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## BULLETIN BIBLIOGRAPHIQUE

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Zahari ZLATEV. — **Computational methods for general sparse matrices.** — Mathematics and its applications, vol. 65. — Un vol. relié,  $16,5 \times 24,5$ , de XIX, 328 p. — Prix: Dfl. 185.00/US\$99.00/£62.00. — Kluwer Academic Publishers, Dordrecht, 1991.

The usual approach adopted in the treatment of sparse matrices is to consider either direct methods or iterative methods. This volume attempts to build a bridge between these methods. The first part (Chapters 1-3) reviews and discusses some common principles concerning the treatment of sparsity. The second part (Chapters 4-11) studies how sparsity can be exploited in the solution of linear algebraic equations. This part concludes with a description and testing of parallel methods for sparse matrices. The third part (Chapters 12-16) is devoted to orthogonalization methods and their use in the solution of large linear least squares problems.

C.A. MARINOV, P. NEITTAANMAEKI. — **Mathematical models in electrical circuits : theory and applications.** — Mathematics and its applications, vol. 66. — Un vol. relié,  $16,5 \times 24,5$ , de X, 160 p. — Prix: Dfl. 120.00/US\$66.50/£40.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This book deals with the mathematical modelling of electrical and electronic circuits. On the one hand, efficient mathematical tools developed in functional analysis, the study of differential equations, and numerical analysis are brought to bear on solving problems of circuit theory. On the other hand, new models are offered which derive from the engineering of integrated circuits — a field in rapid progress. Chapter I introduces the mathematics employed, the following chapters deal with lumped parameter circuits (Chapter II), “infinite” circuits (Chapter III), and mixed type circuits (Chapters IV-VI).

V.N. FOMIN. — **Discrete linear control systems.** — Mathematics and its applications, Soviet series, vol. 67. — Un vol. relié,  $16,5 \times 24,5$ , XIII, 302 p. — Prix: Dfl. 220.00/US\$134.00/£75.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume deals with various topics of modern control theory. Emphasis is placed on the investigation of linear systems and quadratic criteria in a discrete time domain. Control, with or without noise, with complete or partial information, and other cases are discussed. Major attention is paid to the foundation of adaptive control techniques and analysis is presented using well-known recursive algorithms such as the Kalman-Bucy filter for stochastic approximation. New results are also discussed.

John E. GILBERT, Margaret A.M. MURRAY. — **Clifford algebras and Dirac operators in harmonic analysis.** — Cambridge studies in advanced mathematics, vol. 26. — Un vol. relié,  $15,5 \times 23,5$ , de VI, 334 p. — Prix: £37.50/US\$75.00. — Cambridge University Press, Cambridge, 1991.

The aim of this book is to unite the seemingly disparate topics of Clifford algebras, analysis on manifolds and harmonic analysis. The authors show how algebra, geometry and differential

equations all play a more fundamental role in Euclidean Fourier analysis than has been fully realised before. Their presentation of the Euclidean theory then links up naturally with the representation theory of semi-simple Lie groups. The book will be accessible to graduate students, yet researchers will also appreciate the wealth of new results and insights made available here for the first time.

**Statistical inference : theory and practice.** — Edited by Tadeusz Bromek and Elzbieta Pleszczyńska. — Theory and decision library, Series B, Mathematical and statistical methods, vol. 17. — Un vol. relié,  $16,5 \times 24,5$ , de ix, 311 p. — Prix: Dfl. 285.00/US\$ 165.00/£99.00. — Kluwer Academic Publishers, Dordrecht, 1991.

The book deals with selected ideas and schemes of statistical inference which are of considerable value in practice. Stress has been laid upon problems of observability and of reducing the information on the empirical phenomena investigated. The whole subject has been treated in a rather unconventional manner. One of the aims of the book is to present the discrepancy which exists between the simplicity and elegance of the theory and the intricacy of real problems. The book may also be regarded as source of unconventional and diversified examples which can be used in teaching and in studying statistics.

Pierre WOLPER. — **Introduction à la calculabilité.** — Un vol. broché,  $15,8 \times 23$ , de 268 p. — Prix: FF 150.00. — InterEditions, Paris, 1991.

Introduction. — Les automates finis. — Les grammaires régulières. — Automates à pile et langages hors-contexte. — Les machines de Turing. — Les fonctions récursives. — La non-calculabilité. — La complexité. — Si ce livre constitue avant tout un cours destiné aux étudiants informaticiens, à qui il propose de nombreux exercices, il s'adresse tout aussi bien aux professionnels désireux de mieux comprendre cette science fondamentale qu'est la théorie de la calculabilité, pour l'ensemble de l'informatique.

Michel LEDOUX, Michel TALAGRAND. — **Probability in Banach spaces: isoperimetry and processes.** — Ergebnisse der Mathematik und ihrer Grenzgebiete, 3. Folge, Band 23. — Un vol. relié,  $17 \times 24,5$ , de xii, 480 p. — Prix: DM 164.00. — Springer-Verlag, Berlin, 1991.

New isoperimetric inequalities and random process techniques have recently appeared at the basis of the modern understanding of probability in Banach spaces. Based on these tools, the book presents a complete treatment of the main aspects of probability in Banach spaces (boundedness and continuity of random processes, integrability and limit theorems for vector valued random variables,...) and some of their links to geometry of Banach spaces. In particular, the most important features are the systematic use of isoperimetry and related concentration of measure phenomena (to study integrability and limit theorems for vector valued random variables), and recent abstract random process techniques (entropy and majorizing measures). Some examples of these probabilistic ideas to classical Banach space theory complete this exposition.

**Complex analysis.** — Proceedings of the International Workshop, Wuppertal, 1990, dedicated to H. Grauert. — Edited by Klas Diederich. — Aspects of mathematics, E17. — Un vol. relié,  $16,5 \times 23$ , de ix, 341 p. — Prix: DM 89.00. — Friedr. Vieweg, Braunschweig, 1991.

The "International Workshop Complex Analysis" was held in Wuppertal (Germany) from February 12 to 16, 1990 in honour of H. Grauert, one of the most creative mathematicians in complex analysis of the century. In complete accordance with the width of the work of Grauert, these proceedings contain 49 articles, mostly research notes, from all areas of complex analysis

by many important mathematicians. The main subjects are: Cauchy-Riemann equations and CR structures, convexity, deformation theory, envelopes of holomorphy, function algebras, group actions in the complex domain, Hodge theory, instantons, Kähler geometry, Lefschetz theorems, holomorphic mappings, Nevanlinna theory, singularities, twistor theory, uniformization.

Helga BAUM, Thomas FRIEDRICH, Ralf GRUNEWALD, Ines KATH. — **Twistors and Killing spinors on Riemannian manifolds.** — Teubner-Texte zur Mathematik, Band 124. — Un vol. broché, 14,5 × 20,5, de 180 p. — Prix: DM 29.00. — B.G. Teubner, Stuttgart, 1991.

From the preface: "This book is devoted to the so-called Killing and twistor spinors, special kinds of spinors on Riemannian manifolds appearing in mathematical physics as well as in a purely mathematical context." — Contents: An introduction to Killing and twistor spinors. — The properties of twistor spinors. — A survey of twistor theory. — Odd-dimensional Riemannian manifolds with real Killing spinors. — Even-dimensional Riemannian manifolds with real Killing spinors. — Manifolds with parallel spinor fields. — Riemannian manifolds with imaginary Killing spinors.

Manfred STERN. — **Semimodular lattices : dedicated to Garrett Birkhoff.** — Teubner-Texte zur Mathematik, Band 125. — Un vol. broché, 14,5 × 20,5, de 180 p. — Prix: DM 29.00. — B.G. Teubner, Stuttgart, 1991.

From the preface: "In the present text I have tried to incorporate some recent results into the well-known body of results. The text consists of four chapters, the first three of which deal almost exclusively with lattices of finite length, whereas the fourth chapter deals mostly with one important class of semimodular lattices of infinite length. Throughout the text I have included sections (sometimes in a more or less informal way) to indicate connections with other topics and objects outside of lattice theory."

**Algebraic computing with REDUCE.** — Lecture notes from the first Brazilian School on Computer Algebra, vol. 1. — Edited by Malcolm A.H. MacCallum and Francis J. Wright. — Un vol. broché, 15,5 × 23,5, de xx, 294 p. — Prix: £ 15.00. — Clarendon Press, Oxford, 1991.

REDUCE is one of the most widely available and simple to use computer algebra systems. It enables users to manipulate complex algebraic expressions and equations symbolically... This book provides a comprehensive introduction to REDUCE from starting to run it through to using some of the user-contributed REDUCE packages written for specific applications. Throughout, numerous exercises are provided to illustrate themes covered in the text, as well as to encourage "hands on" working with REDUCE.

John M. HOWIE. — **Automata and languages.** — Un vol. broché, 15,5 × 23,5, de x, 294 p. — Prix: £ 15.00. — Clarendon Press, Oxford, 1991.

Theoretical models of simple computing machines, known as automata, play a central role in theoretical computer science. This textbook presents an introduction to the theory of automata and to their connections with the study of languages. At the heart of the book is the notion that by considering a language as a set of words it is possible to construct automata which "recognize" words in the language. Consequently one can generate a correspondence between a hierarchy of machines and a corresponding hierarchy of grammars and languages.

Tammo tom DIECK. — **Topologie.** — De Gruyter Lehrbuch. — Un vol. broché, 23 × 15,5, de ix, 401 p. — Prix: DM 98.00 (relié)/DM 58.00 (broché). — Walter de Gruyter, Berlin, 1991.

Das vorliegende Lehrbuch bietet eine Einführung in das Gesamtgebiet der Topologie. Je ein Kapitel widmet der Autor der grundlegenden Gegenständen der Topologie: Mannigfaltigkeiten, Zellenkomplexe und Bündel. Die weiteren Kapitel erläutern die wesentlichen algebraischen und geometrischen Methoden und Begriffe: Homotopie, Homologie und Kohomologie, Bordismus. Klassische Themen wie Umlauf- und Windungszahlen, Schnitt- und Verschlingungszahlen, Euler-Charakteristik, Abbildungsgrad sowie die Klassifikation der Flächen und Ueberlagerungen werden ebenfalls ausführlich behandelt.

Siegfried PROESSDORF, Bernd SILBERMANN. — **Numerical analysis for integral and related operator equations.** — Operator theory: advances and applications, vol. 52. — Un vol. relié,  $17 \times 24$ , de 524 p. — Prix: SFr. 228.00. — Birkhäuser, Basel, 1991.

This book presents some recent developments in numerical analysis for important classes of integral and pseudodifferential equations. Special attention is given to one-dimensional singular integral equations, and pseudodifferential equations on Lyapunov curves. The approximation methods considered incorporate finite section methods, polynomial approximation methods, quadrature methods and a variety of spline approximation methods. The approach to the matter is based upon ideas of functional analysis.

V.K. KHARCHENKO. — **Automorphisms and derivations of associative rings.** — Mathematics and its applications, Soviet series, vol. 69. — Un vol. relié,  $16,5 \times 20$ , de xiv, 385 p. — Prix: Dfl. 260.00/US\$144.00/£88.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume presents a comprehensive overview of the methods and results of the theory of automorphisms and derivations of associative rings. Among the problems discussed are the following : construction of a Galois theory for prime and semiprime rings and its application to domains and free algebras; investigation of the problems of the algebraic dependence of automorphisms and derivations; studies of the fixed rings for finite groups and rings of constants for differential Lie algebras acting on the rings; non-commutative invariants of linear groups; theorems of finite groups acting on modular lattices; actions of Hopf algebras.

L. SAULIS and V.A. STATULEVICIUS. — **Limit theorems for large deviations.** — Mathematics and its applications, Soviet series, vol. 73. — Un vol. relié,  $16,5 \times 20$ , de vi, 232 p. — Prix: Dfl. 160.00/US\$88.00/£54.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This book is devoted to the investigation of probabilities of large deviations for sums of independent and dependent random variables, polynomial forms, multiple stochastic integrals of stochastic processes and fields and some statistics. Theorems on large deviations for these functionals are proved by the cumulant method which was essentially developed by the authors of this monograph. It is shown that mixed cumulants of random process, which are correlation functions of the corresponding order, can be estimated simply and precisely by various mixing functions.

A.M. SAMOILENKO. — **Elements of the mathematical theory of multi-frequency oscillations.** — Mathematics and its applications, Soviet series, vol. 71. — Un vol. relié,  $16,5 \times 20$ , de xvi, 313 p. — Prix: Dfl. 260.00/US\$142.00/£88.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume deals with the theory of multi-frequency oscillations as a motion of a dynamical system which describes a recurrent trajectory on an invariant toroidal manifold of the system. In this way, the invariant toroidal manifold becomes the main subject of the theory and the existence of such manifold is a sufficient condition for the existence of multi-frequency

oscillations of the system. — Contents: Periodic and quasi-periodic functions. Invariant sets and their stability. Some problems of the linear theory. Perturbation theory of an invariant torus of a nonlinear system.

A.Yu. OL'SHANSKII. — **Geometry of defining relations in groups.** — Mathematics and its applications, Soviet series, vol. 70. — Un vol. relié,  $16,5 \times 20$ , de xvi, 505 p. — Prix: Dfl. 340.00/US\$ 185.00/£ 115.00. — Kluwer Academic Publishers, Dordrecht, 1991.

The main feature of this book is a systematic application of elementary geometric and topological techniques for solving problems that arise naturally in algebra. After an account of preliminary material, there is a discussion of a geometrically intuitive interpretation of the derivation of consequences of defining relation in groups. A study is made of planar and certain other two-dimensional maps connected with well-known problems such as the problems of Burnside and O.Yu. Schmidt.

Carlos A. BERENSTEIN, Roger GAY. — **Complex variables: an introduction.** — Graduate texts in mathematics, vol. 125. — Un vol. relié,  $16 \times 24$  de xii, 650 p. — Prix: DM 128.00. — Springer-Verlag, New York, 1991.

This text gives an overview of the basic properties of holomorphic functions of one complex variable. Topics studied include a detailed description of differential forms, homotopy theory, homology theory, as the analytic properties of holomorphic functions, the solvability of the inhomogenous Cauchy-Riemann equation with emphasis on the notation of compact families, the theory of growth of subharmonic functions, and an introduction to the theory of sheaves, covering spaces and Riemann surfaces. A large number of exercises have been included.

**Estimation and control of distributed parameter systems.** — Proceedings of an International Conference on Control and Estimation of Distributed Parameter Systems, Vorau, July 8-14, 1990. — Edited by W. Desch, F. Kappel, K. Kunisch. — International series of numerical mathematics, vol. 100. — Un vol. relié,  $17 \times 24$ , de xi, 389 p. — Prix: SFr. 118.00. — Birkhäuser, Basel, 1991.

This volume comprises 27 articles which were presented at the conference. They cover a wide spectrum of novel research topics in linear and nonlinear control and in the area of parameter estimation and inverse problems. The following are representative topics covered in the papers, all of which were subject to a refereeing process : control of systems governed by nonlinear state equations, parameter estimation and inverse problems, numerical treatment of control problems, feedback control, the Hamilton-Jacobi equation, and homogenization theory.

Kjeld Knudsen JENSEN, Klaus THOMSEN. — **Elements of KK-theory.** — Mathematics: theory and applications. — Un vol. relié,  $16 \times 24$ , de viii, 202 p. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1991.

This is a book about fundamentals of KK-theory: the Kasparov groups and their functionality in relation to the Kasparov product. The existing pictures of KK-theory are described in detail and their equivalence with all arguments exposed and explained. By keeping the prerequisites to a minimum it provides an introduction to the subject which can be read by researchers in the mathematical areas where KK-theory enters, as well as graduate students with a basic knowledge of  $C^*$ -algebras and operators theory. In this way the book opens the gates to this mathematical theory with applications far beyond the basis from which it is developed.

Alte SELBERG. — **Collected papers, vol. 2.** — Un vol. relié,  $17 \times 25$ , de VIII, 253 p. — Prix: DM 138.00. — Springer-Verlag, Berlin, 1991.

