$ , de vi, 254 p. — Prix: £19.50. — Oxford University Press, Oxford, 1994.

This book is about the measurement of symmetry — what groups are for. Divided into two parts. The first part covers groups and the second part geometry, with the symbiotic relationship between the two more than justifying the union. Both parts contain a number of exercises that will be invaluable to any reader wishing to gain a fuller understanding of this area of mathematics.

Akihiko YUKIE. — **Shintani zeta functions**. — London Mathematical Society lecture note series, vol. 183. — Un vol. broché,  $15 \times 23$ , de xii, 339 p. — Prix: £25.00. — Cambridge University Press, Cambridge, 1993.

The book represents the author's deep study of prehomogeneous vector spaces and his generalisation of Shintani's approach from the viewpoint of geometric invariant theory. In some special cases he determines not only the pole structure but also the principal part of the zeta function.

Michael K. MURRAY and John W. RICE. — **Differential geometry and statistics**. — Monographs on statistics and applied probability, vol. 48. — Un vol. relié,  $14 \times 22,5$ , de xiii, 272 p. — Prix: £29.99. — Chapman & Hall, London, 1993.

The book commences with the study of the simplest differentiable manifolds - affine spaces and their relevance to exponential families, and goes on to the general theory, the Fisher information metric, the Amari connections and asymptotics. It culminates in the theory of vector bundles and jets and their applications to the theory of strings.

**For all practical purposes : introduction to contemporary mathematics**. — Third edition. — Un vol. relié,  $20 \times 24$ , de 704 p. — Prix: £23.95. — W.H. Freeman and Company, New York, 1993.

The authors of this book are members of the COMAP, Consortium for Mathematics and its Applications. This group of mathematicians and educators is dedicated to the improvement of mathematics education. Topics involved are: Management science. Statistics: the science of data. Coding information. Social choice and decision making. On size and shape.

Alan DOLAN, and Joan ALDOUS. — **Networks and algorithms: an introductory approach.** — Un vol. broché,  $15,5 \times 23$ , de x, 544 p. — Prix: £19.95, (relié: £49.95). — John Wiley & Sons, Chichester, 1993.

Detailed solution procedures (usually in the form of an algorithm) are given to a wide range of central network problems including longest and shortest paths, critical path scheduling, location problems, electrical networks, maximum flow problems and transportation problems. There is also a discussion of the time complexity of algorithms and the theory of *NP*-completeness.

**Didactics of mathematics as a scientific discipline.** — Edited by R. Biehler, R.W. Scholz, R. Straesser, B. Winkelmann. — Mathematics education library, vol. 13. — Un vol. relié,  $17 \times 24,5$ , de 467 p. — Prix: Dfl. 250.00. — Kluwer Academic Publishers, Dordrecht, 1993.

Preparing mathematics for students. Teacher education and research on teaching. Interaction in the classroom. Technology and mathematics education. Psychology of mathematical thinking. Differential didactics. History and epistemology of mathematics and mathematics education. Cultural framing of teaching and learning mathematics.

Daniel S. ALEXANDER. — **A history of complex dynamics: from Schröder to Fatou and Julia.** — Aspects of mathematics, vol. E 24. — Un vol. relié,  $16 \times 23$ , de vii, 165 p. — Prix: DM 58.00. — Vieweg, Braunschweig/Wiesbaden, 1994.

Schröder, Cayley and Newton's method. The next wave: Korkine and Farkas. Gabriel Koenigs. Iteration in the 1890's: Grévy. Iteration in the 1890's: Leau. The Flower theorem of Fatou and Julia. Fatou's 1906 note. Montel's theory of normal families. The contest. Lattès and Ritt. Fatou and Julia.

**Harmonic maps and integrable systems.** — Edited by Allan P. Fordy and John C. Wood. — Aspects of mathematics, vol. E 23. — Un vol. relié,  $16 \times 23$ , de viii, 330 p. — Prix: DM 88.00. — Vieweg, Braunschweig, Wiesbaden, 1994.

Recently, there has been an explosion of interest in applying the methods of integrable systems to find and study harmonic maps. This book brings together experts in the field to give a coherent account of this subject. — Contents: Introduction and background material. The geometry of surfaces. Sigma and chiral models. The algebraic approach. The twistor approach.

Michael VAUGHAN-LEE. — **The restricted Burnside problem.** — Second edition. — London Mathematical Society monographs new series, vol. 8. — Un vol. relié,  $16 \times 24$ , de xiii, 256 p. — Prix: £93.00. — Clarendon Press, Oxford, 1993.

