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## BULLETIN BIBLIOGRAPHIQUE

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**Revolutions in mathematics.** — Edited by Donald Gillies. — Un vol. relié,  $16 \times 24$ , de VIII, 353 p. — Oxford science publications. — Prix: £55.00. — Clarendon Press, Oxford, 1992.

From the preface: "The idea of the present collection arose gradually from discussions with quite a number of people. My attention was first drawn to the debate between Crowe and Dauben on whether there were revolutions in mathematics by Caroline Dunmore, whose thesis on the development of mathematics I was supervising... The idea was to have a collection on revolutions in mathematics which would reprint the original papers that started the debate, and include also a series of specially commissioned papers discussing the question from different points of view and describing different historical examples of what might be considered revolutions in mathematics... This volume discusses the ideas of Kuhn, and the alternative approaches of Popper, Lakatos, Feyerabend, and others in the context of science."

G.R. GRIMMETT, D.R. STIRZAKER. — **Probability and random processes.** — Second edition. — Oxford science publications. — Un vol. broché,  $16 \times 24$ , de XII, 541 p. — Prix: £22.50. — Clarendon Press, Oxford, 1992.

This successful text has now been comprehensively revised. There are three main aims: to provide a simple but rigorous introduction to probability without exposing the reader to overmuch measure theory, to discuss a wide range of random processes in some depth with many examples and to give the beginner some flavour of more advanced work, by suitable choice of material. The book begins with basic material commonly covered in first-year undergraduate mathematics and statistics courses, and finishes with topics to be found in graduate courses. This new edition includes, among other important features, two new chapters providing more comprehensive treatments of the simpler properties of martingales and diffusion processes.

G.R. GRIMMETT, D.R. STIRZAKER. — **Probability and random processes: problems and solutions.** — Oxford science publications. — Un vol. broché,  $16 \times 24$ , de X, 366 p. — Prix: £19.50. — Clarendon Press, Oxford, 1992.

This book contains around 675 problems in probability and random processes, together with their solutions. Apart from being a volume of worked problems in its own right, it is also a solutions manual for exercises and problems appearing in the companion volume "Probability and random processes (2nd ed.)". The range of topics covered is broad, beginning with the elementary theory of probability and random variables, and continuing, via chapters on Markov chains and convergence, to extensive sections devoted to stationarity and ergodic theory, renewals, queues, martingales, and diffusions.

**Optimization, optimal control and partial differential equations.** — First Franco-Romanian Conference, Iasi, September 7-11, 1992. — Edited by V. Barbu, J.F. Bonnans, D. Tiba. — International series of numerical mathematics, vol. 107. — Un vol. relié,  $17 \times 24$ , de XIII, 347 p. — Prix: SFr. 118.00/DM 136.00. — Birkhäuser Verlag, Basel, 1992.



This book collects research papers presented during the first Franco-Romanian Conference on Optimization, Optimal Control and Partial Differential Equations held in Iasi from September 7-11, 1992. This volume presents a large spectrum of problems and covers the development of results in this field, to which most of the participants have brought notable contributions. The following topics are discussed in the articles contained in this volume: variational methods in mechanics and physical models, the controllability of infinite dimensional and distributed parameter systems, the  $H^\infty$  control problem, the dynamic programming method and optimal control, optimal control of nonlinear partial differential equations, mathematical programming and nonsmooth optimization.

Vladimir I. ARNOL'D. — **Ordinary differential equations.** — Translated from the Russian by Roger Cooke. — Springer Textbook. — Un vol. broché,  $15,5 \times 24$ , de 334 p. — Prix: DM 78.00. — Springer-Verlag, Berlin, 1992.

In this text Arnol'd puts a clear emphasis on the qualitative and geometric properties of ODEs and their solutions, rather than on the routine presentation of algorithms for solving special classes of equations. It is rich with examples and connections with mechanics. Where possible, Arnol'd proceeds by physical reasoning, using it as a convenient shorthand for much longer formal mathematical reasoning. This book is an excellent text for a course whose goal is a mathematical treatment of differential equations and the related physical systems.

Roger HOWE, Eng Chye TAN. — **Non-Abelian harmonic analysis: applications of  $SL(2, \mathbb{R})$ .** — Universitext. — Un vol. broché,  $15,5 \times 23,5$ , de xv, 257 p. — Prix: DM 58.00. — Springer-Verlag, New York, 1992.