Alte Selberg is renowned for his profound work in number theory and other branches of mathematics, highlighted, perhaps, by his powerful trace formula. He is also known for the important lectures and papers that he has never published. With volume 2 of Selberg's collected papers, these unpublished works become widely available for the first time. This collection will fill a longstanding gap in the literature.

Reinhold REMMERT. — **Theory of complex functions.** — Translated by Robert B. Burckel. — Graduate texts in mathematics, vol. 122. — Readings in mathematics. — Un vol. relié,  $16,5 \times 24$ , de XIX, 453 p. — Prix: DM 118.00. — Springer-Verlag, New York, 1991.

The material from function theory, up to the residue calculus, is developed in a lively style, well motivated throughout by examples and practice exercises. Additionally, there is ample discussion of the historical evolution of the theory, biographical sketches of important contributors, and citations from their classical works. In fact, even experts will find here few new or long forgotten gems, like Eisenstein's novel approach to the circular functions.

Stanislaw ŁOJASIEWICZ. — **Introduction to complex analytic geometry.** — Translated from the Polish by Maciej Klimek. — Un vol. relié,  $17,5 \times 24$ , de XIV, 523 p. — Prix: SFr. 168.00. — Birkhäuser Verlag, Basel, 1991.

The subject of this book is analytic geometry, understood as the geometry of analytic sets (or more generally, analytic spaces), i.e. sets described locally by systems of analytic equations. Some results presented are already part of the classical tool-kit of workers in analytic and algebraic geometry and in analysis (the theorems of Chevalley on constructible sets, of Remmert-Stein on removable singularities... etc.). The author's intention is to give the reader access to complete proofs without the need to rely on so-called "well-known" facts.

**Nonlinear synthesis.** — Proceedings of a IIASA Workshop, held in Sopron, Hungary, June 1989. — Edited by Christopher I. Byrnes and Alexander Kurzhansky. — Progress in systems and control theory, vol. 9. — Un vol. relié,  $16 \times 24$ , de VIII, 304 p. — Prix: SFr. 128.00. — Birkhäuser, Boston, 1991.

The interested reader of this selection of fully developed and reviewed conference papers will find some original contributions to controlled invariance using viability theory, to the control of nonlinear sampled-data systems, to control synthesis for uncertain systems, to differential games, to feedback stabilization of nonlinear systems, to identification and filtering, as well as some recent advances in the regulation and optimal control of nonlinear systems. In addition, three papers on motion and trajectory control for rigid and flexible robots illustrate the application of new control techniques.

**Computation and control II.** — Proceedings of the 2nd Bozeman Conference, Bozeman, Montana, August 1-7, 1990. — Edited by K.L. Bowers, J. Lund. — Progress in systems and control theory, vol. 11. — Un vol. relié,  $16 \times 24$ , de X, 369 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1991.

This volume contains a representative cross section of the interdisciplinary blend of analytic and numerical techniques that often occur between advanced control design and practical numerical solution of lumped and distributed parameter systems. Addressing both linear and

nonlinear aspects of computation and control, this volume will be a valuable resource to systems and control engineers as well as to the computationalists who wish to enhance and expand their tool-box of numerical techniques.

Claudio BARTOCCI, Ugo BRUZZO and Daniel HERNANDEZ-RUIPEREZ. — **The geometry of supermanifolds.** — Mathematics and its applications, vol. 71. — Un vol. relié,  $16,5 \times 24,5$ , de XIX, 242 p. — Prix: Dfl. 140.00/US\$ 77.00/£48.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This book presents a detailed analysis of the foundations of supermanifold theory. The approach followed, which is a modification of the DeWitt-Rogers approach, allows for a straightforward and consistent development of the basic geometry of these objects. Contents: Elements of graded algebra. Sheaves and cohomology. Categories of supermanifolds. Basic geometry of  $G$ -supermanifolds. Cohomology of supermanifolds. Geometry of super vector bundles. Lie supergroups and principal super fibre bundles.

Hans DELFS. — **Homology of locally semialgebraic spaces.** — Lecture notes in mathematics, vol. 1484. — Un vol. broché,  $16,5 \times 24$ , de VIII, 136 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

This book contributes to the fundamental theory of semialgebraic topology and falls into two main parts. The first deals with sheaves and their cohomology on spaces which locally look like a constructible subset of a real spectrum. In the second part a homology theory for locally complete locally semialgebraic spaces over a real closed field is developed, the semialgebraic analogue of classical Borel-Moore-homology. Topics include fundamental classes of manifolds and varieties, Poincaré duality, extensions of the base field and a comparison with the classical theory.

Jan CHABROWSKI. — **The Dirichlet problem with  $L^2$ -boundary data for elliptic linear equations.** — Lecture notes in mathematics, vol. 1482. — Un vol. broché,  $16,5 \times 24$ , de VI, 173 p. — Prix: DM 31.00. — Springer-Verlag, Berlin, 1991.

In the last decade the Dirichlet problem with  $L^2$ -boundary data has attracted the attention of several mathematicians. The significant features of this recent research are the use of weighted Sobolev spaces, existence results for elliptic equations under very weak regularity assumptions on coefficients, energy estimates involving  $L^2$ -norm of a boundary data and the construction of a space larger than the usual Sobolev space  $W^{1,2}$  such that every  $L^2$ -function on the boundary of a given set is the trace of a suitable element of this space.

Eduard REITHMEIER. — **Periodic solutions of nonlinear dynamical systems: numerical computation, stability, bifurcation and transition to chaos.** — Lecture notes in mathematics, vol. 1483. — Un vol. broché,  $16,5 \times 24$ , de VI, 171 p. — Prix: DM 31.00. — Springer-Verlag, Berlin, 1991.

Limit cycles or, more generally, periodic solutions of nonlinear dynamical systems occur in many different fields of application. The bifurcation behavior of periodic solutions by means of parameter variations plays an important role in transition to chaos, so numerical algorithms are necessary to compute periodic solutions and investigate their stability on a numerical basis. From the technical point of view, dynamical systems with discontinuities are of special interest. Periodic solutions of dynamical systems with discontinuities have never really been closely investigated, either in application or in theory. This is done in this book.

Guy DAVID. — **Wavelets and singular integrals on curves and surfaces.** — Lecture notes in mathematics, vol. 1465. — Un vol. broché,  $16,5 \times 24$ , de x, 107 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

The book begins with an introduction to the theory of wavelets and limits itself to the detailed construction of various orthonormal bases of wavelets. A second part centers on a criterion for the  $L^2$ -boundedness of singular integral operators. It contains a full proof of  $T(b)$ -theorem, and a few of the most striking applications. The third part is a survey of recent attempts to understand the geometry of subsets of  $\mathbf{R}^n$  on which analogues of the Cauchy kernel define bounded operators.

**Singularity theory and its applications, Warwick 1989, Part I: Geometric aspects of singularities, Part II: Singularities, bifurcations and dynamics.** — Edited by D. Mond and J. Montaldi (Part I), M. Roberts and I. Stewart (Part II). — Lecture notes in mathematics, vol. 1462 and 1463. — Deux vol. brochés,  $16,5 \times 24$ , de VIII, 408 p. et de VIII, 320 p. respectivement. — Prix: DM 72.00 (Part I), DM 55.00 (Part II). — Springer-Verlag, Berlin, 1991.

A workshop on singularities, bifurcation and dynamics was held at Warwick in July 1989 as part of a year-long symposium on singularity theory and its applications. Volume 1 of the proceedings is mainly devoted to connections with algebraic geometry, and volume 2 to connections with dynamical systems theory, bifurcation theory, and applications in the sciences. The papers are original research. All have been refereed. The main topic, deformation theory, is represented by several papers on descriptions of the bases of versal deformations, and several more on descriptions of the generic fibres. Other topics include stratifications, and applications to differential geometry.

Renate SCHAAF. — **Global solution branches of two point boundary value problems.** — Lecture notes in mathematics, vol. 1458. — Un vol. broché,  $16,5 \times 24$ , de XIX, 141 p. — Prix: DM 30.00. — Springer-Verlag, Berlin, 1990.

Introduction. — Dirichlet branches bifurcation from zero. — Neumann problems, period maps and semilinear Dirichlet problems. — Generalizations. — General properties of time maps. — Appendix: Some remarks on the computer plots of time maps.

Dan TIBA. — **Optimal control of nonsmooth distributed parameter systems.** — Lecture notes in mathematics, vol. 1459. — Un vol. broché,  $16,5 \times 24$ , de VII, 159 p. — Prix: DM 30.00. — Springer-Verlag, Berlin, 1990.

The book is devoted to the study of distributed control problems governed by various nonsmooth state systems. The main questions investigated include: existence of optimal pairs, first order optimality conditions, state-constrained systems, approximation and discretization, bang-bang and regularity properties for optimal control. Some prerequisites relating to convex analysis, nonlinear operators and partial differential equations are collected in the first chapter or are supplied appropriately in the text.

Rudolf GORENFLO, Sergio VESSELLA. — **Abel integral equations : analysis and applications.** — Lecture notes in mathematics, vol. 1461. — Un vol. broché,  $16,5 \times 24$ , de VII, 214 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1991.

Basic theory and representation formulas. — Applications of Abel's original integral equation. — Applications of a transformed Abel integral equation. — Smoothing properties of the Abel operators. — Existence and uniqueness theorems. — Relations between the Abel

transform and other integral transforms. — Nonlinear Abel integral equations of second kind. — Illposedness and stabilization of linear Abel integral. — On numerical treatment of first kind Abel integral equations.

Alexey A. PANCHISHKIN. — **Non-Archimedean  $L$ -functions of Siegel and Hilbert modular forms.** — Lecture notes in mathematics, vol. 1471. — Un vol. broché,  $16,5 \times 24$ , de VII, 157 p. — Prix: DM 31.00. — Springer-Verlag, Berlin, 1991.

The main subject of the book is arithmetic of zeta functions of automorphic forms. More precisely, it looks at  $p$ -adic properties of the special values of these functions. For the Riemann-zeta function this goes back to the classical Kummer congruences for Bernoulli numbers and their  $p$ -adic interpretation given by Kubota/Leopoldt and Mazur. Using the technique of  $p$ -adic integration and the Rankin convolution method we construct the  $p$ -adic analytic continuation of the standard zeta functions of Siegel and modular forms and of the convolutions of Hilbert modular forms.

Ryszard JAJTE. — **Strong limit theorems in noncommutative  $L_2$ -spaces.** — Lecture notes in mathematics, vol. 1477. — Un vol. broché,  $16,5 \times 24$ , de X, 113 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

The noncommutative versions of fundamental classical results on the almost sure convergence in  $L_2$ -spaces are discussed: individual ergodic theorems, strong laws of large numbers, theorems on convergence of orthogonal series, of martingales of powers of contractions etc. The proofs introduce new techniques in von Neumann algebras. The reader is assumed to master the fundamentals of functional analysis and probability.

M. BEKKALI. — **Topics in set theory : Lebesgue measurability, large cardinals, forcing axioms, Rho-functions.** — Lecture notes in mathematics, vol. 1476. — Un vol. broché,  $16,5 \times 24$ , de VII, 120 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

During the Fall semester of 1987, Stevo Todorcevic gave a series of lectures at the University of Colorado. These notes of the course, taken by the author, give a novel and fast exposition of four chapters of set theory. The first two chapters are about the connection between large cardinals and Lebesgue measure. The third is on forcing axioms such as Martin's axiom or the proper forcing axiom. The fourth chapter looks at the method of minimal walks and  $p$ -functions and their applications.

Yoshiyuki HINO, Satoru MURAKAMI, Toshiki NAITO. — **Functional differential equations with infinite delay.** — Lecture notes in mathematics, vol. 1473. — Un vol. broché,  $16,5 \times 24$ , de X, 317 p. — Prix: DM 55.00. — Springer-Verlag, Berlin, 1991.

In the theory of functional differential equations with infinite delay, there are several ways to choose the space of initial functions (phase space); and diverse (duplicated) theories arise, according to the choice of phase space. To unify the theories, an axiomatic approach has been taken since the 1960's. This book is intended as a guide for the axiomatic approach to the theory of equations with infinite delay and a culmination of the results obtained in this way. It can also be used as a textbook for a graduate course. The prerequisite knowledge is foundations of analysis including linear algebra and functional analysis.

Torben T. NIELSEN. — **Bose algebras : the complex and real wave representations.** — Lecture notes in mathematics, vol. 1472. — Un vol. broché,  $16,5 \times 24$ , de V, 132 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

The mathematics of Bose-Fock spaces is built on the notion of a commutative algebra. The well-known complex and real wave representations appear here as natural consequences of the basic mathematical structure — a mathematician familiar with category theory will regard these representations as functors. Operators generated by creations and annihilations in a given Bose algebra are shown to give rise to a new Bose algebra of operators yielding the Weyl calculus of pseudo-differential operators.

Wolfgang M. SCHMIDT. — **Diophantine approximations and diophantine equations.** — Lecture notes in mathematics, vol. 1467. — Un vol. broché,  $16,5 \times 24$ , de VIII, 217 p. — Prix: DM 39.00. — Springer-Verlag, Berlin, 1991.

This book by a leading researcher and masterly expositor of the subject studies diophantine approximations to algebraic numbers and their applications to diophantine equations. The methods are classical, and the results stressed can be obtained without much background in algebraic geometry. In particular, Thue equations, norm form equations and  $S$ -unit equations, with emphasis on recent explicit bounds on the number of solutions, are included. The book will be useful for graduate students and researchers.

Katsuo KAWAKUBO. — **The theory of transformation groups.** — Un vol. relié,  $16 \times 24$ , de x, 338 p. — Prix: £45.00. — Oxford University Press, Oxford, 1991.

The aim of this book is to present an introduction to the theory of transformation groups which will be suitable for all those coming to the subject for the first time. The emphasis is on the study of topological groups and, in particular, the study of compact Lie groups acting on manifolds. Throughout, much care is taken to illustrate concepts and results with examples and applications. Numerous exercises are also included to further extend a reader's understanding and knowledge. Prerequisites are a familiarity with algebra and topology as might have been acquired from an undergraduate degree in mathematics.

Nicolas BOULEAU, Francis HIRSCH. — **Dirichlet forms and analysis on Wiener space.** — De Gruyter studies in mathematics, vol. 14. — Un vol. relié,  $17,5 \times 24,5$ , de x, 325 p. — Prix: DM 128.00/US\$69.00. — Walter de Gruyter, Berlin, 1991.

This book presents an introduction to the ideas, phenomena, and methods of analysis in infinite-dimensional spaces, in particular Wiener spaces, and stochastic differential equations. Emphasis is led upon the interaction between two important tools: the Malliavin calculus and the theory of Dirichlet forms and spaces. The text introduces the reader to an important subject of current research and is accessible to advanced undergraduate or graduate students. It is also of interest to researchers because it contains many recent and new results, some of which appear here for the first time.

Peter KOSMOL. — **Optimierung und Approximation.** — De Gruyter Lehrbuch. — Un vol. broché,  $15,5 \times 23$ , de XIV, 394 p. — Prix: DM 58.00 (relié: DM 88.00). — Walter de Gruyter, Berlin, 1991.

Dieses Buch bietet eine Einführung in die wichtigsten Grundbegriffe und Fragestellungen der Optimierungs- und Approximationstheorie. Neben der Grundlagen der linearen und nicht-linearen Optimierung werden Steuerungstheorie, Variationsrechnung, Approximationstheorie sowie Anwendungen in der Statistik behandelt. Besonderer Wert wird auf möglichst einfache und durchsichtige Beweise gelegt, die zugleich eine geometrische Anschauung erlauben. Zahlreiche Übungsaufgaben und Beispiele zeigen Anwendungen auf und dienen dazu, den Stoff zu motivieren und zu erläutern.

Peter DEUFLHARD, Andreas HOHMANN. — **Numerische Mathematik : eine algorithmisch orientierte Einführung.** — De Gruyter Lehrbuch. — Un vol. broché,  $15,5 \times 23$ , de xv, 339 p. — Prix: DM 42.00 (relié: DM 82.00). — Walter de Gruyter, Berlin, 1991.