Basic concepts. The associated Lie ring of a group. Kostrikin's theorem. Razmyslov's theorem. Group of exponents two, three, and six. Groups of exponent four. Groups of prime exponent. Groups of prime-power exponent. Zelmanov's theorem.

Jean-Pierre KAHANE. — **Some random series of functions.** — Second edition. — Cambridge studies in advanced mathematics, vol. 5. — Un vol. broché,  $15 \times 23$ , de xiii, 305 p. — Prix: £19.95. — Cambridge University Press, Cambridge, 1985.

The book covers random series in Banach and Hilbert spaces, random Taylor or Fourier series, Brownian motion and other Gaussian processes, plus certain types of random sets and measures. The subject matter of this book is important and has wide application in mathematics, statistics, engineering, and physics. Exercises are provided throughout.

**Deformations of mathematical structures II: Hurwitz-type structures and applications to surface physics.** — Selected papers from the seminar on deformations, Lodz-Malinka, 1988/92. — Edited by Julian Lawrynowicz. — Un vol. relié, 16,5 × 26, de x, 464 p. — Prix: Dfl. 350.00. — Kluwer Academic Publishers, Dordrecht, 1994.

This volume presents a collection of papers on geometric structures in the context of Hurwitz-type structures and applications to surface physics. The first part of this volume concentrates on the analysis of geometric structures. The second part contains a study of surface physics structures, in particular boundary conditions.

Daniel W. STROOCK. — **Probability theory, an analytic view.** — Un vol. relié, 18 × 26, de xiv, 512 p. — Prix: £30.00. — Cambridge University Press, Cambridge, 1993.

The first part of the book deals with independent random variables, central limit phenomena, the general theory of weak convergence and several of its applications, as well as elements of both the Gaussian and Markovian theory of measures on function space. The introduction of conditional expectation values is postponed until the second part of the book, where it is applied to the study of martingales.

Stuart MARTIN. — **Schur algebras and representation theory.** — Cambridge tracts in mathematics, vol. 112. — Un vol. relié, 16 × 23,5, de xv, 232 p. — Prix: £30.00. — Cambridge University Press, Cambridge, 1993.

The Schur algebra is an algebraic system providing a link between the representation theory of the symmetric and general linear groups (both finite and infinite). The author gives a full self-contained account of this algebra and these links..., he discusses the usual representation-theoretic topics such as constructions of irreducible modules, the blocks containing them, their modular characters and the problem of computing decomposition numbers.

Virginia KIRYAKOVA. — **Generalized fractional calculus and applications.** — Pitman research notes in mathematics series, vol. 301. — Un vol. broché, 17 × 24,5, de 388 p. — Prix: £39.00. — Longman Scientific & Technical, Harlow, Essex, 1994.

This volume is devoted to a systematic and unified development of a new generalized fractional calculus, related to many special cases and several applications. The basic operators are the generalized (multiple Erdélyi-Kober) fractional integrals and derivatives, considered as a single object and involving Meijer's G-functions (or Fox's H-functions) as kernels.

**Continued fractions and orthogonal functions: theory and applications.** — Edited by S. Clement Cooper, W.J. Thron. — Lecture notes in pure and applied mathematics, vol. 154. — Un vol. broché, 18 × 25,5, de xiii, 379 p. — Prix: US\$145.00. — Marcel Dekker, New York, 1994.

Uniting the research efforts of over 15 experts, the volume treats strong moment problems, orthogonal polynomials, and Laurent polynomials...analyzes sequences of linear fractional transformations... presents convergence results... considers discrete distributions and limit functions arising from indeterminate moment problems... discusses Szegő polynomials and their application to frequency analysis, etc.

Phoolan PRASAD. — **Propagation of a curved shock and nonlinear ray theory.** — Pitman research notes in mathematics series, vol. 292. — Un vol. broché, 17 × 24,5, de xii, 124 p. — Prix: £22.00. — Longman Scientific and Technical, Harlow, Essex, 1993.



This monograph contains some recent theoretical developments in the study of the propagation of a curved nonlinear wavefront and shockfront in the most general situation, and in the caustic region in particular. The material in the book is self-contained, and starts with an introduction to a shock wave. The monograph also contains a theory for the computation of a weakly nonlinear wavefront under short wave approximation in a continuous flow.