The authors of the book discuss the representation theory of  $SL(2, \mathbb{R})$  and applications both to an outside of representation theory. The topics outside representation theory include Fourier analysis, the Laplace equation (for definite as well as indefinite metrics), Huyghens' principle, and ergodic theory. The topics inside representation theory mostly concern themes that have been central to Harish-Chandra's development of harmonic analysis on semisimple groups, including his restriction theorem, his regularity theorem, character formulas, and asymptotic decay of matrix coefficients and temperedness.

Anthony J. TROMBA. — **Teichmüller theory in Riemannian geometry.** — Based on lecture notes by Jochen Denzler. — Lectures in mathematics ETH Zürich. — Un vol. broché,  $17 \times 24$ , de 220 p. — Prix: SFr. 39.00/DM 44.00. — Birkhäuser Verlag, Basel, 1992.

These lectures develop Teichmüller theory within the context of Riemannian geometry and elliptic partial differential equations. It is the author's hope that this new approach, which is more in the spirit of modern general relativity, will provide a substantially more accessible framework within which to study the properties of Teichmüller space. This space has proved to be of absolutely fundamental importance to many different areas of mathematics and physics, from the study of Riemann surfaces, minimal surfaces, and number theory through to modern string theory.

**Quasiconformal space mappings: a collection of surveys 1960-1990.** — Edited by Matti Vuorinen. — Lecture notes in mathematics, vol. 1508. — Un vol. broché,  $16,5 \times 25$  cm, de ix, 148 p. — Prix: DM 42.00. — Springer-Verlag, Berlin, 1992.

The present volume is the first collection of surveys devoted to the theory of quasiconformal space mapping. Individual papers are surveys of their respective topics: G.D. Anderson, M.K. Vamanamurthy, M. Vuorinen: Conformal invariants, quasiconformal maps and special

functions. F.W. Gehring: Topics in quasiconformal mappings. T. Iwaniec: L P-Theory of quasiregular mappings. O. Martio: Partial differential equations and quasiregular mappings. Yu.G. Reshetnyak: On functional classes invariant relative to homotheties. S. Rickman: Picard's theorem and defect relation for quasiregular mapping. U. Srebro: Topological properties of quasiregular mappings. J. Väisälä: Domains and maps. V.A. Zorich: The global homeomorphism theorem for space quasiconformal mappings, its development and related open problems.

David BLEECKER, George CSORDAS. — **Basic partial differential equations.** — Un vol. relié, 19 × 25 cm, de XV, 676 p. Prix: £36.50. Van Nostrand Reinhold, New York, 1992.

Methods of solution for partial differential equations (PDEs) used in mathematics, science, and engineering are clarified in this self-contained source. You'll learn how to use PDEs to predict system behavior from an initial state of the system and from external influences, and enhance the success of endeavors involving reasonably smooth, predictable changes of measurable quantities. The book enables you not only to find solutions of many PDEs, but also to interpret and use these solutions. It offers 600 exercises ranging from routine to challenging and 280 examples. Applications include heat conduction, wave propagation fluid flow, electrostatics, quantum mechanics, minimal surfaces gravitation, and vibrations of strings, square drums, round drums, and spheres.

Richard V. KADISON, John R. RINGROSE. — **Fundamentals of the theory of operator algebras.** — Vol. IV: Special topics: advanced theory, an exercise approach. — Un vol. relié, 16 × 23,5, de XIV, 859 p. — Prix: SFr. 98.00/DM 112.00. — Birkhäuser, Boston, 1992.

This is the second volume of the continuation of a two volume work previously published under the same title and well known throughout the mathematics and physics community. It contains the authors' complete solutions to all the exercises in the previous vol. 2, presented here with their characteristic clarity and attention to detail. One of the splendid features of the original two volumes is their large supply of exercises — 450 in vol. II, separated into 1129 manageable tasks — which illustrate the results of the text and expand its scope. Groups of exercises constitute presentations of topics, explained with the background of the authors' vast experience. Among such topics in this volume are derivations and automorphisms, completely positive mappings, the Friedrichs extension, modular theory and dual cones, the Sakai flip and much more.

Walter GANDER. — **Computer-Mathematik.** — 2. überarbeitete Auflage mit TURBO PASCAL-Programmen. — Programm Praxis, Bd. 3. — Un vol. broché, 15 x 21, de 266 p. — Prix: SFr. 58.00/DM 69.00. — Birkhäuser Verlag, Basel, 1992.