Das Buch ist eine elementare Einführung in die Grundlagen und Methoden der modernen Numerik, die heute aufgrund des Einsatzes von Hochleistungsrechnern und der Verwendung von immer komplexeren Algorithmen als Teildisziplin des Scientific Computing (Wissenschaftliches Rechnen) verstanden wird. Dieser Entwicklung trägt das Buch in Stoffauswahl und Darstellungsweise Rechnung. Es ist elementar in dem Sinne, dass die wesentlichen Konzepte und Anwendungen jeweils am einfachsten Problemtyp behandelt werden. Inhaltlich schliesst das Buch an die Grundvorlesungen über Analysis und Lineare Algebra an.

**Séminaire de probabilités XXV.** — J. Azéma, P.A. Meyer, M. Yor, eds. — Lecture notes in mathematics, 1485. — Un vol. broché,  $16,5 \times 24$ , de viii, 440 p. — Prix: DM 72.00. — Springer-Verlag, Berlin, 1991.

From the contents: C. Dellacherie: Théorie non linéaire du potentiel: un principe unifié de domination et du maximum et quelques applications. — M. Emery: Quelques cas de représentation chaotique. — K.R. Parthasarathy: Realisation of a class of Markov processes through unitary evolutions in Fock space. — P.A. Meyer: Application du «bébé Fock» au modèle d'Ising. — P.A. Meyer, J.A. Yan: Les fonctions caractéristiques des distributions sur l'espace de Wiener. — S. Kawabata, T. Yamada: On Newton's method for stochastic differential equations... etc.

Eberhard FREITAG. — **Singular modular forms and theta relations.** — Lecture notes in mathematics, vol. 1487. — Un vol. broché,  $16,5 \times 24$ , de vi, 172 p. — Prix: DM 31.00. — Springer-Verlag, Berlin, 1991.

This research monograph reports on recent work on the theory of singular Siegel modular forms of arbitrary level. Singular modular forms are represented as linear combinations of theta series. The reader is assumed to know only the basic theory of Siegel modular forms.

Alexander MIELKE. — **Hamiltonian and Lagrangian flows on center manifolds : with applications to elliptic variational problems.** — Lecture notes in mathematica, vol. 1489. — Un vol. broché,  $16,5 \times 24$ , de x, 140 p. — Prix: DM 26.00. — Springer-Verlag, Berlin, 1991.

From the preface: "It is the aim of this work to establish connections between three fields which seem only loosely related from the usual point of view. These fields are described by the following terms: Hamiltonian and Lagrangian systems, center manifold reduction, and elliptic variational problems... Here we want to consider just one facet at the intersection of all three fields, namely the implications of center manifold theory to the study of variational problems. The main tool for the analysis is the Hamiltonian point of view."

Klaus METSCH. — **Linear spaces with few lines.** — Lecture notes in mathematics, vol. 1490. — Un vol. broché,  $16,5 \times 24$ , de xiii, 196 p. — Prix: DM 39.00. — Springer-Verlag, Berlin, 1991.

A famous theorem in the theory of linear spaces states that every finite linear space has at least as many lines as points. This result of De Bruijn and Erdős led to the conjecture that every linear space with "few lines" can be obtained from a certain projective plane by changing only a small part of its structure. Many results related to this conjecture have been proved in the last

twenty years. This monograph surveys the subject, presents several new results, such as the recent proof of the Dowling-Wilson conjecture. Typical methods used in combinatorics are developed.

T.Y. LAM. — **A first course in noncommutative rings.** — Graduate texts in mathematics, vol. 131. — Un vol. relié,  $16 \times 24$ , de xv, 397 p. — Prix: DM 86.00. — Springer-Verlag, Berlin, 1991.

This text is an outgrowth of the author's lectures at the University of California at Berkeley. The material covered includes the Wedderburn-Artin theory of semisimple rings, Jacobson theory of the radical, representation theory of groups and algebras, prime and semiprime rings, primitive and semiprimitive rings, division rings, ordered rings, local and semilocal rings, and perfect and semiperfect rings. The author has stressed the role of examples and motivation by aiming his writing at the novice level rather than the connoisseur level. Numerous exercises testing the understanding of the general theory in the text are also included.

**Partial differential equations III : the Cauchy problem. Qualitative theory of partial differential equations.** — Edited by Yu. V. Egorov, M.A. Shubin. — Encyclopaedia of mathematical sciences, vol. 32. — Un vol. relié,  $16 \times 24$ , de vii, 197 p. — Prix: DM 136.00. — Springer-Verlag, Berlin, 1991.

Two general questions regarding partial differential equations are explored in detail. The first is the Cauchy problem, and its attendant question of well-posedness (or correctness). The authors address this question in the context of PDEs with constant coefficients and more general convolution equations, and extend a number of these results to equation with variable coefficients. The second topic covered is the qualitative theory of second order linear PDEs, in particular elliptic and parabolic equations.

Yu.A. BRUDNYI, N.Ya. KRUGLJAK. — **Interpolation functors and interpolation spaces, vol. 1.** — North-Holland Mathematical Library, vol 47. — Un vol. relié,  $15,5 \times 23$ , de xvi, 718 p. — Prix: Dfl. 275.00/US\$ 157.00. — North-Holland, Amsterdam, 1991.

The theory of interpolation spaces has its origin in the classical work of Riesz and Marcinkiewicz but had its first flowering in the years around 1960 with the pioneering work of Aronszajn, Calderón, Gagliardo and a few others. Further development in the 1970s and 1980s included the solution by the authors of this book of one of the outstanding question in the theory of the real method, the K-divisibility problem. Contents : Classical interpolation theorems. Interpolation spaces and interpolation functors. The real interpolation method. Selected questions of the theory of the real interpolation method.

H.W. BROER, F. DUMORTIER, S.J. van STRIEN, F. TAKENS. — **Structure in dynamics : finite dimensional deterministic studies.** — Studies in mathematical physics, vol. 2. — Un vol. broché,  $15 \times 22,5$ , de xi, 309 p. — Prix: Dfl. 110.00/US\$ 56.50, (relié: Dfl. 190.00/US\$ 97.50). — North-Holland, Amsterdam, 1991.

The study on non-linear dynamical systems nowadays is an intricate mixture of analysis, geometry, algebra and measure theory and this book takes all aspects into account. Presenting the contents of its authors' graduate courses in non-linear dynamical systems, this volume aims at researchers who wish to be acquainted with the more theoretical and fundamental subjects in non-linear dynamics and is designed to link the more popular literature with research papers and monographs.

Charles M. GOLDIE, Richard G.E. PINCH. — **Communication theory.** — London Mathematical Society Student Texts, vol. 20. — Un vol. broché,  $15 \times 22,5$ , de XIV, 210 p. — Prix: £ 10.95/US\$ 19.95, (relié: £ 30.00/US\$ 59.95. — Cambridge University Press, Cambridge, 1991.

This book is an introduction, for mathematics students, to the theories of information and codes. They are usually treated separately but, as they both address the problem of communication through noisy channels (albeit from different directions), the authors have been able to exploit the connection to give a reasonably self-contained treatment, relating the probabilistic and algebraic viewpoints.

Sabine VAN HUFFEL, Joos VANDEWALLE. — **The total least squares problem : computational aspects and analysis.** — Frontiers in applied mathematics, vol. 9. — Un vol. broché,  $18 \times 25,5$ , de XIII, 300 p. — Prix: US\$ 28.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1991.

This is the first book devoted entirely to total least squares. The authors give a unified presentation of the TLS problem. A description of its basic principle is given, the various algebraic, statistical, and sensitivity properties of the problem are discussed, and generalizations are presented. Applications are surveyed to facilitate uses in an even wider range of applications. Whenever possible, comparison is made with the well-known least squares methods.

**Fourth International Symposium on Domain Decomposition Methods for Partial Differential Equations.** — Edited by Roland Glowinski, Yuri A. Kuznetsov, Gérard Meurant, Jacques Périaux, Olof B. Widlund. — Proceedings in applied mathematics, vol. 51. — Un vol. broché,  $17,5 \times 25,5$ , de XI, 417 p. — Prix: US\$ 56.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1991.

Proceedings of the fourth in a series of conferences on domain decomposition. Held in Moscow in May 1990, the conference presented state of the art numerical solution methods for partial equations using domain decomposition. The volume focuses on the notion that by breaking the domain of the original problem into subdomains, such an approach can, if properly implemented, lead to a considerable speed up. The methods are particularly well suited for parallel computers.

**Graph theory, combinatorics, algorithms, and applications.** — Edited by Yousef Alavi, Fan R.K. Chung, Ronald L. Graham, D. Frank Hsu. — Proceedings in applied mathematics, vol. 54. — Un vol. broché,  $17,5 \times 24,5$ , de XII, 635 p. — Prix: US\$ 77.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1991.

This volume contains the proceedings of the Second International Conference in Graph Theory, Combinatorics, Algorithms and Applications, held at San Francisco State University, California, July 24-28, 1989. The contributions to this volume include many topics in current research in both the theory and applications in the areas of graph theory, combinatorics, algorithms, including articles by leading international experts and specialists.

George F. CARRIER, Carl E. PEARSON. — **Ordinary differential equations.** — Classics in applied mathematics, vol. 6. — Un vol. broché,  $15 \times 22$ , de X, 220 p. — Prix: US\$ 25.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1991.

This book offers an alternative to the "rote" approach of presenting standard categories of differential equations accompanied by routine problem sets. The exercises presented amplify

and provide perspective for the material, often giving readers opportunity for ingenuity. This reprint provided the authors a chance to correct misprints and clarify certain aspects of the presentation. Little or no previous acquaintance with the subject is required of the reader to learn usage of techniques for constructing solutions of differential equations.

P.M. COHN. — **Algebraic numbers and algebraic functions.** — Un vol. relié,  $16 \times 24$ , de XII, 192 p. — Prix: £25.00. — Chapman & Hall, London, 1991.

The book is an introduction to the theory of algebraic numbers and algebraic functions of one variable. The basic development is the same for both, using E. Artin's elegant approach, via valuations. A fairly comprehensive account of valuations is included, as a powerful method of studying general fields, and natural way of introducing Dedekind domains. Number theory is pursued as far as the unit theorem and the finiteness of the class number. The longest chapter (4) in the book is on algebraic function theory, assuming, besides basic algebra, a knowledge of only a minimum of complex variable theory for the reader.

**General topology and applications.** — Fifth Northeast Conference. — Edited by Susan J. Andima, Ralph Kopperman, Prabudh Ram Misra, Jack Z. Reichman, Aaron R. Todd. — Lecture notes in pure and applied mathematics, vol. 134. — Un vol. broché,  $18 \times 25,5$ , de XIII, 416 p. — Prix: US\$155.25 (U.S.A. et Canada: US\$135.00). — Marcel Dekker, New York, 1991.

This collection presents papers from the Fifth Northeast Conference on General Topology and Applications held at the City University of New York, June 1989. Emphasizing general topology and its applications, the volume covers recent research results and trends in general topology, categorical topology, and topological algebra. This book provides stimulating insights into the relationship between general topology and a wide range of disciplines, including set theoretic topology, topological groups and semigroups, convergence structures, functional analysis, Lie group theory, topological dynamics, and computer graphics and image processing.

**Semigroup theory and applications.** — Edited by Philippe Clément, Sergio Invernizzi, Enzo Mitidieri, Ioan I. Vrabie. — Lecture notes in pure and applied mathematics, vol. 116. — Un vol. broché,  $18 \times 25,5$ , de X, 449 p. — Prix: US\$172.50 (U.S.A. et Canada: US\$150.00). — Marcel Dekker, New York, 1991.

This volume focuses on linear and nonlinear semigroup theory and emphasizes applications of semigroup techniques. It also furnishes new results on semigroup theory, partial differential equations, and evolution equations. It contains in-depth coverage of such important topics as multiplicative perturbations of generators, dual and positive semigroups, semigroup methods for hyperbolic equations, functional differential equations, degenerate equations, quantum stochastic differential equations, asymptotic behavior of solutions, inverse problems, and semigroup methods in population dynamics.

A. FROELICH, M.J. TAYLOR. — **Algebraic number theory.** — Cambridge studies in advanced mathematics, vol. 27. — Un vol. relié,  $16 \times 23,5$ , de XIV, 355 p. — Prix: £50.00/US\$69.95. — Cambridge University Press, Cambridge, 1991.

Throughout, the authors emphasise the systematic development of techniques for the explicit calculation of the basic invariants, such as rings of integers, class groups, and units. Moreover, they combine, at each stage of development, theory with explicit computations and applications, and provide motivation in terms of classical number-theoretic problems. A

number of special topics are included that can usually only be found in research monographs or original papers: module theory of Dedekind domains, tame and wild ramifications, Gauss series and Gauss periods, binary quadratic forms, Brauer relations.

M.J. ABLOWITZ and P.A. CLARKSON. — **Solitons, nonlinear evolution equations and inverse scattering.** — London Mathematical Society lecture note series, vol. 149. — Un vol. broché,  $15 \times 22,5$ , de XII, 516 p. — Prix: £27.95/US\$49.95. — Cambridge University Press, Cambridge, 1991.

This book brings together several aspects of soliton theory currently only available in research papers. Emphasis is given to the multi-dimensional problems arising and includes inverse scattering in multi-dimensions, integrable nonlinear evolution equations in multi-dimensions and the delta method. Thus, this book will be a valuable addition to the growing literature.

Samuel M. VOVSI. — **Topics in varieties of group representations.** — London Mathematical Society lecture note series, vol. 163. — Un vol. broché,  $15 \times 22,5$ , de XIV, 200 p. — Prix: £19.95/US\$34.95. — Cambridge University Press, Cambridge, 1991.

This book is devoted to the theory of group representations, a young and promising area of modern algebra. It provides a detailed exposition of several central topics in the field, leading to the most current advances and developments. Much of the included material has never been available in book form before. Contents: Preliminaries (Definitions, notation and facts). Stable varieties and homogeneity. Locally finite-dimensional varieties. Identities of finite and stable-by-finite representations. Further topics (A selection of mutually independent results).

J.W.S. CASSELS. — **Lectures on elliptic curves.** — London Mathematical Society student texts, vol. 24. — Un vol. broché,  $15 \times 22,5$ , de VI, 137 p. — Prix: £12.95/US\$22.95 (relié: £24.95/US\$59.95). — Cambridge University Press, Cambridge, 1991.

This book introduces basic theory from a contemporary viewpoint but with an eye to the historical background. The central portion deals with curves over the rationals: the Mordell-Weil finite basis theorem, points of finite order, etc.... The treatment is structured by the local-global standpoint and culminates in the description of the Tate-Shafarevich group as the obstruction to a Hasse principle. In an introductory section the Hasse principle for conics is discussed. The book closes with sections on the theory over finite fields and recently developed uses of elliptic curves for factoring large integers. Many exercises and examples are included.

**Stochastic analysis : proceedings of the Durham Symposium on Stochastic Analysis, 1990.** — Edited by M.T. Barlow and N.H. Bingham. — London Mathematical Society lecture note series, vol. 167. — Un vol. broché,  $15 \times 22,5$ , de 375 p. — Prix: £24.95/US\$47.95. — Cambridge University Press, Cambridge, 1991.

Durham Symposium traditionally constitute an excellent survey of recent developments in many areas of mathematics. This Symposium organized in July 1990, was no exception. This volume contains papers contributed by leading specialists in diverse areas of probability theory and stochastic processes. Of particular note are the papers by David Aldous, Harry Kesten, and Alain-Sol Sznitman, all of which are based upon short courses of invited lectures.

J.W.P. HIRSCHFELD and J.A. THAS. — **General Galois geometries.** — Oxford mathematical monographs. — Un vol. relié,  $16 \times 24$ , de XII, 407 p. — Prix: £55.00. — Clarendon, Oxford, 1991.

Projective spaces over a finite field find wide application in coding theory, algebraic geometry, design theory, graph theory, and group theory as well as being objects of study in their own right. This volume is the culmination of a three volume treatise. Essentially self-contained, this volume with its companion volumes ("Projective geometries over finite fields" and "Finite projective spaces of three dimensions") will provide a major reference to the subject. Three main themes are studied: algebraic varieties over finite fields, combinatorics of Galois geometries, identification of various incidence structures associated with them.