**Les grands systèmes des sciences et de la technologie: ouvrage en hommage à Robert Dautray.** — Coordonné par J. Horowitz et J.-L. Lions. — Collection Recherches en Mathématiques Appliquées, vol. 28. — Un vol. broché,  $16 \times 24$ , de XVIII, 827 p. — Prix: FF 460.00. — Masson, Paris, 1994.

Cet ouvrage rassemble plus de 70 contributions pour rendre hommage au professeur R. Dautray. Ces contributions retracent les divers apports du professeur dans des domaines aussi vastes et variés que les mathématiques pures et appliquées, la physique, l'économie. Ce livre est destiné aux mathématiciens et physiciens.

**Vieweg Mathematik Lexikon: Begriffe/Definitionen/Sätze/Beispiele für das Grundstudium.** — Erarbeitet von Otto Kerner, Joseph Maurer, Jutta Steffens, Thomas Thode und Rudolf Voller. — 2., überarbeitete Auflage. — Un vol. broché,  $12,5 \times 19$ , de XII, 378 p. — Prix: DM 39.80. — Vieweg, Braunschweig/Wiesbaden, 1993.

Das Vieweg Mathematik Lexikon ist ein handliches Nachschlagewerk. Es entspricht den Bedürfnissen der Mathematikstudenten. Bezogen auf den heute üblichen Stoffumfang der Vorlesungen über Analysis, Lineare Algebra, Numerik, Stochastik, Funktionentheorie, elementare Zahlentheorie, Differentialgeometrie, mengentheoretische Topologie und Funktionalanalysis werden unter geeigneten Stichworten diejenigen Informationen geboten, die einem Studenten erfahrungsgemäss am nützlichsten sind.

**Commutative ring theory.** — Proceedings of the Fès International Conference. — Edited by Paul-Jean Cahen, Douglas L. Costa, Marco Fontana, Salah-Eddine Kabbaj. — Lecture notes in pure and applied mathematics, vol. 153. — Un vol. broché,  $17,5 \times 25$ , de X, 256 p. — Prix: US\$ 125.00. — Marcel Dekker, New York, 1994.

Exploring commutative algebra's connections with the applications to topological algebra and algebraic geometry, the book covers the spectra of rings...chain conditions, dimension theory, and Jaffard rings...fiber products...group rings, semigroup rings, and graded rings, class groups...linear groups...integer-valued polynomials...rings of finite fractions...big Cohen-Macaulay modules, etc...

**Two dimensional homotopy and combinatorial group theory.** — Edited by Cynthia Hog-Angeloni, Wolfgang Metzler and Allan J. Sieradski. — London Mathematical Society lecture notes series, vol. 197. — Un vol. broché,  $15 \times 23$ , de XI, 412 p. — Prix: £25.00. — Cambridge University Press, Cambridge, 1993.

The editors start with introductory chapters on low dimensional topology. Further chapters deal with the latest algebraic results and their applications to three- and four-dimensional manifolds. Final chapters summarise and contribute to the present status of the conjectures of Zeeman, Whitehead and Andrews-Curtis.

Serge FRANCINO, Hervé GIANELLA. **Exercices de mathématiques pour l'agrégation: algèbre 1.** — Préface de Daniel Perrin. — Série Agrégation de mathématiques. — Un vol. broché,  $16 \times 24$ , de X, 254 p. — Prix: FF 145.00. Masson, Paris, 1994.

Trois types d'exercices sont présentés: des exercices généraux visant à une bonne assimilation des connaissances, des études d'exemples précis d'objets mathématiques présentant des propriétés remarquables, des exercices plus théoriques impliquant des démonstrations de théorèmes fondamentaux.

TRAN VAN HIEP. — **Algèbre: cours et exercices corrigés.** — Collection Major. — Un vol. broché,  $17,5 \times 24$ , de XI, 730 p. — Prix: FF 249.00. — Presses universitaires de France, Paris, 1994.

Ce manuel est destiné aux candidats des classes préparatoires HEC, mais s'adresse également aux étudiants de Math Sup C, Math Spé C et DEUG. Chaque chapitre est suivi d'un plan de travail indiquant les notions essentielles à savoir, les pièges à éviter et la marche à suivre pour résoudre les 200 exercices et problèmes entièrement corrigés et commentés.

**Mathematicians and education reform 1990-1991.** — Naomi D. Fisher, Harvey B. Keynes, Philip D. Wagreich, editors. — Conference Board of the Mathematical Science, issues in mathematics education, vol. 3. — Un vol. broché,  $17,5 \times 25,5$ , de x, 185 p. — Prix: £93.00. — American Mathematical Society, Providence, R.I., distributed by Oxford University Press, Oxford, 1993.