Dieses Lehrbuch zeigt, wie der Computer als Werkzeug zum Lösen von mathematischen Aufgaben eingesetzt werden kann. Vorausgesetzt wird, dass der Leser bereits eine Programmiersprache kennt. Mit zahlreichen Beispielen und interessanten Aufgaben kann er seine Programmierkenntnisse erweitern. Algorithmen werden entwickelt für nichtlineare Gleichungen, Polynome, Splinefunktionen, lineare Gleichungssysteme, Matrixoperationen, numerische Integrationen und mehrfachgenaues Rechnen. Mathematische Algorithmen sind komplizierte Formeln, welche hier in PASCAL dargestellt sind. Es wird gezeigt, wie ein solcher Algorithmus nach einer Variablen differenziert werden kann.

Isao IMAI. — **Applied hyperfunction theory.** — Mathematics and its applications (Japanese series), vol. 8. — Un vol. relié, 16,5 × 24,5, de XIX, 438 p. — Prix: Dfl. 360.00/US\$ 199.00/£ 123.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This book gives an intelligible exposition of generalized functions based on Sato's hyperfunction, which is essentially the 'boundary value of analytic functions.' An intuitive image — hyperfunction = vortex layer — is adopted, and only an elementary knowledge of complex function theory is assumed. The treatment is entirely self-contained. The first part of the book gives a detailed account of fundamental operations such as the four arithmetical operations applicable to hyperfunction, namely differentiation, integration, and convolution, as well as Fourier transform. In the second part, based on the general theory, the Hilbert transform and Poisson-Schwarz integral formula are treated and their application to integral equation is studied.

Arkady TEMPELMAN. — **Ergodic theorems for group actions: informational and thermodynamical aspects.** — Mathematics and its applications, vol. 78. — Un vol. relié, 16,5 × 24,5, de XVIII, 399 p. — Prix: Dfl. 285.00/US\$ 165.00/£ 89.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume is devoted to generalizations of the classical Birkhoff and von Neumann ergodic theorems to semigroup representations in Banach spaces, semigroup actions in measure spaces, homogeneous random fields and random measures on homogeneous spaces. In particular homogeneous spaces, on which all homogeneous random fields are quasimixing, are introduced and studied. Also dealt with are applications of general ergodic theorems for the construction of specific informational and thermodynamical characteristics of homogeneous random fields on amenable groups and for proving general versions of the McMillan, Breiman and Lee-Yang theorems. A variational principle which characterizes the Gibbsian homogeneous random fields in terms of the specific free energy is also proved.

Yu.A. BRYCHKOV, H.-J. GLAESKE, A.P. PRUDNIKOV, Vu Kim TUAN. — **Multidimensional integral transformations.** — Un vol. relié, 16 × 23,5, de XIII, 386 p. — Gordon and Breach Science Publishers, Philadelphia, 1992.

In this extensive work, the authors offer a thorough introduction to multidimensional integral transformations. They discuss all of the most important transformations, providing in a single volume a compilation of information that is at present scattered throughout the literature. Attention is concentrated on the operational calculus of the major integral transformations and some of its applications, with an investigation of transforms in spaces of functions and of distributions.

E. RAMIS, C. DESCHAMPS, J. ODOUX. — **Cours de mathématiques spéciales, vol. 5: Applications de l'analyse à la géométrie.** — 2e édition révisée et complétée. — Un vol. broché, 16 × 24, de VIII, 315 p. — Prix: FF 250.00. — Masson, Paris, 1992.

Le présent ouvrage est le cinquième et dernier tome d'un «Cours de mathématiques» écrit à l'intention des élèves des classes de mathématiques supérieures et de mathématiques spéciales. Cette édition qui conserve au cours le caractère d'ouvrage de référence contient: — d'une part les compléments de mathématiques qui rendent l'ouvrage utilisable par les étudiants des universités et par les candidats aux concours de recrutement des professeurs; — d'autre part les deux chapitres concernant les applications des mathématiques aux autres disciplines scientifiques, allant jusqu'à des notions utiles pour les physiciens, telles l'analyse vectorielle ou les théorèmes de Stokes et d'Ostrogradski.