Maciej KLIMEK. — **Pluripotential theory.** — London Mathematical Society monographs. New series, vol. 6. — Un vol. relié,  $16 \times 24$ , de XII, 407 p. — Prix: £30.00. — Clarendon Press, Oxford, 1991.

Pluripotential theory is a non-linear complex counterpart of classical potential theory. Its main area of application is multidimensional complex analysis. The central part of the pluripotential theory is occupied by maximal plurisubharmonic functions and the generalized complex Monge-Ampère operator. The interplay between these two notions provides the focal point of this monograph, which contains an up-to-date account of the developments from the large volume of recent work in this area, and makes the subject available for the first time to a wide audience of analysts.

Jiri KONDO. — **Integral equations.** — Oxford applied mathematics and computing science series. — Un vol. broché,  $13,5 \times 21,5$ , de XVI, 440 p. — Prix: £17.50. — Clarendon, Oxford, 1991.

This textbook is devoted to the study and solution of integral equations and it simultaneously provides a unified treatment of the theory together with a description of the range of methods for their solution. Professor Kondo's wide experience in science and engineering ensures that the many applications presented here are both up-to-date and relevant to current problems. Throughout, a wide selection of exercises will help further a student's understanding of the subject.

Helmut KLINGEN. — **Introductory lectures on Siegel modular forms.** — Cambridge studies in advanced mathematics, vol. 20. — Un vol. relié,  $15,5 \times 23,5$ , de X, 162 p. — Cambridge University Press, Cambridge, 1990.

About half a century ago C.L. Siegel discovered a new type of automorphic forms in several variables in connection with his famous work on the analytic theory of quadratic forms. Then, Siegel modular forms have been connected with number theory. Later they were also studied extensively because of their significance for automorphic functions in several complex variables. The comprehensive theory of automorphic forms to subgroups of algebraic groups and the recent arithmetical theory of modular forms illustrate these two aspects in an illuminating manner. The author's aim is to present a straightforward and easily accessible survey of the main ideas of the theory at an elementary level.

B.-W. SCHULZE. — **Pseudo-differential operators on manifolds with singularities.** — Studies in mathematics and its applications, vol. 24. — Un vol. relié,  $15,5 \times 23$ , de VI, 410 p. — Prix: US\$133.50/Dfl. 260.00. — North-Holland, Amsterdam, 1991.

The present book is devoted to elliptic partial differential equations in the framework of pseudo-differential operators. The first chapter contains the Mellin pseudo-differential calculus on  $\mathbf{R}_+$  and the functional analysis of weighted Sobolev spaces with discrete and continuous asymptotics. Chapter 2 is devoted to the analogous theory on manifolds with

conical singularities. Chapter 3 to manifolds with edges. Employed are pseudo-differential operators along edges with cone-operator-valued symbols.

Charles SMALL. — **Arithmetic of finite fields.** — Pure and applied mathematics, vol. 148. — Un vol. relié,  $15,5 \times 23,5$ , de XII, 216 p. — Prix: US\$99.75. — Marcel Dekker, Inc., New York, 1991.

This reference text examines counting or estimating numbers of solutions of equations in finite fields, concentrating on topics that link finite fields with number theory and algebraic geometry. Emphasizing conceptual, structural, and arithmetic aspects instead of computational applications, this volume discusses current knowledge of permutation polynomials, theorems of Chevalley and Warning, and of König-Radon, quadratic forms and diagonal equations, the Zeta function, elliptic curves, etc... The presentation provides exercises, suggestions and answers at the end of each chapter.

Kichoon YANG. — **Complex algebraic geometry: an introduction to curves and surfaces.** — Pure and applied mathematics, vol. 149. — Un vol. relié,  $15,5 \times 23,5$ , de XII, 216 p. — Prix: US\$99.75 (USA et Canada), US\$114.50 (Autres pays). — Marcel Dekker, Inc., New York, 1991.

This book provides an outstanding introduction to various aspects of algebraic geometry for the nonexpert- emphasizing the transcendental aspects. Containing never-before-published material on smooth projective subvarieties and their osculating maps, this title discusses complex analytic techniques, examines algebraic curves and compact Riemann surfaces, explores the Enriques-Kodaira classification of algebraic surfaces, and covers Hermitian differential geometry and its possible ramifications in complex algebraic geometry.

**Ordinary and partial differential equations, vol. III.** — Proceedings of the 11th Dundee Conference, 1990. — Edited by B.D. Sleeman and R.J. Jarvis. — Pitman research notes in mathematics series, vol. 254. — Un vol. broché,  $17 \times 24,5$ , de 219 p. — Prix: £23.00. — Longman Scientific and Technical, Harlow, Essex, U.K., 1991.

This volume contains papers by a number of experts. Special emphasis is given to nonlinear differential equations which assist in the understanding of nonlinear wave propagation, continuum mechanics and biology. Topics covered include dynamical systems, calculus of variations, Hamiltonian systems, asymptotic integration in the theory of elliptic equations involving critical exponents, Sturm-Liouville theory and multiparameter spectral problems, Floquet theory, the propagation of oscillations and concentration effects in partial differential equations, stochastic modelling of latent image formation, a model of a cardiac fibre and microwave heating of ceramics.

**Geometry and physics : essays in honour of I.M. Gelfand.** — Edited by S. Gindikin and I.M. Singer. — Un vol. relié,  $17 \times 24,5$ , de xv, 750 p. — US\$128.00/Dfl. 250.00. — North-Holland, Amsterdam, 1991.

This volume contains 32 papers by distinguished authors throughout the world who are friends or students of I.M. Gelfand. These essays cover a large spectrum of subjects including contact and symplectic geometry, singularities, complex geometry, Riemann surfaces, moduli spaces, Virasoro and Kac Moody Lie algebras, quantum groups, integral geometry, spinors and twistors, quantization and conformal quantum field theories, dynamical systems and chaos, semi-martingales, etc... The unifying principle to these papers is that they all represent geometrical ideas that are related to physical problems.

Włodzimierz MLAK. — **Hilbert spaces and operator theory.** — Mathematics and its applications (East European series), vol. 51. — Un vol. relié,  $17 \times 24,5$ , de x, 289 p. — Prix: Dfl. 235.00/US\$149.00/£81.00. — Kluwer Academic Publishers, Dordrecht, PWN-Polish Scientific Publishers, Warsaw, 1991.

This volume gives a comprehensive presentation of the basic notions and methods of the theory of Hilbert spaces. This is not a standard introduction to the subject. A far greater emphasis is placed on algebraic lattices and integral representations. The volume begins by describing the underlying notion of the algebraic lattice which presents the theory (of representations) of Hilbert spaces. The spectral theory of operators on Hilbert spaces is then treated via representations of function algebras and semi-spectral measures. Numerous examples and exercises are given.

A.V. ARKHANGEL'SKII. — **Topological function spaces.** — Mathematics and its applications (Soviet series), vol. 78. — Un vol. relié,  $17 \times 24,5$ , de ix, 205 p. — Prix: Dfl. 140.00/US\$79.00/£48.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume deals with the space of all realvalued continuous functions on a given topological space. The topological properties of such spaces and their subspaces are of great interest in areas such as general topology, topological algebra and functional analysis. Many new and original results are presented here.

**Queueing, performance and control in ATM.** — Proceedings of the Thirteenth International Teletraffic Congress, Copenhagen, Denmark, June 19-26, 1991. — Edited by J.W. Kohen and Charles D. Pack. — North-Holland studies in telecommunication, vol. 15. — Un vol. relié,  $20 \times 27$ , de xiv, 265 p. — Prix: US\$100.00/Dfl. 175.00. — North-Holland, Amsterdam, 1991.

Technological advances have provided a rich and interesting set of issues for traffic research that may impact nearly every aspect of the telecommunication industry. This proceedings reflects a truly broadened field of work, from basic traffic theory to network services, planning tools, network technologies, forecasting methods, simulation, and computing algorithms. Contents: Workshop on ATM: Asynchronous transfer mode. Part I. Queueing. Part II. Performance. Part III. Control. Part IV. Workshop on stochastic modelling.

Allen C. PIPKIN. — **A course on integral equations.** — Texts in applied mathematics, vol. 9. — Un vol. relié,  $16 \times 24$ , de xiii, 268 p. — Prix: DM 68.00. — Springer-Verlag, New York, 1991.

This book is based on a one semester course for graduate students in physical sciences and applied mathematics. Not detailed mathematical background is needed but the student should be familiar with the theory of analytic functions of a complex variable. The main requirement is that the student should be willing to work out of a large number of specific examples. The course is divided about equally into three parts, where the first part is mostly theoretical and the remaining two parts emphasize on problem solving.

Yu.L. DALECKY and S.V. FOMIN. — **Measures and differential equations in infinite-dimensional space.** — Mathematics and its applications (Soviet Series). — Un vol. relié,  $16,5 \times 24,5$ , xiv, 337 p. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume does not seek to present a comprehensive treatment of the infinite-dimensional analysis. Rather, it deals with certain aspects of analysis in infinite-dimensional spaces. Contents: Measures and quasimeasures. Integration. Gaussian measures in Hilbert space.

Measures in linear topological spaces. Differentiable measures and distributions. Evolution differential equations. Integration in path space. Probabilistic representations of solutions of parabolic equations and systems. Smooth measures. Remarks and historical comments.

John P. CLEAVE. — **A study of logics.** — Oxford logic guides, vol. 18. — Un vol. relié, 16 × 24, de XIII, 417 p. — Prix: £65.00. — Clarendon Press, Oxford, 1991.

There is an enormous variety of logical systems which have originated in the areas of mathematical logic and computer science. In this book the author presents a systematic study of this rich harvest of logic via Tarski's well-known axiomatization of the notion of logical consequence. Contents: The multiplicity of logics. Classical logic. Abstract logics. Logical operations. Order and lattices. Constructing logics. Quasi-Boolean algebras and empirical continuity. Three-valued logic. Relevance. The calculus of logics: effective logic. Modal logics.

**Statistical methods in biological and medical sciences.** — Edited by C.R. Rao and R. Chakraborty. — Handbook of statistics, vol. 8. — Un vol. relié, 17 × 24,5, de XVI, 554 p. — Prix: US\$ 120.00/Dfl. 290.00. — North-Holland, Amsterdam, 1991.

The material in this book is essentially expository in nature, and the proofs of the results are generally omitted. Special emphasis is placed on applications-oriented techniques, with applied statistician in mind as the primary audience. Contents: Genetics and epidemiology. Anthropometry and evolutionary biology. Cancer biology. Medical statistics.

**Applications of category theory to fuzzy subsets.** — Edited by Stephen Ernest Rodabaugh, Erich Peter Klement and Ulrich Höhle. — Theory and decision library. Series B: Mathematical and statistical methods, vol. 14. — Un vol. relié, 16,5 × 24,5, de IX, 396 p. — Prix: Dfl. 180.00/US\$ 99.00/£ 61.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This book is the first major work to comprehensively describe the deeper mathematical aspects of fuzzy sets, particularly those aspects which are category-theoretic in nature, and is intimately related to the first eleven years of the renowned International Seminar on Fuzzy Theory. The extensive bibliography, indices and the tutorial nature of its chapters make it suitable as a text for advanced graduate students. Contents: Topos-like and model-theoretic approaches. Categorical methods in topology. Applications and related topics in logic and topology.

N.Ja VILENKIN and A.U. KLIMYK. — **Representation of Lie groups, special functions, vol. 1: Simplest Lie groups, special functions and integral transforms.** — Mathematics and its applications (Soviet Series), vol. 72. — Un vol. relié, 17 × 24,5, XXIII, 608 p. — Prix: Dfl. 460.00/US\$ 249.00/£ 155.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This volume (the first of three volumes) deals with the properties of classical orthogonal polynomials and special functions which are related to representations of groups of matrices of second order and of groups of triangular matrices of third order. This material forms the basis of many results concerning classical special functions such as Bessel, Macdonald, Hankel, Whittaker, hypergeometric, and confluent hypergeometric functions, and different classes of orthogonal polynomials, including those having a discrete variable. Many new results are given.

J.D. JOBSON. — **Applied multivariate data analysis, vol. 1: Regression and experimental design.** — Springer texts in statistics. — Un vol. relié, 16 × 24, de XXIV, 621 p. — Prix: DM 118.00. — Springer-Verlag, New York, 1991.

An easy to read survey of data analysis, linear regression models and analysis of variance. The extensive development of the linear model includes the use of the linear model approach to analysis of variance, provides a strong link to statistical software packages, and is complemented by a thorough overview of the theory. It is assumed that the reader has the background equivalent to an introductory book in statistical inference. Intended for first year graduate students in business, social and biological sciences. Undergraduate statistics majors will find this text useful as a survey of linear models and their applications.

**Advanced mathematical thinking.** — Edited by David Tall. — Mathematics education library, vol. 11. — Un vol. relié,  $16,5 \times 24,5$ , de xvii, 289 p. — Prix: Dfl. 165.00/US\$ 89.00/£56.00. — Kluwer Academic Publishers, Dordrecht, 1991.

This book is the first major study of advanced mathematical thinking as performed by mathematicians and taught to students in senior high school and university. Its three main parts focus on the nature of advanced mathematical thinking, the theory of its cognitive development, and reviews of cognitive research. Topics covered include the psychology of advanced mathematical thinking, the processes involved, mathematical creativity, proof, the role of definitions, symbols and reflective abstraction. The reviews of recent research concentrate on cognitive development and conceptual difficulties with the notions of functions, limits, infinity, analysis, proof, and the use of computer.

**Mathematical knowledge: its growth through teaching.** — Edited by Alan J. Bishop, Stieg Mellin-Olsen and Joop Van Dormolen. — Mathematics education library, vol. 10. — Un vol. relié,  $17,5 \times 24,5$ , de 221 p. — Prix: Dfl. 130.00/US\$ 69.00/£44.00. — Kluwer Academic Publishers, Dordrecht, 1991.

The book focuses on the genesis of mathematical knowledge in the classroom. The concerns are with fundamental analysis of the problem field, and various approaches are presented in the book which stimulate new thinking about research and teacher development.

Robert W. CARROLL. — **Topics in soliton theory.** — North-Holland mathematics studies, vol. 167. — Un vol. relié,  $17 \times 24,5$ , de xii, 428 p. — Prix: Dfl. 195.00/US\$ 100.00. — North-Holland, Amsterdam, 1991.

Although integrable systems are still special, the mathematical interaction of integrable systems theory with virtually all branches of mathematics illustrates the importance of the field. This book concentrates on developing the theme of the tau function. KdV and KP equations are treated extensively, with material on NLS and AKNS systems, and in following the tau function theme one is led to conformal field theory, strings, and other topics in physics.

Claude BREZINSKI, Michela REDIVO ZAGLIA. — **Extrapolation methods : theory and practice.** — Studies in computational mathematics, vol. 2. — Un vol. relié,  $17 \times 24,5$ , de ix, 464 p. — Prix: Dfl. 225.00/US\$ 115.50. — North-Holland, Amsterdam, 1991.

This volume is a self-contained, exhaustive exposition of the extrapolation methods theory, and of the various algorithms and procedures for accelerating the convergence of scalar and vector sequences. Many subroutines (written in FORTRAN 77) with instructions for their use are provided on a floppy disk in order to demonstrate to those working with sequences the advantages of the use of extrapolation methods. Many numerical examples showing the effectiveness of the procedures and a consequent chapter on applications are also provided.

**Harmonic analysis on reductive groups.** — Edited by William Barker and Paul Sally. — Proceedings of the Bowdoin Conference, 1989. — Progress in mathematics, vol. 101. — Un vol. relié, 16 × 24, de VIII, 388 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1991.

The book reflects accurately most of the major developments in harmonic analysis on both real and p-adic groups. Thus it builds on a well-established body of literature, in particular the deep and penetrating work of Harish-Chandra, but contains a substantial proportion of mathematics developed entirely within the past twenty years. Examples are the work on unipotent representations in the unitary dual for real groups, applications of the local trace formula to harmonic analysis, and many others, a number of which are motivated by considerations related to various aspects of the Langlands program.

**Symplectic geometry and mathematical physics: actes du colloque en l'honneur de Jean-Marie Souriau.** — Edited by P. Donato, C. Duval, J. Elhadad, G.M. Tuynman. — Progress in mathematics, vol. 99. — Un vol. relié, 16 × 24, de VIII, 475 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1991.