This is the latest volume in the CBMS issues in mathematics education series, which seeks to stimulate the flow of information among mathematical scientists and mathematics educators about innovative efforts to revitalize the teaching of the mathematical sciences at all levels.

Charles C. SIMS. — **Computation with finitely presented groups.** — Encyclopedia of mathematics and its applications, vol. 48. — Un vol. relié,  $16 \times 24$ , de XIII, 604 p. — Prix: £65.00. — Cambridge University Press, Cambridge, 1994.

This text presents the fundamental algorithmic ideas which have been developed to compute with finitely presented groups that are infinite, or at least not obviously finite. The book describes methods for working with elements, subgroups, and quotient groups of a finitely presented group. The author emphasizes the connection with fundamental algorithms from theoretical computer science, particularly the theory of automata and formal languages.

Yurii NESTEROV and Arkadii NEMIROVSKII. — **Interior-point polynomial algorithms in convex programming.** — SIAM studies in applied mathematics, vol. 13. — Un vol. relié,  $18 \times 26$ , de IX, 405 p. — Prix: US\$68.50. — SIAM, Society for industrial and applied mathematics, Philadelphia, 1994.

Here is the first unified theory of polynomial-time interior-point methods. This focus on the theoretical aspects allows for new possibilities for constructing efficient methods for nonlinear convex problems. Applications cover a wide variety of problems, from quadratic programming to finding extremal ellipsoids, from extremal eigenvalue problems arising in control theory to geometric programming.

**Operator algebras, mathematical physics, and low dimensional topology.** — Edited by Richard Herman, Betül Tanbay. — Research notes in mathematics, vol. 5. — Un vol. relié,  $15,5 \times 23,5$ , de 324 p. — Prix: US\$39.95. — A.K. Peters, Wellesley, Mass., 1993.

In this compilation, problems relating to the structure of  $C^*$ -algebras, their automorphism groups, and algebras arising out of dynamical systems are discussed. The subjects of quantization, Virasoro algebras, and the action of Hopf algebras can also be found herein. as well as Connes' work leading to physical predictions, invariants on 3-manifolds arising out of operator algebras, recent developments such as perturbation-theoretic Chern-Simons theory relating the invariant of Jones and Vassiliev, etc...

Wolfgang BOEHM, Hartmut PRAUTZSCH. — **Geometric concepts for geometric design.** — Un vol. relié, 15 × 23,5, de XVII, 393 p. — Prix: US\$49.95. — A.K. Peters, Wellesley, Mass., 1994.

The author's provide a way in which to visualize a variety of geometric problems and present the tools for their accurate representation... They clarify these concepts and allow for applying the material to other problems of a geometric nature. They also provide a solid foundation of applied geometry as used in geometric design and geometric modeling.

Mario PERUGIA. — **Discrete iterated function systems.** — Un vol. relié, 16 × 23,5, de XVI, 180 p. — Prix: US\$34.95. — A.K. Peters, Wellesley, Mass., 1993.

Since it was recognized that they could be used for encoding a large class of digitized color images, fractals have become the "golden child" of the computer graphics industry. The original encoding method is based on the identification of an image with the unique stationary distribution of an ergodic Markov chain... This book examines the theoretical and practical consequences brought about by the discretization procedure.

Ruma FALK. — **Understanding probability and statistics: a book of problems.** — Un vol. relié, 16 × 23,5, de XIII, 239 p. — Prix: US\$39.95. — A.K. Peters, Wellesley, Mass., 1993.

This is a book of creative statistical problems intended to allay the mathematical fears of the average student through "experiencing the revelation of understanding". The collection encompasses a range of problems from high-school to graduate level and takes the active, hands-on approach to the assimilation of basic concepts.

Josef HOSCHEK, Dieter LASSER. — **Fundamentals of computer aided geometric design.** — Un vol. relié, 16 × 23,5, de XIII, 239 p. — Prix: US\$79.95. — A.K. Peters, Wellesley, Mass., 1993.

This work is a complete introduction to the mathematical foundations used to create an accurate computer screen image. Using results from linear algebra, analytic geometry, and analysis in  $R^2$  and  $R^3$ , the authors furnish the necessary tools for developing software to create, describe, and transform freeform curves and surfaces. An extensive bibliography is provided.

Norman BIGGS. — **Algebraic graph theory.** — Second edition. — Cambridge mathematical library. — Un vol. broché, 15 × 22,5, de VI, 205 p. — Prix: £14.95 (relié: £22.95). — Cambridge University Press, Cambridge, 1994.