Piotr BILER, Tadeusz NADZIEJA. — **Problems and examples in differential equations.** — Pure and applied mathematics, vol. 164. — Un vol. relié, 16 × 23,5, de VIII, 244 p. — Prix: US\$ 55.00. — Marcel Dekker, Inc., New York, 1992.

This practical textbook discusses topics from original research and unpublished papers and presents small investigation subjects, ... offers a collection of advanced-level problems and many examples and counterexamples previously scattered in the literature and not easily accessible... furnishes concise answers to the problems so readers can work out methodologies on their own... examines theorems and information to point out far-reaching generalizations and give a better understanding of results... explores the wide scope of the theory of differential equations... describes current research on simplified models of important questions under study... and more.

D. COLLETT. — **Modelling binary data.** — Un vol. broché, 15,5 × 23,5, de XIII, 369 p. — Prix: £19.95. — Chapman & Hall, London, 1991.

This book shows how binary data, that is data that can take one of two possible forms, such as alive or dead and success or failure, can be analysed using statistical modelling. The role of the linear logistic model is particularly stressed, but models based on the probit and complementary log-log transformations are introduced. Throughout this book, the practical aspects of the modelling approach are emphasized. It is designed to be used by statisticians and numerate scientists in the pharmaceutical industry, and those engaged in agricultural, biological, industrial and medical research.

Michael R. BEAUREGARD, Raymond J. MIKULAK, Barbara A. OLSON. — **A practical guide to statistical quality improvement: opening up the statistical toolbox.** — Un vol. relié, 16 × 24, de x, 469 p. — Prix: £46.00. — Van Nostrand Reinhold, New York, distributed by Routledge, Chapman and Hall, London, 1992.

Written by working engineers for working engineers in manufacturing and service organizations, this volume takes the mystery out of statistical improvement tools. It gives readers a non-theoretical look at continual enhancement of manufacturing through statistical process control and improvement techniques. The Guide contains the first compilation of special techniques for SPC with step-by-step guidance for applying these tools to process improvement. Emphasized throughout are the specific details of how to use the statistical improvement tools.

**Partial differential equations and related subjects.** — Proceedings of the Conference dedicated to Louis Nirenberg. — Edited by M. Miranda. — Pitman research notes in mathematics series, 269. — Un vol. broché, 17 × 24,5, de 256 p. — Prix: £28.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

The study of partial differential equations impinges on many areas of interest in scientific and technological research. The main purpose of these studies is the proof of existence of solutions. A revolutionary event in this direction was the introduction of direct methods of calculus of variations by David Hilbert at the end of the last century. In addition to calculus of variations there are other general mathematical theories which contribute substantially to the solution of the main problem: potential theory, analytic functions theory, and functional analysis. Some of the leading mathematicians interested in partial differential equations and related subjects went to Trento in September 1990 to honour of Louis Nirenberg. Their talks at the meeting are presented in this volume.

Shelley RASMUSSEN. — **An introduction to statistics with data analysis.** — International student edition. — Un vol. broché, 18,5 × 23,5, de XIX, 707 p. — Prix: US\$19,95. — Brooks/Cole Publishing Company, Pacific Grove, Calif, distributed by Routledge, Chapman and Hall Ltd, London, 1992.

From the preface: "This book is intended for a one- or two-semester introduction to statistics. The discussion is not calculus-based and the only prerequisite is high school algebra. The emphasis is on the art of statistical thinking. I believe that a course emphasizing statistical thinking about applied problems ought to be anyone's introduction to statistics, no matter what major or year in college... Almost all of the examples and exercises in this book are based on real data sets... Data analysis is introduced at the beginning of the book, in part I... Part II contains the essential concepts in probability that we need for statistical inference... A number of topics and techniques of formal statistical inference are presented in part III".

Frank C. DILORIO. — **SAS Applications programming: a gentle introduction.** — The Duxbury series in statistics and decision sciences. — Un vol. broché, 21,5 × 28, de xiv, 684 p. — Prix: US\$21.00. — PWS-Kent Publishing Company, Boston, distributed by Routledge, Chapman and Hall, London, 1991.

The author presents the basics of the SAS System in a well-paced, structured, and non-threatening manner for the beginning or intermediate user. Numerous practical and real-world examples are drawn from the author's fifteen years of experience using SAS. System- and version-independent, "SAS Applications Programming" gives the reader the flexibility to utilize any recent version of this popular statistical software package. Complex topics are introduced at a reasonable rate, gradually bringing readers to the point where they can manage multiple datasets, read complex raw data, perform complex calculations quickly and effectively, and write custom reports.