Most of the contributions to this volume contain new results that will not be published elsewhere. They may be classified according to the following subjects: Poisson manifolds, symplectic geometry, classical mechanics, particles and fields in physics, and quantization. However, a completely different classification could have been obtained by using the categories: pure differential geometry, applications of Lie groups, constrained systems in physics, etc., which show the interrelatedness of all these subjects.

Konrad JACOBS. — **Discrete stochastics.** — Basler Lehrbücher, vol. 3. — Un vol. relié, 17 × 24, de X, 283 p. — Prix: SFr. 78.00. — Birkhäuser-Verlag, Basel, 1991.

This undergraduate textbook gives a concise introduction into discrete stochastics in general, and into a variety of typical special topics in this field, such as information theory, fluctuation theory, and semigroups of stochastic matrices. The emphasis lies on probability theory rather than on statistical methodology. Motivations, interpretations, and numerous examples and exercises relate the mathematical theory to stochastic experience.

Fyodor A. MEDVEDEV. — **Scenes from the history of real functions.** — Translated from the Russian by Roger Cooke. — Science networks. Historical studies, vol. 7. — Un vol. relié, 17 × 24,5, de 265 p. — Prix: SFr. 148.00. — Birkhäuser Verlag, Basel, 1991.

The essays in this book search deeply into both the original works of mathematicians and commentaries on them to illuminate dark corners in the history of the subject of functions of real variable. The author reveals the many roads taken by mathematicians over the past three hundred years in the quest to understand the fundamental operations underlying the calculus: differentiation, integration, and infinite series. The interrelations of these three operations form the unifying theme for this book.

Maureen H. FENRICK. — **Introduction to the Galois correspondence.** — Un vol. relié, 16 × 24, de X, 189 p. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1992.

This monograph is a self-contained textbook which assumes only that the student has a certain level of mathematical sophistication and some linear algebra background. The Galois correspondence itself is presented with many well-constructed, concrete examples. Most of these examples include exercises which involve verifying related facts and are designed to give the student a chance to test his understanding of the current theory before moving on. The book conclude with a discussion of some of the diverse applications of the Galois correspondence.

Israel GOHBERG, Naum KRUPNIK. — **One dimensional linear singular integral equations, vol. 1: Introduction.** — Operator theory, vol. 53. — Un vol. relié,  $17 \times 24$ , de 266 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1992.

This book is the first part of an introduction into the theory of linear one-dimensional singular integral operators. The main topics of this volume are: boundedness of singular integral operators in various function spaces, invertibility of these operators, and inversion methods, Noether-Fredholm theory, and local principles. The book contains both a general abstract approach and concrete solution methods for singular integral equations, various applications, numerous examples and exercises. In this volume only singular integral operators with continuous coefficients on closed curves are considered.

**Unilateral problems in structural analysis IV.** — Proceedings of the fourth Meeting on Unilateral Problems in Structural Analysis, Capri, June 14-16, 1989. — Edited by G. Del Piero and F. Maceri. — International series of numerical mathematics, vol. 101. — Un vol. relié,  $17 \times 24$ , de VII, 228 p. — Prix: SFr. 88.00. — Birkhäuser Verlag, Basel, 1991.

From the preface: The contents of the present volume reflects the composite character of the meeting. There are contributions in the mathematical theory, and studies in classical problems of mechanics such as unilateral contact with friction, plasticity and composite material and structures. Some contributions deal with not yet completely explored questions of unilateral dynamics; finally, a contribution concerns the comparatively new subject of masonry structures, in which the unilateral constraint enters at the constitutive level.

**Random partial differential equations.** — Proceedings of the conference held at the Mathematical Research Institute at Oberwolfach, Black Forest, November 19-25, 1989. — Edited by U. Hornung, P. Kotelenetz, G. Papanicolaou. — International series of numerical mathematics, vol. 102. — Un vol. relié,  $17 \times 24$ , IX, 165 p. — Prix: SFr. 69.00. — Birkhäuser Verlag, Basel, 1991.

From the preface: Topics of the papers presented at the conference were parabolic Itô equations, Malliavin calculus, Dirichlet forms, Markov fields, Skorohod and Hellinger integrals, random Schrödinger operators, Lyapunov exponents, and optimal control of stochastic systems. Furthermore, limit theorems of particle systems, acoustic waves in random media, and random oscillations were discussed. The 13 papers of this volume reflect the above-mentioned topics. These contributions deal with functional analysis, probabilistic methods, and applications to homogenization, particle physics, and random vibrations.

L.S. PONTRJAGIN. — **Verallgemeinerungen der Zahlen.** — Un vol. broché,  $12 \times 19$ , de 154 p. — Prix: DM 29.00. — Akademie Verlag, Berlin, 1991.

Der Autor geht von den reellen Zahlen aus und betrachtet komplexe Zahlen und den Hauptsatz der Algebra. Er behandelt den Euklidischen Algorithmus mit der Division von Polynomen, beschreibt Quaternionen als Elemente eines vierdimensionalen Euklidischen Vektorraumes, untersucht als Verallgemeinerung Quaternionen und Strukturen mit algebraischen Operationen und Grenzübergängen.

**Fluid dynamical aspects of combustion theory.** — Edited by M. Onofri and A. Tesei. — Pitman research notes in mathematics series, vol. 223. — Un vol. broché,  $17 \times 24$ , de 364 p. — Prix: £30.00. — Longman Scientific & Technical, Harlow, 1991.

This book contains papers presented in a series of seminars held at the Istituto per le Applicazioni del Calcolo 'M. Picone' of the Italian National Research Council. Six lecture series were organized, given by outstanding researchers who were asked to provide the audience with fundamentals of combustion theory, their recent contributions, and motivations for future research. The result is an introduction to combustion theory that may be suitable for graduate courses in applied mathematics, chemistry, and mechanical, aerospace or chemical engineering.

David H. VON SEGGERN. — **CRC handbook of mathematical curves and surfaces.** — Un vol. relié, 16 × 23,5, de 286 p. — Prix: £39.00. — CRC Press, Boca Raton, Florida, 1990.

The book presents, in catalog form, comprehensive illustrations of the equations used in elementary and advanced mathematics. This new work incorporates numerous illustrations previously unavailable in one source. Designed for quick and easy reference, illustrations are organized by type of equation, and presented in a common format. Data featured include such topics as algebraic curves and surfaces, polynomial sets, polygons and polyhedra, non-differentiable and discontinuous surfaces, transcendental functions and surfaces, and special functions in mathematical physics, probability, and statistics.

François GUENARD et Patricia HUG. — **Mathématiques.** — Collection «QCM Dunod». — Un vol. broché, 13 × 22, de iv, 250 p. — Dunod, Paris, 1991.

20 chapitres × 10 questions × 5 choix = 10 façons de se tester et de tester les autres. Le programme suivi est celui de la 1<sup>ère</sup> année d'études supérieures. Le style de l'ouvrage est bel et bien celui du jeu. Lorsque l'étudiant ouvre ce livre, il peut y rentrer sans effort et répondre aux questions... sans crayon. Les réponses sont déjà rédigées. Il suffit de reconnaître la bonne. Toutes les solutions sont données et elles sont expliquées en détail.

James D. LEWIS. — **A survey of the Hodge conjecture: introductory lectures in transcendental algebraic geometry.** — Lecture notes of a course given at CRM in 1990. — Les publications CRM. — Un vol. broché, 17 × 25, de 389 p. — Centre de recherches mathématiques, Université de Montréal, Montréal, 1991.

Complex manifolds. Vector bundles. Kähler manifolds. Line bundles. Lefschetz theorem. Lefschetz theorem revisited. Formulation of the general Hodge conjecture. Chern class theory. Cohomology of complete intersections. The Hodge theorem. Analytic and topological necessities of the Kähler condition. Intermediate Jacobians. Various approaches to the Hodge conjecture for varieties with well understood geometric structure. The approach to the Hodge conjecture via normal functions. Hodge theory and Chow groups.

**Diffusion processes and related problems in analysis, volume 2: stochastic flows.** — Edited by Mark A. Pinsky, Volker Wihstutz. — Progress in probability, vol. 27. — Un vol. relié, de x, 346 p. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1992.

The book contains 15 carefully reviewed papers which discuss stochastic flows generated by stochastic differential systems and iterated function systems. They explore in particular, the relation between flows and the intrinsic geometry of the Riemannian manifold, stochastic versus control flows, hereditary systems, Lyapunov spectra, invariant measures, stability and statistical equilibrium.

Elvezio RONCHETTI, Gabrielle ANTILLE, Maurice POLLÀ. — **STEP I: STatistique Et Probabilités: une introduction.** — 2<sup>ème</sup> édition revue et augmentée. — Un vol. broché, 16 × 24,

de 272 p. + 3 disquettes-DD-5.1/4, format IBM ou compatible, écran CGA ou compatible. — Prix: SFr. 130.00. — Presses polytechniques et universitaires romandes, Lausanne, 1991.

La conception originale de STEP I, repose sur la complémentarité et la forte interaction entre les sujets traités dans le livre et le matériel de simulation et d'analyse contenu sur les disquettes. Le contenu inclut: L'analyse exploratoire de données et ses représentations graphiques, une ouverture à l'aléatoire (éléments de calcul des probabilités, loi des grands nombres, découverte de la loi normale), une introduction aux sondages avec la notion d'intervalle de confiance, des éléments d'estimation, d'analyse graphique et d'analyse de sensibilité dans le cadre d'un modèle de régression, l'étude des séries chronologiques, une série d'outils statistiques.

Wilfred W.J. HULSBERGEN. — **Conjectures in arithmetic algebraic geometry : a survey.** — Aspects of mathematics, vol. E18. — Un vol. relié, 16 × 23, de 236 p. — Prix: DM 64.00. — Vieweg, Braunschweig, 1992.

The main purpose of this book is to give an introduction to Beilinson's conjectures. In two motivational chapters on classical number theory and elliptic curves,  $L$ -functions and regulators are introduced. Topics discussed are Fermat's conjecture, Dirichlet and Artin  $L$ -functions,  $L$ -functions of elliptic curves, the conjectures of Shimura-Taniyama-Weil and of Birch and Swinnerton-Dyer. Later chapters deal with the general formulation of Beilinson's conjectures and of those of Hodge and Tate in Jannsen's approach. Also, the necessary tools such as higher algebraic  $K$ -theory, Poincaré duality theories, Chern characters and motives, are treated in some detail. In the final chapter a few examples are discussed of cases where some of the conjectures are verified.

**Noncommutative rings.** — Edited by S. Montgomery and L. Small. — Mathematical Sciences Research Institute publications, vol. 24. — Un vol. relié, 16 × 24, de ix, 178 p. — Prix: DM 74.00. — Springer-Verlag, New York, 1992.

This volume collects some of the survey lectures delivered at the Microprogram on Noncommutative Rings held at the Mathematical Sciences Research Institute, July 10-12, 1989. While the program was concerned with recent advances in ring theory, it also focussed on related areas of mathematics where ring theory might be expected to have an impact. Topics covered included quantum groups, the algebraic aspects of quantum field theory, finite dimensional Lie algebras, and the modern theory of Noetherian rings and localization. The text will be a valuable tool for both advanced graduate students and research mathematicians.

Alan F. BEARDON. — **Iteration of rational functions : complex analytic dynamical systems.** — Graduate texts in mathematics, vol. 132. — Un vol. relié, 16 × 24, de xiii, 280 p. — Prix: DM 74.00. — Springer-Verlag, New York, 1991.

This book makes available a comprehensive, detailed, and carefully organized treatment of the foundations of the theory of iteration of rational functions of a complex variable. The material covered extends from the original memoirs of Fatou and Julia to the recent and important results and methods of Sullivan and Shishikura. The theory of dynamical systems and chaos has recently undergone a rapid growth in popularity, in part due to the spectacular computer graphics of Julia sets, fractals, and the Mandelbrot set. The text focuses on the specialized area of complex analytic dynamics, a subject that dates back to 1916 and is currently a very active area in mathematics.

C.T.J. DODSON, T. POSTON. — **Tensor geometry: the geometric viewpoint and its uses.** — Second edition. — Graduate texts in mathematics, vol. 130. — Un vol. relié,  $16 \times 24$ , de xiv, 432 p. — Prix: DM 88.00. — Springer-Verlag, Berlin, 1991.

This treatment of differential geometry and the mathematics required for general relativity makes the subject of this book accessible for the first time to anyone familiar with elementary calculus in one variable and with a knowledge of some vector algebra. The emphasis throughout is on the geometry of the mathematics, which is greatly enhanced by the many illustrations presenting figures of three and more dimensions as closely as book form will allow. The imaginative text is a major contribution to expounding the subject of differential geometry as applied to studies in relativity, and will prove of interest to a large number of mathematicians and physicists.

William FULTON, Joe HARRIS. — **Representation theory : a first course.** — Graduate texts in mathematics, vol. 129. — Readings in mathematics. — Un vol. broché,  $15,5 \times 23$ , de xv, 551 p. — Prix: DM 48.00. — Springer-Verlag, New York, 1991.

The primary goal of these lectures is to introduce the beginner to finite-dimensional representations of Lie groups and Lie algebras. The book begins with a brief tour through representation theory of finite groups ; in particular, the symmetric groups are treated in some detail. The focus then turns to Lie groups and Lie algebras and finally to the heart of the course: working out the finite dimensional representations of the classical groups and exploring the related geometry. The goal of the last portion of the book is to make a bridge between the example-oriented approach of the earlier parts and the general theory.

**Geometry I: basic ideas and concepts of differential geometry.** — Ed. by R.V. Gamkrelidze. — Encyclopaedia of mathematical sciences, vol. 28. — Un vol. relié,  $16 \times 24$ , de 264 p. — Prix: DM 136.00. — Springer-Verlag, Berlin, 1991.

In this volume of "Encyclopaedia", the authors give a tour of the principal areas and methods of modern differential geometry. Beginning at the introductory level with curves in Euclidean space, the sections become more challenging, arriving finally at the advanced topics which form the greatest part of the book: transformation groups, the geometry of differential equations, geometric structures, the equivalence problem, the geometry of elliptic operators. As an overview of the major current methods of differential geometry, this book is a map of these different ideas which explains the interesting points at every stop.

**Partial differential equations I : foundations of the classical theory.** — Edited by Yu.V. Egorov and M.A. Shubin. — Encyclopaedia of mathematical sciences, vol. 30. — Un vol. relié,  $16 \times 24$ , de 259 p. — Prix: DM 136.00. — Springer-Verlag, Berlin, 1992.

This volume presents an introduction to the classical theory, emphasizing along the way physical methods and physical interpretation. The first of the two chapters in the book contains a derivation of some of the classical partial differential equations, with a discussion of the limitations of the physical models upon which the derivations are based. The second chapter discusses the classical methods for studying PDE's, including the theory of distributions and the Petrovskij classification into elliptic, parabolic and hyperbolic equations. Among the more advanced methods discussed are spectral theory, the method of planar waves and the theory of semigroups.

R. GRIMSHAW. — **Nonlinear ordinary differential equations.** — Applied mathematics and engineering science texts, vol. 2. — Un vol. broché,  $17 \times 24,5$ , de viii, 328 p. — Prix: £15.95. — Blackwell Scientific Publications, Oxford, 1990.

This book has been written because the advent of modern high-speed computing facilities means that it is now possible to shift from the classical study of linear systems to the fascinating problems encountered in the study of nonlinear systems. This text is designed to be a bridge between elementary courses on ordinary differential equations and advanced graduate courses on topics such as chaotic phenomena, bifurcation theory and Hamiltonian dynamics.

Manfredo Perdigao DO CARMO. — **Riemannian geometry**. — Translated by Francis Flaherty. — Mathematics: theory and applications. — Un vol. relié, 16 × 24, de 300 p. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1992.

Differentiable manifolds. Riemannian metrics. Affine connections, Riemannian connections. Geodesics, convex neighborhoods. Curvature. Jacobi fields, isometric immersions. Complete manifolds, Hopf-Rinow and Hadamard theorems. Spaces of constant curvature. Variations of energy. The Rauch comparison theorem. The Morse index theorem. The fundamental group of manifolds of negative curvature. The sphere theorem.