This is a substantial revision of a much-quoted monograph. The structure is unchanged, but the text has been clarified and the notation brought into line with current practice. A large number of additional results are included at the end of each chapter, thereby covering most of the major advances in the last twenty years. The author basic aim remains to express properties of graphs in algebraic terms, then to deduce theorems about them.

**Symplectic geometry.** — Edited by Dietmar Salamon. — London Mathematical Society lecture note series, vol. 192. — Un vol. broché, 15 × 23, de 236 p. — Cambridge University Press, Cambridge, 1994.

This volume is based on lectures given at a Workshop and Conference on Symplectic Geometry at the University of Warwick in August 1990. This area of research has developed rapidly with major discoveries that were motivated by and have provided links with many other subjects such as dynamical systems, topology, gauge theory, mathematical physics and singularity theory. This conference brought together a number of leading experts in these areas.



**Computer algebra and differential equations.** — Edited by E. Tournier. — London Mathematical Society lecture note series, vol. 193. — Un vol. broché,  $15 \times 23$ , de 259 p. — Prix: £24.95. — Cambridge University Press, Cambridge, 1994.

Three main topics are discussed. The first of these is the theory of  $D$ -modules. The second topic concerns the theoretical aspects of dynamical systems, with an introduction to Ecalle theory and perturbation analysis applied to differential equations and other nonlinear systems. The final topic is the theory of normal forms. Here recent improvements and computation of normal forms are discussed.

Isaac CHAVEL. — **Riemannian geometry : a modern introduction.** — Cambridge tracts in mathematics, vol. 108. — Un vol. relié,  $16 \times 23,5$ , de XII, 386 p. — Prix: £35.00. — Cambridge University Press, Cambridge, 1994.

The main theme of this book is the effect of the curvature of curved spaces on the usual notions of geometry-distances, areas and volumes, and on those new notions and ideas motivated by curvature itself. Among other topics in a new setting are volume-comparison theorems, and isoperimetric inequalities. New themes created by curvature include the interaction of microscopic behavior of the geometry with the macroscopic structure of the space.

Ya. G. SINAI. — **Topics in ergodic theory.** — Princeton mathematical series, vol. 44. — Un vol. relié,  $16 \times 24,5$ , de VI, 218 p. — Prix: Pour les USA.: US\$39.5 (£32.50 pour tout autre pays). — Princeton University Press, Princeton, N.J., 1994.

This book concerns areas of ergodic theory that are now being intensively developed. The topics include entropy theory (with emphasis on dynamical systems with multi-dimensional time), elements of the renormalization group method in the theory of dynamical systems, splitting of separatrices, and some problems related to the theory of hyperbolic dynamical systems.

**Elliptic curves and related topics.** — Edited by Hershy Kisilevsky, M. Ram Murty. — CRM proceedings and lecture notes, vol. 4. — Un vol. relié,  $18 \times 25,5$ , de VIII, 195 p. Prix: US\$55.00. — American Mathematical Society, Providence, R.I., 1994.

12 exposés par Gerhard Frey, Karl Rubin, John E. Cremona, Henri Darmon, Josef Gebel and Horst G. Zimmer, Fernando Q. Gouvea, Ralph Greenberg, John Im, Liem Mai and M. Ram Murty, David E. Rohrlich, Freydoon Shahidi, Yuri G. Zarhin.

**Asymptotic methods in mechanics.** — Edited by Rémi Vaillancourt, Andrei L. Smirnov. — CRM proceedings and lecture notes, vol. 3. — Un vol. relié,  $18 \times 25,5$ , de XVIII, 282 p. — American Mathematical Society, Providence, R.I., 1994.

These proceedings consist of two parts. The first is a survey of the asymptotic methods applied to the analysis of thin-wall structures. It contains only the main results and a vast bibliography. The second part of contains original papers on mechanics in which an asymptotic approach is used.

Pierre FERLAND, Claude TRICOT, Axel van de WALLE. — **Fractal analysis user's guide: introduction to fractal sets using windows TM3.x.** — Un vol. broché,  $18 \times 25,5$ , de VII, 35 p. + 1 disquette. — Prix: US\$50.00. — American Mathematical Society, Providence, R.I., 1993.

This software is designed for the well-established scientist or student who desires a quick initiation into the main notions of fractal analysis without going through all theoretical and

technical books. The goal of this software is to illustrate the dynamics of affine applications and the fixed point theorem and estimate the fractal dimension of a given set using covers of decreasing sizes.