**Symposium "Analysis on manifolds with singularities", Breitenbrunn 1990.** — Edited by Bert-Wolfgang Schulze and Hans Triebel. — Teubner-Texte zur Mathematik, Bd. 131. — Un vol. broché, 14,5 × 20,5, de 306 p. — Prix: DM 44.00. — B.G. Teubner, Leipzig, 1992.

In recent years the analysis on manifolds with singularities became more and more interesting, not only because of the progress in solving corresponding singular problems in partial differential equations but also of the new relations to other parts of mathematics such as geometry, topology and mathematical physics. Other motivations come from concrete models in engineering and applied sciences which lead to partial differential equations in domains with a piece-wise smooth geometry, piece-wise smooth data or boundary and transmission conditions, degenerate coefficients, etc... There are natural relations to the numerical analysis where also the asymptotics of solutions close to the singularities play a role. The 24 papers presented in this book explore the different aspects of the subject.

Konrad JACOBS. — **Invitation to mathematics.** — Un vol. broché, 15,5 × 23,5, de xi, 247 p. — Prix: US\$29.95 pour les USA, £18.00, pour tout autre pays, (relié: US\$60.00 pour les USA, et £37.00 pour tout autre pays). — Princeton University Press, Princeton, 1992.

Based on a well-received course designed for philosophy students, this book is an informal introduction to mathematical thinking. The work will be rewarding not only for philosophers concerned with mathematical questions but also for serious amateur mathematicians with an interest in the "frontiers" as well as the foundations of mathematics. In what might be termed a sampler of the discipline, Konrad Jacobs discusses an unusually wide range of topics, including such items of contemporary interest as knot theory, optimization theory, and dynamical systems.

**Histoire de fractions, fractions d'histoire.** — Coordonné par Paul Benoit, Karine Chemla, Jim Ritter. — Science networks: historical studies, vol. 10. — Un vol. relié, 17 × 24, de xii, 436 p. — Prix: SFr. 158.00. — Birkhäuser Verlag, Basel, 1992.



Les fractions sont à la fois simples et déconcertantes. Apparues avec l'écriture, elles furent dès le début utilisées dans les opérations arithmétiques de la vie quotidienne. Elles ont joué un rôle crucial dans la recherche mathématique pendant près de 5000 ans. Pourtant cet outil a été curieusement négligé par les historiens. Il n'existe aucune histoire des fractions, et elles n'ont pas de spécialiste. Les traiter nécessitait le concours de chercheurs venant d'horizons différents. C'est pourquoi on trouvera parmi les auteurs de ce livre des mathématiciens, des orientalistes, des historiens de l'économie, des médiévistes, ... chacun apportant son éclairage sur le sujet.

**Operator calculus and spectral theory.** — Symposium on operator calculus and spectral theory, Lambrecht (Germany), December 1991. — Edited by M. Demuth, B. Gramsch, B.-W. Schulze. — Operator theory: advances and applications, vol. 57. — Un vol. relié, 16,5 × 24, de 359 p. — Prix: SFr. 118.00. — Birkhäuser Verlag, Basel, 1992.

Treated are subjects such as operator algebras and calculus in the sense of pseudo-differential operators, Fourier integral operators, P.D.E., manifolds with singularities, as well as aspects of index theory, particularly in connection with the heat transfer equation method, and precise estimates of the spectral asymptotics. In spectral theory and stochastic spectral analysis generalised Schrödinger operators, relativistic and time-dependent Hamiltonians, pseudo-differential operators and second order perturbations are studied. N-body scattering, long-range potentials, eigenvalue estimates, resonances, time delay, qualitative perturbations of spectral measures, and singular perturbations, are analysed.

**Continuous and discrete Fourier transforms, extension problems and Wiener-Hopf equations.** — Edited by I. Gohberg. — Operator theory: advances and applications, vol. 58. — Un vol. relié, 17 × 24, de VIII, 214 p. — Prix: SFr. 92.00. — Birkhäuser Verlag, Basel, 1992.