Richard V. KADISON, John R. RINGROSE. — **Fundamentals of the theory of operator algebras: special topics, vol. 3: Elementary theory-an exercise approach**. — Un vol. relié, 16 × 23,5, de XIV, 273 p. — Prix: SFr. 59.00. — Birkhäuser, Boston, 1991.

This book of exercises is conceived as a companion volume to the treatise "Fundamentals of the theory of operator algebras". The present text contains the written solutions of the exercises of volume one of the treatise. Topics covered are: Linear spaces. Basics of Hilbert space and linear operators. Banach algebras. Elementary  $C^*$ -algebra theory. Elementary von Neumann algebra theory.

**Séminaire de théorie des nombres, Paris, 1989-90**. — Sinnou David, Editor. — Progress in mathematics, vol. 102. — Un vol. relié, 16 × 24, de 270 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1992.

This is the eleventh annual volume of papers based on the lectures given at the Séminaire de théorie des nombres de Paris, including some additional papers of widespread interest. The results presented here by an international group of mathematicians reflect recent work in many areas of number theory and should form a basis for further discussion of these topics. Contributors: Y. André, A. Ash, D. Blasius, M. Carpentier, B. Erez, R. Heath-Brown, Y. Hellegouarch, M.N. Huxley, W. Duke, H. Iwaniec, U. Jannsen, J.-F. Jaulent, W.C. W. Li, C. Mauduit, K. Miyake, G. Robert, J. Wu.

Arthur G. WERSCHULZ. — **The computational complexity of differential and integral equations: an information-based approach**. — Oxford mathematical monographs. — Un vol. relié, 16 × 24, de IX, 331 p. — Prix: £35.00. — Oxford University Press, Oxford, 1991.

Introduction. A two-point boundary value problem. General formulation. The worst case setting: general results. Elliptic partial differential equations in the worst case setting. Other problems in the worst case setting. The average case setting. Complexity in the asymptotic and randomized settings. Appendix: Sobolev spaces, weakly coercive linear equations. Bibliography (140 references).

Jonathan CHAPMAN, Frederick ROWBOTTOM. — **Relative category theory and geometric morphisms: a logical approach**. — Oxford logic guides, vol. 16. — Un vol. relié, 16 × 24, de XI, 263 p. — Prix: 35.00. — Clarendon Press, Oxford, 1992.

Introduction. Local set theories. Partial function theory,  $L'$ . The interpretation of  $L'$ . Equationals. Categories in a topos. Topoi in a topos. A representation theorem for geometric morphisms. Local set theories in  $S$ . The theory of a topos in  $S$ . Topologies and sheaves. The relative Giraud theorem. Appendix.

**Algorithms and classification in combinatorial group theory.** — Edited by G. Baumslag, C.F. Miller III. — Mathematical Sciences Research Institute publications, vol. 23. — Un vol. relié,  $16 \times 24$ , de VIII, 232 p. — Prix: DM 84.00. — Springer-Verlag, New York, 1992.

C.F. Miller: Decision problems for groups: survey and reflections. — O. Kharlampovich: The word problem for solvable groups and Lie algebras. — A. Juhasz: Solution of the conjugacy problem in one-relator groups. — E.A. Scott: A tour around finitely presented infinite simple groups. — K.S. Brown: The geometry of finitely presented infinite simple groups. K.S. Brown: The geometry of rewriting systems: a proof of the Anick-Groves-Squier theorem. — J.M. Alonso: Combinations of groups. — G. Baumslag, S.M. Gersten, M. Shapiro, and H. Short: Automatic groups and amalgams: a survey. — S.M. Gersten: Dehn functions and  $l_1$ -norms of finite presentations. S.M. Gersten: Problems on automatic groups.

Hershel M. FARKAS, Irwin KRA. — **Riemann surfaces.** — Second edition. — Graduate texts in mathematics, vol. 71. — Un vol. relié,  $16 \times 24$ , de XVI, 363 p. — Prix: DM 98.00. — Springer-Verlag, New York, 1992.

This text covers Riemann surface theory from elementary aspects to the frontiers of current research. Open and closed surfaces are treated with emphasis on the compact case... Topics covered include existence of meromorphic functions, the Riemann-Roch theorem, Abel's theorem, the Jacobi inversion problem, Noether's theorem and the Riemann vanishing theorem. A complete treatment of the uniformization of Riemann surfaces via Fuchsian groups, including branched coverings, is presented. Alternate proofs for the most important results are included showing the diversity of approaches to the subject. For this edition the material has been brought up-to-date, and errors have been corrected.

Masanobu TANIGUCHI. — **Higher order asymptotic theory for time series analysis.** — Lecture notes in statistics, vol. 68. — Un vol. broché,  $16,5 \times 24$ , de VIII, 160 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1991.

A survey of the first-order asymptotic theory for time series analysis. — Higher order asymptotic theory for Gaussian ARMA processes. — Validity of Edgeworth expansions in time series analysis. — Higher order asymptotic sufficiency, asymptotic ancillarity in time series analysis. — Higher order investigations for testing theory in time series analysis. — Higher order asymptotic theory for multivariate time series. — Some practical examples.

Nicole BERLINE, Ezra GETZLER, Michèle VERGNE. — **Heat kernels and Dirac operators.** — Grundlehren der mathematischen Wissenschaften, vol. 298. — Un vol. relié,  $16,5 \times 24$ , de VII, 369 p. — Prix: DM 118.00. — Springer-Verlag, Berlin, 1992.

Background on differential geometry. — Asymptotic expansion of the heat kernel. — Clifford modules and Dirac operators. — Index density of Dirac operators. — The exponential map and the index density. — The equivariant index theorem. — Equivariant differential forms. — The Kirillov formula for the equivariant index. — The index bundle. — The family index theorem.

**Geometry and complex variables.** — Proceedings of an international meeting on the occasion of the IX centennial of the University of Bologna. — Edited by Salvatore Coen. — Lecture notes in pure and applied mathematics, vol. 132. — Un vol. broché,  $18 \times 25,5$ , de XIII, 493 p. — Prix: US\$150.00 (U.S.A. et Canada), US\$172.50 (autres pays). — Marcel Dekker, Inc., New York, 1991.

This volume contains new studies on the history of mathematics, including the algebraic geometry work of F. Enriques, B. Levi, and B. Segre... complex function theory ideas of L. Fantappiè, B. Levi, S. Pincherle, and G. Vitali ... series theory and logarithm theory contributions of P. Mengoli and S. Pincherle... etc. Additionally, the book lists all the University of Bologna's mathematics professors — from 1860 to 1940 — with precise indications of each course year by year.

**$p$ -adic functional analysis.** — Edited by José M. Bayod, N. De Grande-De Kimpe, J. Martinez-Maurica. — Lecture notes in pure and applied mathematics, vol. 137. — Un vol. broché,  $18 \times 25,5$ , de VIII, 236 p. — Prix: US\$ 99.75. — Marcel Dekker, Inc., New York, 1992.

This volume contains research articles based on the lectures presented at the first International Conference on the Functional Analysis Aspects of  $p$ -adic Mathematics held in Laredo, Spain, June 4-9, 1990. The book discusses important research topics on  $p$ -adic functional analysis and closely related areas... highlights a collection of open problems, each documented with extensive comments and references... provides an authoritative overview of the main investigative fronts where developments are expected in the future... discloses the answers to two of the given problems that were solved recently.

**Numerical integration: recent developments, software and applications.** — Edited by Terje O. Espelid and Alan Genz. — NATO ASI series, series C, Mathematical and physical sciences, vol. 357. — Un vol. relié,  $16,5 \times 24,5$ , XII, 367 p. — Prix: Dfl. 195.00/US\$115.00/£67.00 — Kluwer Academic Publishers, Dordrecht, 1992.

From the preface: "The main focus of the workshop was to survey recent progress in the theory of methods for the calculation of integrals and show how the theoretical results have been used in software development and in practical applications. The papers in this volume fall into four broad categories: numerical integration rules, numerical integration error analysis, numerical integration applications and numerical integration algorithms and software".

Rudolph TASCHNER. — **Lehrgang der konstruktiven Mathematik. 2. Teil: Differentialrechnung.** — Vorlesungen über Mathematik. — Un vol. broché,  $17 \times 24$ , de 551 p. — Prix: OeS 530.00. — Manz Verlags- und Universitätsbuchhandlung, Wien, 1992.

Der zweite Teil des Lehrgangs der konstruktiven Mathematik befasst sich mit den wichtigsten Aspekten der Differentialrechnung. Von einfachsten Differentiationsregeln bis zu Koordinatentransformationen, von elementaren Integrationen bis zu Integralsätzen für Mehrfachintegrale, von Ellipse, Hyperbel, Parabel bis zu Krümmungsformen von Mannigfaltigkeiten, von simplen Wachstumsprozessen bis zur newtonschen Mechanik und dem Satz von Frobenius über totale Differentialgleichungen wird ein breites Spektrum angeboten, das den Leser profund mathematisch bildet und darüber hinaus auch Kenntnisse für Anwendungen in Ingenieurwissenschaften und theoretischer Physik erschliesst.

Calvin C. CLAWSON. — **Conquering math phobia: a painless primer.** — Un vol. broché,  $15 \times 23$ , de x, 289 p. — Prix: £13.50. — John Wiley & Sons, Inc., New York, 1991.

The book systematically attacks the problem of math illiteracy and teaches you the practical mathematical skills that can open doors to higher achievement in both personal and professional life. It walks you step-by-step through the basics of addition, subtraction, multiplication, division. It provides clear examples of how math applies to every day living. It offers numerous illustrations. It explores and disproves the cultural myths that block the average person from becoming math literate.

Renzo A. PICCININI. — **Lectures on homotopy theory.** — North-Holland mathematics studies, vol 171. — Un vol. relié,  $17 \times 24,5$ , de XII, 293 p. — Prix: US\$92.50/Dfl. 180.00. — North-Holland, Amsterdam, 1992.

Homotopy groups: Function spaces. H-spaces and CoH-spaces. Homotopy groups. — Fibrations and cofibrations: Pullbacks and pushouts. Fibrations. Cofibrations. Applications of the mapping cylinder. — Exact homotopy sequences: Exact sequence of a map: covariant case and contravariant case. — Simplicial complexes: Simplicial complexes. Simplicial approximation theorem. Polyhedra. Fibrations and polyhedra. — Relative homotopy groups: Homotopy groups of maps. Quasifibrations. Some homotopy groups of spheres. — Homotopy theory of  $CW$ -complexes:  $CW$ -complexes. Homotopy theory of  $CW$ -complexes. Eilenberg-Mac Lane spaces. — Fibrations revisited: Sections of fibrations.  $F$ -fibrations. Universal  $F$ -fibrations. — Colimits. — Compactly generated spaces.

**Selected works of A.N. Kolmogorov, vol. 2: Probability theory and mathematical statistics.** — Edited by A.N. Shirayev. — Mathematics and its applications (Soviet series), vol. 26. — Un vol. relié,  $17 \times 24,5$ , de xv, 597 p. — Prix: Dfl. 360.00/US\$199.00/£120.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume is the second of three volumes devoted to the work of one of the most prominent twentieth-century mathematicians. This second volume contains papers on probability theory and mathematical statistics, and embraces topics such as limit theorems, axiomatics and logical foundations of probability theory, Markov chains and processes, stationary processes and branching processes. A number of papers deals with various applications. The material appearing in each volume was selected by A.N. Kolmogorov himself.

Frank B. KNIGHT. — **Foundations of the prediction process.** — Oxford studies in probability, vol. 1. — Un vol. relié,  $16 \times 24$ , de XII, 248 p. — Prix: £40.00. — Clarendon Press, Oxford, 1992.

This book presents a unified treatment of the prediction process approach to continuous time stochastic processes. The underlying idea is that there are two kinds of time: stationary physical time and the moving observer's time. By developing this theme, the author develops a theory of stochastic processes whereby two processes are considered rather than one which coexist on the same probability space. In this way, the observer's process is strongly Markovian. Consequently, any measurable stochastic process of a real parameter may be regarded as a homogeneous strong Markov process in an appropriate setting. This leads to a unifying principle for the representation of general processes in terms of martingales which facilitates the prediction of their properties.

A.D. BARBOUR, Lars HOLST, Svante JANSON. — **Poisson approximation.** — Oxford studies in probability, vol. 2. — Un vol. relié,  $16 \times 24$ , de x, 277 p. — Prix: £30.00. — Clarendon Press, Oxford, 1992.

The law of small numbers is only an approximation. In 1975, a new technique was introduced, the Stein-Chen method, which makes it possible to estimate the accuracy of the approximations in a wide range of situations. This book provides an introduction to the method, and a varied selection of examples of its application, emphasizing the flexibility of the technique when combined with a judicious choice of coupling. It also contains more advance material, in particular on compound Poisson and Poisson process approximation, where the reader is brought to the boundaries of current knowledge.

Michel HULIN, Nicole HULIN, Denise PERRIN. — **Equations de Maxwell, ondes électromagnétiques: cours, exercices d'application, problèmes résolus et annexe mathématique.** — Un vol. broché,  $17,5 \times 25,5$ , de vi, 226 p. — Dunod, Paris, 1992.

Science expérimentale, la physique est aussi une science formalisée: précédemment exposée dans un volume distinct, les bases de l'électromagnétisme sont reprises dans ce livre pour y être formalisées. Vient ensuite le développement de l'électromagnétisme des régimes variables. Avec la présentation de la symétrie caractéristique du champ électrique et du champ magnétique, l'insistance est mise sur l'exploitation des symétries, et c'est d'après l'étude des équations de Maxwell et de leurs conséquences dans le vide qu'est abordé le cas des milieux linéaires. En conclusion, le livre fournit quelques aperçus sur des problèmes tels que la réflexion et la réfraction des ondes ou la propagation guidée.

A. MARTIN. — **Equations aux dérivées partielles: exercices résolus.** — Dunod université. — Un vol. broché,  $15,5 \times 24$ , de viii, 224 p. — Dunod, Paris, 1991.

Ce recueil d'exercices résolus vient compléter le cours de H. Reinhard «Equations aux dérivées partielles», publié dans la même série. Leur objectif commun est de fournir à des étudiants dont le bagage mathématique est restreint, les connaissances minimum pour pouvoir suivre leurs cours de physique, d'électronique ou de mécanique. Des rappels de cours fondamentaux précèdent chaque chapitre. Les solutions détaillées des exercices permettent à chacun de contrôler son niveau de compréhension des sujets traités.

**Applied mathematics for engineering sciences : 2nd French-Chilean Symposium of Applied Mathematics.** — Edited by C. Carasso, C. Conca, R. Correa, J.-P. Puel. — Un vol. broché,  $17 \times 24$ , de vii, 452 p. — CEPADUES-Editions, Toulouse, 1991.

Tenu à Santiago du Chili du 4 au 8 décembre 1989, ce symposium a traité les sujets suivants: équations aux dérivées partielles, applications des équations aux dérivées partielles en mécanique et d'autres branches des sciences de l'ingénieur, analyse numérique. Ce recueil regroupe 33 exposés.

**L'ordinateur pour enseigner les mathématiques.** — Sous la direction de Bernard Cornu. — Nouvelle encyclopédie Diderot. — Un vol. broché,  $15 \times 21,5$ , de 328 p. — Prix: FF 240.00. — Presses universitaires de France, Paris, 1992.

Les auteurs donnent dans cet ouvrage des exemples variés d'utilisations de l'ordinateur pour enseigner les mathématiques, prenant en compte dans leur ensemble les problèmes de l'enseignement et de l'apprentissage, notamment en s'appuyant sur les résultats de travaux de recherche en didactique des mathématiques. Ils montrent également qu'au delà de l'outil pédagogique, l'ordinateur influe sur les mathématiques elles-mêmes, sur l'activité du mathématicien, et donc sur la façon de faire et d'apprendre.

A.M. TURING. — **Collected works: pure mathematics.** — Edited by J.L. Britton. — With a section on Turing's statistical work by I.J. Good. — Un vol. relié,  $17 \times 24,5$ , de XXII, 287 p. — Prix: US\$89.50/Dfl. 175.00. — North-Holland, Amsterdam, 1992.