Vic BARNETT and Toby LEWIS. — **Outliers in statistical data.** — 3rd edition. — Wiley series in probability and mathematical statistics. — Un vol. relié,  $16 \times 23,5$ , de xvii, 584 p. — Prix: £49.95. — John Wiley & Sons, Chichester, 1994.

In this edition every important area has been thoroughly updated to reflect the latest research. All the topics have been fully revised and extended, and additional topics and emphases are presented, making it an essential purchase for researchers in this area.

Bradley EFRON and Robert J. TIBSHIRANI. — **An introduction to the bootstrap.** — Monographs on statistics and applied probability, vol. 57. — Un vol. relié,  $15 \times 22$ , de xvi, 436 p. — Prix: £29.99. — Chapman & Hall, New York, 1993.

This book presents an overview of the bootstrap and related methods for assessing statistical accuracy. The first 19 chapters are expository. The remaining chapters are at a higher mathematical level and are suitable for a graduate level course in statistics.

J.S. Urban HJORTH. — **Computer intensive statistical methods: validation model selection and bootstrap.** — Un vol. relié,  $14 \times 22$ , de x, 263 p. — Prix: £29.99. — Chapman & Hall, London, 1994.

The computer-intensive methods outlined in this book can show how to pass many obstacles that could not previously be overcome. The book places much emphasis on applications in science, economics, reliability, meteorology, medicine and transportation.

Zoltan SASVARI. — **Positive definite and definitizable functions.** — Mathematical topics, vol. 2. — Un vol. relié,  $17 \times 24$ , de 208 p. — Prix: DM 98.00. — Akademie Verlag, Berlin, 1994.

The present book provides an introduction to the theory of positive definite functions from the point of view of harmonic analysis on groups. The main topics of the book are: basic results on positive definite functions, decomposition and extension of positive definite functions, functions having a finite number of negative squares and with definitizable functions.

Alfred TARSKI. — **Introduction to logic and to the methodology of the deductive sciences.** — 4th edition edited by Jan Tarski. — Oxford logic guides, vol. 24. — Un vol. relié,  $16 \times 24$ , de xxii, 229 p. — Prix: £25.00. — Oxford University Press, New York, 1994.

On the use of variables. — On the sentential calculus. — On the theory of Identity. — On the theory of classes. — On the theory of relations. — On the deductive method. — Construction of a mathematical theory: laws of order for numbers, laws of addition and subtraction. — Methodological considerations on the constructed theory. — Extension of the constructed theory: foundations of arithmetic of real numbers.

Wolfgang SCHWARZ, Jürgen SPILKER. — **Arithmetical functions: an introduction to elementary and analytic properties of arithmetic functions and to some of their almost-periodic properties.** — London Mathematical Society lecture note series, vol. 184. — Un vol. broché,  $15 \times 22,5$ , de xix, 367 p. — Prix: £25.00. — Cambridge University Press, Cambridge, 1994.

The aim of this book is to characterize certain multiplicative and additive arithmetical functions by combining methods from number theory with some simple ideas from functional

and harmonic analysis. The authors also prove the mean-value theorems of Wirsing and Halasz and study the pointwise convergence of the Ramanujan expansion. Some applications to power series with multiplicative coefficients and an extensive bibliography are included.

Wolmer V. VASCONCELOS. — **Arithmetic of blowup algebras.** — London Mathematical Society lecture note series, vol. 195. — Un vol. broché,  $15 \times 23$ , de 329 p. — Prix: £22.95. — Cambridge University Press, Cambridge, 1994.

This book provides an introduction to the theory of blowup algebras. The emphasis is on deriving properties of rings from their specifications in terms of generators and relations. While this places limitations on the generality of many results, it opens the way for the application of computational methods. The author presents the Gröbner basis algorithm and shows how it can be used to resolve many computational questions in algebra.

David NELSON, George G. JOSEPH, Julian WILLIAMS. — **Multicultural mathematics.** — Oxford paperbacks. — Un vol. broché,  $14 \times 21,5$ , de VII, 228 p. — Prix: £10.95. — Oxford University Press, Oxford, 1993.

This pioneering work is the first to explore ways of helping school-children understand the universality of mathematics. The authors offer suggestions and guidance for a multicultural approach. With technical mathematics kept to a minimum, their book will be of use to teachers, parents, and anyone interested or involved in education.