The collected works of Turing, including a substantial amount of unpublished material, will comprise four volumes: Mechanical intelligence, Pure mathematics, Morphogenesis, Mathematical logic. Today the name of Turing is mentioned frequently in philosophical discussions about the nature of artificial intelligence. Actually, he was a pioneer researcher in computer architecture and software engineering; his work in pure mathematics and mathematical logic extended considerably further and his last work, on morphogenesis in plants, is also acknowledged as being of the greatest originality and of permanent importance. What is maybe surprising about these papers is that although they were written over thirty-five years ago, they address major issues which concern researchers today.

A.M. TURING. — **Collected works: mechanical intelligence.** — Edited by D.C. Ince. — Un vol. relié,  $17 \times 24,5$ , de XIX, 227 p. — Prix: US\$82.00/Dfl. 160.00. — North-Holland, Amsterdam, 1992.

From the introduction: "This volume contains details of [Turing's] contributions to the development of computing. They range from a painstaking technical description of the architecture of the ACE computer, to broad philosophical descriptions of the nature of intelligence and the prospect of computers achieving the level of performance of humans".

Hassler WHITNEY. — **Collected papers.** — Edited by James Eells, Domingo Toledo. — Contemporary mathematicians. — 2 vol. reliés,  $18,5 \times 26$ , de XIV, 590 p. et XIV, 596 p. respectivement. Prix: Vol. 1: SFr. 180.00, vol.2: SFr. 180.00, l'ensemble des deux vol.: SFr. 328.00. — Birkhäuser, Boston, 1991.

This two volume set, contains most of the papers of Hassler Whitney, one of the great innovators in 20th century mathematics. Whitney's pioneering work in algebraic and differential topology and differential geometry has exerted a profound influence on many concepts, including matroids, differentiable manifolds, fiber bundles, characteristic classes, classifying spaces, stratifications, and rational homotopy. His citation for the 1982 Wolf Foundation Prize in Mathematics reads, "His work inaugurates the style of geometric and combinatorial reasoning that has become the standard for the second half of the 20th century". Contents of vol. 1: Graphs and combinatorics, differential functions and singularities, analytic spaces. — Contents of vol. 2: Manifolds, bundles and characteristic classes, topology and algebraic topology, geometric integration theory, other subjects.

Bernd ANGER, Claude PORTENIER. — **Radon integrals : an abstract approach to integration and Riesz representation through function cones.** — Progress in mathematics, vol. 103. — Un vol. relié,  $16 \times 24,5$ , de 332 p. — Prix: SFr. 88.00. — Birkhäuser, Boston, 1992.

The authors of this book have introduced the new concept of a Radon integral, embedded in a general functional analytic theory of integration in an abstract Riemann spirit. They give a unified approach to both the integration- and set-theoretical aspects of measure theory, based on two concepts: that of a regular linear functional on a function cone, and that of an upper functional as an abstract version of an upper integral possibly without convergence properties. In addition, the text will give insight into such concepts as functional analytic finitely-additive integration theory and Riesz representation from a new and systematic point of view, leading to representation theorems.

**Measures of noncompactness and condensing operators.** — By R.R. Akhmerov, M.I. Kamenskii, A.S. Potapov, A.E. Rodkina, B.N. Sadovskii. — Translated from the Russian by A. Iacob. — Operator theory, vol. 55. — Un vol. relié, 17 × 24, de VIII, 249 p. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1992.

This book tackles a new topic in functional analysis, namely, the theory of measures of non-compactness and condensing (or densifying) mappings. General problems of the theory are considered, spectral properties of linear condensing operators are investigated, and index theories (degree theories for vector fields) for condensing mappings and their generalizations are constructed. Applications to the theory of differential equations in Banach spaces, the theory of functional-differential equations, and the theory of stochastic differential equations are considered. Condensing mappings in spaces of summable functions are investigated.

**Theory and applications of Gibbs derivatives.** — Proceedings of the 1st International Workshop on Gibbs Derivatives held September 26-28, 1989 at Kupari-Dubrovnik, Yugoslavia. — Edited by Paul L. Butzer, Radomir S. Stankovic. — Un vol. broché, 17 × 23,5, de xxx, 312 p. — Matematički Institut, Beograd, 1992.

This volume includes 14 invited conference papers. One of these papers lists the literature on Gibbs derivatives and is as complete as possible. The papers are grouped into two parts. The first part contains those contributions that are mainly concerned with “continuous” Gibbs derivatives., considered in the setting of Walsh analysis or general harmonic analysis. The second part deals with papers devoted to “discrete” Gibbs derivatives.

Peter M. HIGGINS. — **Techniques of semigroup theory.** — Oxford science publications. — Un vol relié, 16 × 24, de x, 258 p. — Prix: £40.00. — Oxford University Press, Oxford, 1992.

This book introduces recently developed ideas in semigroup theory and serves to provide a handy reference guide previously unavailable in a single volume. The opening chapter provides sufficient background to enable the reader to follow any of the subsequent chapters. The second chapter gives an account of free inverse semigroups leading to proofs of the McAlister *P*-theorems. Subsequent chapters develop the underlying theme of diagrams and mappings, and the new material includes the theory of biordered sets of Nambooripad and Easdown, the semigroup diagrams of Remmers and Jackson with applications to the one-relator and other word problems... etc. Nearly two hundred exercises are included.

**Stochastic analysis and applications.** — Proceedings of the 1989 Lisbon Conference. — Edited by A.B. Cruzeiro, J.C. Zambrini. — Progress in probability, vol. 26. — Un vol. relié, 16 × 24, de VIII, 197 p. — Prix: SFr. 86.00. — Birkhäuser, Boston, 1991.

In September 1989, the first Lisbon Conference on Stochastic Analysis and Applications was convened to present new research developments. The resulting volume contains a selection of carefully refereed papers from this conference. The wide range of problems tackled by the contributors include: quasi-invariance of measures in infinite dimensions, random walks on groups, problems in stochastic calculus and stochastic calculus of variations, diffusion processes, Gibbs random fields and Dirichlet forms generally motivated by quantum theory, geometric quantization and Witten's topological quantum field theory.

Matthias RICHTER. — **Approximation of Gaussian random elements and statistics.** — Teubner-Texte zur Mathematik, Bd. 130. — Un vol. broché, 14,5 × 20,5, de 156 p. — Prix: DM 29.00. — B.G. Teubner Verlagsgesellschaft, Leipzig, 1992.

In the present book properties of Gaussian random elements and statistics with values in separable Hilbert spaces are studied. The approximation of these random elements is made from the decision theory point of view. For given loss functions characteristics for the approximation errors and the approximation risks are computed. By this the distribution function of infinite dimensional quadratic forms of Gaussian random variables is also discussed. Furthermore, the following problems are treated: the approximation of random elements with given accuracy for the approximation error and risks, optimal selection of approximation operators from given sets, the influence of statistic approximations on statistical decisions.

Kurt HOFFMAN. — **Improved estimation of distribution parameters: Stein-type estimators.** — Teubner-Texte zur Mathematik, Bd. 128. — Un vol. broché, 14,5 × 20,5, de 174 p. — Prix: DM 29.00. — B.G. Teubner Verlagsgesellschaft, Leipzig, 1992.

This book deals with procedures dominating standard estimators of distribution parameters within the scope of exponential families. Besides the representation of improved estimators of the expectation parameter vector of a multivariate normal distribution, procedures better than minimum variance unbiased estimator are derived for the Lognormal, Gamma, Beta, Poisson and Negative Binomial distributions. Much of the material presented is of a fairly recent origin.

Karl STREHMEL, Rüdiger WEINER. — **Linear-implizite Runge-Kutta-Methoden und ihre Anwendung.** — Teubner-Texte zur Mathematik, Bd. 127. — Un vol. broché, 14,5 × 20,5, de 356 p. — Prix: DM 49.00. — B.G. Teubner Verlagsgesellschaft, Leipzig, 1992.

The central theme of this monograph are linearly-implicit Runge-Kutta methods, which include ROW-, W- and adaptive Runge-Kutta methods. Their connection with explicit and implicit Runge-Kutta methods as well as their application to important problem classes are discussed. The considered classes contain stiff systems of ordinary differential equations, retarded differential equations with constant delay, differential-algebraic equations of index 1 and special classes of parabolic equations. The main objects of the theoretical investigations are stability properties, B-consistency and B-convergence.

Vladimir K. DUBOVOJ, Bernd FRITZSCHE, Bernd KIRSTEIN. — **Matricial version of the classical Schur problem.** — Teubner-Texte zur Mathematik, Bd. 129. — Un vol. broché, 14,5 × 20,5, de 355 p. — Prix: DM 49.00. — B.G. Teubner-Verlagsgesellschaft, Leipzig, 1992.

One of the central themes in Schur analysis is the investigation of matricial versions of classical interpolation problems. Recently several different approaches to treat this type of problems have been developed. In the present volume two of these approaches are presented. The method developed by B. Fritzsche and B. Kirstein can be conceived as a direct matricial generalization of Schur's classical algorithm, whereas the variant of V.K. Dubovoj is embedded in V.P. Potapov's concept of transforming a given matrix interpolation problem into an equivalent matrix inequality.

Jeffrey RAUCH. — **Partial differential equations.** — Graduate texts in mathematics, vol. 128. — Un vol. relié, 16 × 24, de x, 263 p. — Prix: DM 88.00. — Springer-Verlag, New York, 1991.

The objective of this book is to present an introduction to the ideas, phenomena, and methods from partial differential equations. This material assumes the reader to be familiar with advanced calculus, real analysis, the rudiments of complex analysis, and the language of functional analysis. Topics discussed include elliptic, hyperbolic, and parabolic equations, the

energy method, maximum principle, and the Fourier transform. The text features many historical and scientific motivations and applications. Exercices, hints and discussions are included.

Keith DEVLIN. — **Sets, functions and logic : an introduction to abstract mathematics.** — Second edition. — Chapman & Hall mathematics. — Un vol. broché,  $15,5 \times 23$ , de x, 147 p. — Prix: £13.95. — Chapman & Hall, London, 1992.

This text is written for students beginning “abstract pure mathematics” at university or college level. Its aim is to provide a solid foundation in the basic logical concepts for most of the subjects encountered in university and college mathematics, including algebra and analysis. What the student needs is to acquire competency in what is virtually an entire new language and to adopt an entirely new mode of thinking (mathematical thinking). The number of exercises has been expanded, and the text completely rewritten for this edition.

Frances KIRWAN. — **Complex algebraic curves.** — London Mathematical Society student texts, vol. 23. — Un vol. broché,  $15 \times 23$ , de VIII, 264 p. — Prix: £13.95 (relié: £30.00). — Cambridge University Press, Cambridge, 1992.

Complex algebraic curves have many fascinating properties and crop up in various areas of mathematics, from number theory to theoretical physics, and are the subject of much research. By using only the basic techniques acquired by most undergraduate courses in mathematics, the author introduces the theory, observes the algebraic and topological properties of complex algebraic curves, and shows how they are related to complex analysis.

***p*-adic methods and their applications.** — Edited by Andrew J. Baker and Roger J. Plymen. — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de 193 p. — Prix: £30.00. — Clarendon Press, Oxford, 1992.

A number of texts have recently become available which provide good general introductions to *p*-adic numbers and *p*-adic analysis. However, there is at present a gap between such books and the sophisticated applications in the research literature. The aim of this book is to bridge this gulf by providing a collection of intermediate level articles on various applications of *p*-adic techniques throughout mathematics. Some of the article presented grew out of talks given at a Meeting held at Manchester University, in September 1989, others were written by invitation especially for this volume.

**Progress in functional analysis.** — Proceedings of the International Functional Analysis Meeting on the Occasion of the 60th Birthday of Professor M. Valdivia, Peniscola, Spain, 22-27 October, 1990. — Edited by K.D. Bierstedt, J. Bonet, J. Horvath, M. Maestre. — North-Holland mathematics studies, vol. 170. — Un vol. relié,  $17 \times 24,5$ , de XXVIII, 431 p. — Prix: US\$115.50/Dfl. 225.00. — North-Holland, Amsterdam, 1992.

During his career, Valdivia has made contributions to a wide variety of areas of functional analysis and his work has had a profound impact. A thorough appreciation of Valdivia's work is presented in J. Horvath's article. This volume presents more than twenty-five papers on topics related to Valdivia's researches (Banach spaces, operator ideals, tensor products, Frechet, (DF) and (LF) spaces, distribution theory, infinite holomorphy, etc...). The book covers a broad spectrum of interests in today's functional analysis and presents new results by leading specialists in the field.

**Coding theory: the essentials.** — Edited by D.G. Hoffman, D.A. Leonard, C.C. Lindner, K.T. Phelps, C.A. Rodger, J.R. Wall. — Pure and applied mathematics, vol. 150. — Un vol. relié, 15,5 × 23,5, de XI, 277 p. — Prix: £55.00. — Marcel Dekker, Inc., New York, 1991.

This textbook deals exclusively with binary codes and codes over fields of characteristic 2, stressing the construction, encoding, and decoding of several important families of codes, primarily those useful in engineering and computer science, such as Reed-Solomon and convolutional codes. Containing solutions to selected exercises, and other features to reinforce essential concepts, this volume makes coding theory accessible to students with only a basic background in mathematics.

Jonathan S. GOLAN. — **The theory of semirings with applications in mathematics and theoretical computer science.** — Pitman monographs and surveys in pure and applied mathematics, vol. 54. — Un vol. relié, 16,5 × 24, de XIV, 318 p. — Prix: £58.00. — Longman Scientific and Technical, Harlow, Essex, 1992.

Semirings and semimodules over them, are algebraic structures which were studied initially in connection with the ideal theory of rings and with the axiomatics of the natural numbers, and with the study of positive functionals on linear spaces. Later they were found to be extremely useful in the solution of problems in graph theory and optimization. Recently, they have found extensive applications in coding theory, automata theory, the description of relational data bases and other areas of theoretical computer science. This is the first book to extensively present, in a readily accessible form, the basic mathematical theory of semirings and semimodules and to elucidate many of the uses to which this theory can be put, both in the realm of mathematics and that of computer science.

**Approximation theory, spline functions and applications.** — Edited by S.P. Singh, with the assistance of Antonio Carbone, R. Charron and B. Watson. — NATO ASI series, series C: Mathematical and physical sciences, vol. 356. — Un vol. relié, 17 × 24,5, de XVI, 479 p. — Prix: Dfl. 240.00/US\$ 139.00/£82.00. — Kluwer Academic Publishers, Dordrecht, 1992.

From the preface: These are the proceedings of the NATO Advanced Study Institute held at Maratea, between April 28, 1991 and May 9, 1991. Among the main topics covered is the subject of univariate and multivariate wavelet decomposition over spline spaces. The work involves key techniques in approximation theory-cardinal splines, B-splines, Euler-Frobenius polynomials, spline spaces with non-uniform knot sequences. A number of scientific applications are also highlighted, most notably applications to signal processing and digital image processing...

**Boundary value and initial problems in complex analysis : studies in complex analysis and its applications to partial differential equations 1.** — Edited by R. Kühnau and W. Tutschke. — Pitman research notes in mathematics series, vol. 256. — Un vol. broché, 17 × 24,5, de 274 p. — Prix: £26.00. — Longman Scientific & Technical, Harlow, Essex, 1991.

This book contains contributions to new trends in complex analysis presented at the 1988 Halle Conference on Complex Analysis and its Applications to Partial Differential Equations. The first part of the book is concentrated on the solution of boundary value problems such as the Riemann-Hilbert one. The papers include non-linear boundary value problems and Riemann-Hilbert type boundary value problems for differential equations with singular coefficients. Some of the papers deal with non-linear problems, e.g. Bergman-Vekua type operators for quasilinear differential equations. A chapter on integral transforms contains new theorems of Paley-Wiener type and new theorems on convolution equations.

**Differential equations and control theory.** — Edited by V. Barbu. — Pitman research notes in mathematics series, vol. 250. — Un vol. broché,  $17 \times 24,5$ , de 353 p. — Prix: £36.00. — Longman Scientific & Technical, Harlow, Essex, 1991.

This Research Note contains the proceedings of an International Conference on Differential Equations and Control Theory held at Iasi (Romania) in August 1990. Many leading specialists in the field participated in the conference and their contributions reflect the main directions and present state of research. Contributions are focused both on theoretical aspects and applied problems. This book will be of interest to specialists in the theory of ordinary differential equations, partial differential equations and control of distributed parameter systems, and to those with an interest in the application of differential equations to mechanics, physics and biology.

**Progress in partial differential equations: the Metz surveys.** — Edited by M. Chipot and J. Saint Jean Paulin. — Pitman research notes in mathematics series, vol. 249. Un vol. broché,  $17 \times 24,5$ , de 200 p. — Prix: £21.00. — Longman Scientific & Technical, Harlow, Essex, 1991.

This book presents some recent advances in three important domains of partial differential equations and applied mathematics: calculus of variations, exact controllability and numerical analysis. These topics are now part of various areas of science and have experienced tremendous development during the last decades. Interconnections within these different areas are presented in particular for the numerical analysis of problems in calculus of variations and applications to mechanics.

**Potential theory.** — Proceedings of the International Conference on Potential Theory, Nagoya (Japan), August 30-September 4, 1990. — Edited by Masanori Kishi. — Un vol. relié,  $18 \times 24,5$ , de IX, 403 p. — Prix: DM 198.00/US\$98.00. — Walter de Gruyter, Berlin, 1992

The contributions to this volume cover a wide spectrum of current potential theory ranging from classical to nonlinear potential theory. Topics covered include Dirichlet and Neumann problems, Martin compactification, Choquet theory and, related to complex analysis, Green's function, capacity and quasiconformal methods. Applications to probability theory and other branches of mathematics are also discussed.

Anvarbek M. MEIRMANOV. — **The Stefan problem.** — Translated from the Russian by Marek Niezgodka and Anna Crowley. — De Gruyter expositions in mathematics, vol. 3. — Un vol. relié,  $17,5 \times 24,5$ , de IX, 244 p. — Prix: DM 148.00/US\$89.00. — Walter de Gruyter, Berlin, 1992.

This book is an exposition of most recent results on evolutionary problems with free boundaries of Stefan type. The central part of the book is devoted to the author's famous results on the existence of classical solutions to the multidimensional problem. Topics covered include: local and global existence of solutions of one- and two-phase problems, use of Lagrange variables in multidimensional problems, classical solutions of one-dimensional problems (including the problem of filtration), properties of generalized solutions (mushy regions), approximate models and crystallization problems.

N.M.J. WOODHOUSE. — **Geometric quantization.** — Second edition. — Oxford mathematical monographs. — Oxford science publications. — Un vol. relié,  $16,5 \times 24$ , de IX, 307 p. — Prix: £37.50. — Clarendon Press, Oxford, 1992.

In this completely revised edition, the author has simplified the presentation, added a number of new examples, and tried to remove the many errors noted in the original. The material has been rearranged in a more logical order. Contents: Symplectic geometry. Lagrangian and Hamiltonian mechanics. Symmetry. Hamilton-Jacobi theory. Complex polarizations. Elementary relativistic systems. Classical fields. Prequantization. Quantization. The metaplectic correction. Appendix.

**Huygens' principle 1690-1990: theory and applications.** — Proceedings of an International Symposium, The Hague/Scheveningen, November 19-22, 1990. — Edited by H. Blok, H.A. Ferwerda, H.K. Kuiken. — Studies in mathematical physics, vol. 3. — Un vol. relié,  $16 \times 23$ , de XIII, 564 p. — Prix: US\$ 128.50/Dfl. 225.00. — North-Holland, Amsterdam, 1992.

This book is based on the symposium organized to commemorate the publication of Christiaan Huygens' famous treatise "Traité de la Lumière", 300 years ago, in January 1690. Huygens' wave principle continues to play an important role in understanding of wave phenomena. Papers included in this volume present a wide range of topics to which the Principle applies. The subjects covered include the historical background, geometrical optics, ray and field theory, the mathematical analysis of wave propagation, quantum electronics and nonlinear optics. The editors have grouped related subjects together.

Martin C. GUTZWILLER. — **Chaos in classical and quantum mechanics.** — Interdisciplinary applied mathematics, vol. 1. — Un vol. relié,  $16 \times 24$ , de XIII, 432 p. — Prix: DM 68.00. — Springer-Verlag, New York, 1991.

The main focus of this book is on seeking the connection between classical and quantum mechanics: classical chaos is rough and fractal, whereas quantum chaos is smooth and elusive; and yet the former should be the limit of the latter as Planck's quantum becomes small. The historical and cultural background is mentioned, and the text discusses realistic examples in some detail, thereby providing readers a new perspective and preparing them to tackle new problems in this rich field.

Reinhard RACKE. — **Lectures on nonlinear evolution equations: initial value problems.** — Aspects of mathematics, vol. E19. — Un vol. relié,  $16 \times 23$ , de VIII, 259 p. — Prix: DM 68.00. — Vieweg, Braunschweig, 1992.

This book serves as an elementary, self-contained introduction into some important aspects of the theory of global solutions to initial value problems for nonlinear evolution equations. The existence and uniqueness of small, smooth solutions which are defined for all values of the time parameter is investigated. Other examples are the equations of elasticity, heat equations, the equations of thermoelasticity, Schrödinger equations, Klein-Gordon equations, Maxwell equations and plate equations. Moreover, a prospect on corresponding initial boundary value problems and on open question is given.

Toma V. TONEV. — **Big planes, boundaries and function algebras.** — North-Holland mathematics studies, vol. 172. — Un vol. relié,  $17 \times 24,5$ , de XVIII, 294 p. — Prix: US\$ 92.50/Dfl. 180.00. — North-Holland, Amsterdam, 1992.

Treated in this volume are selected topics in analytic Gamma-almost-periodic functions and their representations as Gamma-analytic functions in the big-plane;  $n$ -tuple Shilov boundaries of function spaces, minimal norm principle for vector-valued functions and their applications in the study of vector-valued functions and  $n$ -tuple polynomial and rational hulls. Applications to the problem of existence of  $n$ -dimensional complex analytic structures, analytic Gamma-

almost-periodic structures and structures of Gamma-analytic big-manifolds respectively in commutative Banach algebra spectra are also discussed.

**Function spaces.** — Edited by Krzysztof Jarosz. — Lecture notes in pure and applied mathematics, vol. 136. — Un vol. broché,  $18 \times 25$ , de XI, 425 p. — Prix: US\$110.00 (USA et Canada) et US\$126.50 (Tout autre pays). — Marcel Dekker, Inc., New York, 1992.

Written by over 40 leading authorities around the world, "Function spaces" covers developments in such areas as spaces and algebras of analytic functions, isometries of function spaces, geometry of Banach spaces, Banach algebras, Toeplitz operators, von Neumann operators, Wiener amalgams, Hardy and Bergman spaces, Orlicz-Lorentz spaces, multiple Shilov boundaries and related hulls ... etc. This book contains over 625 bibliographic references.

S.G. GINDIKIN, L.R. VOLEVICH. — **Distributions and convolution equations.** — Un vol. relié,  $15,5 \times 23,5$ , de XI, 465 p. — Prix: US\$95.00/£54.00. — Gordon & Breach Science Publishers, Philadelphia, 1992.

The authors apply the results of many years of their own original research to a systematic presentation of the theory of distributions so the book can be used as a textbook. The first part of the book is devoted to Cauchy problem. The second part deals with the Wiener-Hopf equation and related topics in the theory of boundary value problems. To make their work more accessible, the authors restrict initial treatment of problems to the half-line and formulate only principal results, in their simplest form. Special results and possible generalizations are presented as problems and exercises.

Howard ANTON. — **Calculus: with analytic geometry.** — With contributions from Albert Herr. — Fourth edition. — Wiley International Edition. — Un vol. broché,  $20,5 \times 25,5$ , de 1350 p. — Prix: £22.20. (Relié: £62.00). — John Wiley & Sons, Inc., New York, 1992.

Coordinates, graphs, lines. Functions and limits. Differentiation. Applications of differentiation. Integration. Applications of the definite integral. Logarithm and exponential functions. Inverse trigonometric and hyperbolic functions. Techniques of integration. Improper integrals, L'Hôpital's rule. Infinite series. Topics in analytic geometry. Polar coordinates and parametric equations. Three-dimensional space, vectors. Vector-valued functions. Partial derivatives. Multiple integrals. Topics in vector calculus. Second-order differential equations. Appendices: Reviews of sets, trigonometry review, supplementary material.

William E. BOYCE, Richard C. DIPRIMA. — **Elementary differential equations.** — Fifth edition. — Un vol. relié,  $19,5 \times 24,5$ , de XV, 553 p. — Prix: £55.00. — John Wiley & Sons, Inc., New York, 1992.

Introduction. First order differential equations. Second order linear equations. Higher order linear equations. Series solutions of second order linear equations. The Laplace transform. Systems of first order linear equations. Numerical methods. Nonlinear differential equations and stability. Answers to problems.

G.H. HARDY. — **A mathematician's apology.** — With a foreword by C.P. Snow. — Cambridge paperbacks: mathematics. — Canto edition. — Un vol. broché,  $13,5 \times 21,5$ , de 153 p. — Prix: £4.95. — Cambridge University Press, Cambridge, 1992.

G.H. Hardy was one of this century's finest mathematical thinkers, renowned amongst his contemporaries as a "real mathematician... the purest of the pure". He was also, as C.P. Snow recounts in his foreword, "unorthodox, eccentric, radical, ready to talk about anything". This apology, written poignantly as his mathematical powers were declining, offers a brilliant and engaging account of mathematics as very much more than a science.

**Combinatorics and theoretical computer science.** — Edited by R. Simion. — Proceedings of the Capital City Conference on Combinatorics and Theoretical Computer Science, Washington, DC, 1989. — Topics in discrete mathematics, vol. 1. — Un vol. relié, 20 × 26,5, de 290 p. — Prix: US\$ 157.00/Dfl. 275.00. — North-Holland, Amsterdam, 1992.

Important connections between theoretical computer science and combinatorics have been shown by advances in both fields resulting from cross-boundary collaborations and the awareness of problems and techniques specific to both fields. The publication of this volume — the first in the series "Topics in discrete mathematics" — allows a wide audience to appreciate the wealth of beautiful results, the power of techniques, the excitement of open problems and prospective developments in several aspects of both fields. Included are surveys written in a style which bears in mind both the interests of the specialist and non-specialist. The list of recommended reading may encourage interested readers to pursue the study of the topics in depth.

Claude BREZINSKI. — **Biorthogonality and its applications to numerical analysis.** — Pure and applied mathematics, vol. 156. — Un vol. relié, 15,5 × 23,5, de v, 166 p. — Prix: US\$ 85.00 (USA et Canada) US\$ 97.75 (Tout autre pays). — Marcel Dekker, Inc., New York, 1992.

This volume fully exploits biorthogonality and discusses its varied applications in numerical analysis, applied mathematics, and approximation theory. Providing generalizations of known results, methods, and algorithms, the book explores several previously overlooked connections between biorthogonality and such techniques as Fourier expansion, projections, divided differences, and extrapolation processes, presents new results for various recurrence relations as well as generalizations of the method of moments, the method of Lanczos, and biconjugate gradient method... etc.

**Mathematical modelling and applied mathematics.** — Proceedings of the IMACS International Conference on Mathematical Modelling and Applied Mathematics, Moscow, USSR, 18-23 June 1990. — Edited by Aleksandr A. Samarskii and M.P. Sapagovas. — Un vol. relié, 20 × 26,5, de XII, 470 p. — Prix: US\$ 123.00/Dfl. 240.00. — North-Holland, Amsterdam, 1992.

Mathematical modelling and computational experiment make the basis for the methodological renovation of science. It lies in spreading the expertise, ideas and methods of applied mathematics to new spheres. The main purpose of this proceedings is to bring together the scientists in applied mathematics and computational experiment, developers and users of mathematical models from different branches of knowledge in order to exchange ideas, information and experience. The volume contributes to a deeper understanding of contemporary interdisciplinary problems.

Richard A. JOHNSON, Gouri K. BHATTACHARYYA. — **Statistics: principles and methods.** — Second edition. — Un vol. relié, 19 × 24, de XVII, 686 p. — Prix: £ 19.50. — John Wiley & Sons, Inc., New York, 1992.

From the Preface: "...we have written this book to provide students with a first exposure to the powerful ideas of modern statistics. It presents the key statistical concepts and the most commonly applied methods of statistical analysis. Moreover, to keep it accessible to freshmen and sophomores from a wide range of disciplines, we have avoided mathematical derivations...The second edition...maintains the same overall objectives, orientation, and level of presentation as the first edition. We have added a substantial number of exercises, given further emphasis to data analysis and the use of computer printouts...etc."

**The zeta functions of Picard modular surfaces.** — Based on lectures delivered at a CRM Workshop in the spring of 1988. — Edited by Robert P. Langlands and Dinakar Ramakrishnan. — Un vol. relié,  $17,5 \times 25$ , de xiv, 492 p. — Prix: US\$34.00. — Les Publications CRM, Montréal, 1992.

B.B. Gordon: Canonical models of Picard modular surfaces. — M.J. Larsen: Arithmetic compactification of some Shimura surfaces. — M. Goresky:  $L_2$  cohomology is intersection cohomology. — J.D. Rogawski: Analytic expression for the number of points mod  $p$ . — R.E. Kottwitz and M. Rapoport: Contribution of the points at the boundary. — J.S. Milne: The points on a Shimura variety modulo a prime of good reduction. — The Editors: The description of the theorem. — T.C. Hales: Orbital integrals on  $U(3)$ . — R.P. Langlands: Remarks on Igusa theory and real orbital integrals. — R.E. Kottwitz: Calculation of some orbital integrals. — D. Blasius and J.D. Rogawski: Fundamental lemmas for  $U(3)$  and related groups. Tate classes and arithmetic quotients of the two-bal. — J.D. Rogawski: The multiplicity formula for  $A$ -packets. — V.K. Murty and D. Ramakrishnan: The Albanese of unitary Shimura varieties. — M. Goresky and R. MacPherson: Lefschetz numbers of Hecke correspondences. — M. Rapoport: On the shape of the contribution of a fixed point on the boundary: the case of  $Q$ -rank one.

Günther FREI, Urs STAMMBACH. — **Hermann Weyl und die Mathematik an der ETH Zürich, 1913-1930.** — Un vol. relié,  $17 \times 24$ , de 181 p. — Prix: SFr. 68.00. — Birkhäuser Verlag, Basel, 1992.

Anhand von Briefen und Dokumenten, vor allem aus dem Schulratsarchiv der ETH Zürich, beschreibt dieses Buch Hermann Weyls Leben in Zürich; gleichzeitig stellt es die personelle Entwicklung der Mathematik an der ETH Zürich während dieser Zeit dar. Einen besonders wichtigen Platz nehmen in dieser Sammlung die Dokumente ein, die Hermann Weyls zahlreiche Berufungen an andere Hochschulen betreffen; sie erlauben einen interessanten Einblick in die damalige Berufungspraxis. Eine Dokumentation, die dem Leser den Wissenschaftler wie den Menschen Hermann Weyl eindrücklich vor Augen stellt.

Patrice NAUDIN, Claude QUITTE. — **Algorithmique algébrique: avec exercices corrigés.** — Préface de Francis Sergeraert. — Collection Logique, mathématiques/informatique. — Un vol. broché,  $17,5 \times 24$ , de xv, 469 p. — Prix: FF 280.00. — Masson, Paris, 1992.

L'ouvrage traite essentiellement de quatre algorithmes fondamentaux, dont l'ensemble peut être considéré comme la base de tout système de calcul formel: l'algorithme d'exponentiation dichotomique, l'algorithme d'Euclide, le théorème «chinois» et la transformée de Fourier rapide. Leurs relations mutuelles et leurs rapports avec les notions classiques de l'algèbre sont examinés en détail. L'acquis informatique nécessaire à la compréhension de ce cours fait l'objet d'un rappel au début de l'ouvrage. Chaque chapitre est assorti d'exercices, suivis de leurs solutions commentées.