N.V. GOVOROV. — **Riemann's boundary problem with infinite index.** — Introduction, appendix and editing by I.V. Ostrovskii. — Operator theory, vol. 67. — Un vol. relié,  $17 \times 24$ , de XI, 252 p. — Prix: SFr. 148.00. — Birkhäuser Verlag, Basel, 1994.

In the first part of this monograph, the theory of analytic functions of completely regular growth in an angle is developed. The second part contains the theory of the Riemann boundary value problem with power type infinite index. The author gives complete and efficient solutions to the problem in various natural classes of analytic functions.

Aristide HALANAY, Vlad IONESCU. — **Time varying discrete linear systems: input-output operators, Riccati equations, disturbance attenuation.** — Un vol. relié,  $17 \times 24$ , de XI, 252 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1994.

This research monograph contains a study of discrete-time nodes, the discrete counterpart of the theory elaborated by Bart, Gohberg and Kaashoek for the continuous case, discrete-time Lyapunov and Riccati equations, discrete-time Hamiltonian systems in connection with input-output operators and associated Hankel and Toeplitz operators.

Izu VAISMAN. — **Lectures on the geometry of Poisson manifolds.** — Progress in mathematics, vol. 118. — Un vol. relié,  $16 \times 24$ , de VI, 205 p. — Prix: SFr. 78.00. — Birkhäuser Verlag, Basel, 1994.

The main subjects treated in this book are the Schouten-Nijenhuis bracket, the generalized Frobenius theorem, the basics of Poisson manifolds, Poisson calculus and cohomology, quantization, Poisson morphisms and reduction, realizations of Poisson manifolds by symplectic manifolds and by symplectic groupoids and Poisson-Lie groups. The book unifies terminology and notation.

**Holomorphic curves in symplectic geometry.** — Edited by Michèle Audin, Jacques Lafontaine. — Progress in mathematics, vol. 117. — Un vol. relié, 16 × 24, de xi, 328 p. — Prix: SFr. 98.00. — Birkhäuser Verlag, Basel, 1994.

This book is devoted to pseudo-holomorphic curve methods in symplectic geometry. It contains an introduction to symplectic geometry and relevant techniques of Riemannian geometry, proofs of Gromov's compactness theorem, an investigation of local properties of holomorphic curves, including positivity of intersections, and applications to Lagrangian embeddings problems.

**Integrable systems: The Verdier Memorial Conference.** — Actes du Colloque International de Luminy. — Edited by Olivier Babelon, Pierre Cartier, Yvette Kosmann-Schwarzbach. — Progress in mathematics, vol. 115. — Un vol. relié. 16 × 24, de xii, 357 p. — Prix: SFr. 168.00. — Birkhäuser, Boston, 1993.

The book contains 15 articles by the most eminent specialists in the theory of completely integrable systems, bringing together diverse approaches to classical and quantum integrable systems and covering the principal current research developments (Algebro-geometric methods and  $[\tau]$ -functions, Hamiltonian methods, solvable lattice models, topological field theory). The introduction surveys the evolution of the subject from Abel to the most recent developments and analyzes the contributions of J.-L. Verdier.

**Séminaire de théorie des nombres: Paris, 1991-92.** — Edited by Sinnou David. — Progress in mathematics, vol. 116. — Un vol. relié, 16 × 24, de 300 p. — Prix: SFr. 168.00. — Birkhäuser, Boston, 1993.

This is the thirteenth annual volume of papers based on the lectures given at the Séminaire de théorie des nombres, Paris, 1991-1992. Contributors: L. Denis, M. Flach, M. Kolster, B.E. Kunyavskii, M. Langevin, O. Lecacheux, F. Leprévost, M.C. Liu, K.M. Tsang, S. Louboutin, D.W. Masser, B.H. Matzat, Y. Nesterenko, E. Saias, P. Salberger, A.J. Scholl, D. Solomon.

**Algebraic methods in operator theory.** — Edited by Raul E. Curto, Palle E.T. Jorgensen. — Un vol. relié, 16,5 × 24, de vii, 360 p. — Prix: SFr. 158.00. — Birkhäuser, Basel, 1994.

For the reader's convenience, the articles in this book have been grouped into chapters on single operators and applications, nonselfadjoint algebras,  $C^*$ -algebras, von Neumann algebras and subfactor, representation of groups and algebras on Hilbert space, and geometry and topology.

Falko LORENZ. — **Algebraische Zahlentheorie.** — Un vol. broché, 16,5 × 24, de xii, 234 p. — Prix: DM 38.00. — B.I. Wissenschaftsverlag, Mannheim, 1993.

Im ersten Teil (Kap. 1-7) wird allgemeine Einführung in die algebraische Zahlentheorie gegeben. Das zentrale Kap. 5 schliesst mit dem Satz von Minkowski-Hensel, der sich gerade in jüngerer Zeit als bedeutsam erwiesen hat. Im zweiten Teil (Kap. 7-14) werden nun ein möglichst einfacher und direkter Weg zur Klassenkörpertheorie begangen und deren Grundzüge ausführlich dargestellt. Inbegriffen ist dabei auch der Funktionenkörperfall. Kap. 14 enthält Beiträge zur Theorie der Normenreste.

Rudolf FRITSCH. — **Der Vierfarbensatz: Geschichte, topologische Grundlagen und Beweisidee.** — Unter Mitarbeit von Gerda Fritsch. — Un vol. broché, 14,5 × 21, de 251 p. — B.I. Wissenschaftsverlag, Mannheim, 1994.

Beim Färben der Grafschaften auf einer Landkarte Englands stellte Francis Guthrie 1852 fest, dass man mit vier Farben auskommt, wenn man nur verlangt, dass Grafschaften mit gemeinsamer Grenzlinie verschieden gefärbt werden... Das Buch erzählt die Geschichte des Problems mit Kurzbiographien der handelnden Personen und erläutert die mathematischen Gedankengänge, die von der anschaulichen Fragestellung über die Präzisierung in der Begriffswelt der Topologie zur kombinatorischen Formulierung führen.

**MuPAD: Multi processing algebra data tool, tutorial.** — MuPAD Version 1.2. — Benno Fuchssteiner... *et al.* — Un vol. broché,  $17 \times 24$ , de v, 197 p. — Prix: SFr. 42.00. — Birkhäuser, Basel, 1994.

This tutorial gives an introduction to MuPAD, that is a parallel-processing general purpose computer algebra system. Special care in the development of MuPAD has been taken over modern interfaces (graphics tool, hypertext system, and interactive debugger). The system is available on Unix workstations as well as for computers of the Macintosh family. The tutorial encourages a user to get to know MuPAD through "learning by doing".

**Computational optimal control.** — Edited by R. Bulirsch, D. Kraft. — International Series of Numerical Mathematics, vol. 115. — Un vol. relié,  $17 \times 24$ , de vii, 282 p. — Prix: SFr. 128.00. — Birkhäuser, Basel, 1994.

This book collects the reviewed papers of the ninth IFAC Workshop on Control Applications of Optimization, which took place in Munich in September 1992. This volume reflects the state of the art in the application of finite and infinite dimensional optimization to open and closed loop control problems. Among the theoretical papers are contributions from nonlinear programming and optimal control.

B. PLOTKIN. — **Universal algebra, algebraic logic, and databases.** — Mathematics and its applications, vol. 272. — Un vol. broché,  $16,5 \times 25$ , de xv, 438 p. — Prix: Dfl. 320.00. — Kluwer Academic Publishers, Dordrecht, 1994.

This volume is devoted to the development of an algebraic model of databases. The first chapter presents a general introduction. The following sixteen chapters are divided into three main parts. Part I deals with various aspects of universal algebra. Part II deals with different approaches to the algebraization of predicate calculi. Part III is concerned specifically with the algebraic model of databases, which considers the database as an algebraic structure.

**The legacy of Hans Freudenthal.** — Edited by Leen Streefland. — Un vol. relié,  $16,5 \times 25$ , 164 p. — Prix: Dfl. 100.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This book pays homage to Freudenthal and his work on mathematics, its history and education. Almost all authors were his scholars or co-workers. Freudenthal contributed a wealth of ideas and conceptual tools to the development of mathematics education, e.g. on contexts, didactical phenomenology, guided reinvention, mathematisation, the constitution of mental objects, the development of reflective thinking, etc...

Daniel REVUZ. — **Mesure et intégration.** — Collection Méthodes. — Un vol. broché,  $15 \times 22$ , de xi, 212 p. — Prix: FF 150.00. — Hermann, Paris, 1994.

Issu d'un cours de licence professé, pendant plusieurs années à l'Université de Paris VII, ce livre vise à présenter la théorie imaginée par Lebesgue au début du siècle, théorie indispensable à l'analyse harmonique, la théorie ergodique, les probabilités, etc. Bien que privilégiant l'aspect «mesure abstraite», ce livre traite aussi des mesures de Radon et accorde à la mesure de Lebesgue la place qui lui est due.