J. Benedetto, C. Heil, D. Walnut: Uncertainty principles for time-frequency operators. — R.L. Ellis, I. Gohberg, D.C. Lay: Distribution of zeros of matrix-valued continuous analogues of orthogonal polynomials. — I. Gohberg, M.A. Kaashoek: The band extension of the real line as a limit of discrete band extensions, II. The entropy principle. — M. Cotlar, C. Sadosky: Weakly positive matrix measures, generalized Toeplitz forms, and their applications to Hankel and Hilbert transform operators. — J. Ball, I. Gohberg, M.A. Kaashoek: Reduction of the abstract four block problem to a Nehari problem. — A.B. Kuijper: The state space method for integro-differential equations of Wiener-Hopf type with rational matrix symbols. — H. Widom: Symbols and asymptotic expansions.

Israel GOHBERG, Naum KRUPNIK. — **One-dimensional linear singular integral equations, vol II: General theory and applications.** — Operator theory: advances and applications, vol. 54. — Un vol. relié, 17 × 24, de 232 p. — Prix: SFr. 108.00. — Birkhäuser Verlag, Basel, 1992.

The main topics of this book are invertibility, Fredholmness and, in particular, inversion methods for these operators. The subject of the first volume was the case of closed curves and continuous coefficients. Here the case of general curves and discontinuous coefficients is considered. The book contains both the general abstract approach and concrete methods to solve singular integral equations. Numerous applications, examples, and exercises are included.

**Random walks, Brownian motion, and interacting particle systems: a Festschrift in honor of Frank Spitzer.** — Edited by Rick Durrett, Harry Kesten. — Progress in probability, vol. 28. — Un vol. relié, 16 × 24, de IX, 455 p. — Prix: SFr. 108.00. — Birkhäuser, Boston, 1991.

This collection of papers is dedicated to Frank Spitzer on the occasion of his sixty-fifth birthday. The articles, written by a group of his friends, are intended to demonstrate the major

influence Frank has had on probability theory. Basic properties of Brownian motion, fluctuation theory, random walks and interacting particle systems are presented in these papers. The latter topic in particular is presently one of the most exciting and active areas in probability, providing fruitful interaction between statistical physicists and probabilists.

H. DAVENPORT. — **The higher arithmetic: an introduction to the theory of numbers.** — 6th edition. — Un vol. broché,  $14 \times 21,5$ , de 217 p. — Prix: £12.95 (relié: £30.00). — Cambridge University Press, Cambridge, 1992.

Now into its 6th edition and with an additional chapter on computers and number theory, written by J.H. Davenport, "The higher arithmetic" introduces concepts and theorems in a way that does not require the reader to have an in depth knowledge of the theory of numbers but also touches upon matters of deep mathematical significance.

**Number theory II: algebraic number theory.** — Edited by A.N. Parshin, I.R. Shafarevich. — Encyclopaedia of mathematical sciences, vol. 62. — Un vol. relié,  $16 \times 24$ , de vi, 269 p. — Prix: DM 136.00. — Springer-Verlag, Berlin, 1992.

This volume of the Encyclopaedia presents the main structures and results of algebraic number theory with emphasis on algebraic number fields and class field theory. Helmut Koch, the author of this book, has written for the non-specialist. He assumes that the reader has a general understanding of modern algebra and elementary number theory. Mostly only the general properties of algebraic number fields and related structures are included. Special results appear only as examples which illustrate general features of the theory.

Gregory KARPILOVSKY. — **Group representations, vol. 1: part A: Background material and Part B: Introduction to group representations and characters.** — North-Holland mathematics studies, vol. 175. — Deux vol. reliés,  $17,5 \times 24,5$ , de xviii, 1274 p. sur l'ensemble. Prix: US\$271.50/Dfl. 475.00, l'ensemble des deux vol. — North-Holland, Amsterdam, 1992.

This is the first of a multi-volume treatise on group representations. The principal object of these volumes is to provide, in a self-contained manner, comprehensive coverage of the mainstream of group representation theory. The audience for these volumes consists of aspiring graduate students and mature mathematicians working in the field. The style of the presentation is informal. The author is not afraid to repeat definitions and formulas when necessary. Many sections begin with a nontechnical description and special effort has been made to render the exposition transparent.

E.F. ASSMUS, Jr., J.D. KEY. — **Designs and their codes.** — Cambridge tracts in mathematics, vol. 103. — Un vol. relié,  $16 \times 23,5$ , de x, 352 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1992.

The first half of the book contains general background material in design theory, including symmetric designs and designs from affine and projective geometries, and in coding theory, including coverage of most of the important classes of linear codes. In particular the author provides a new treatment of the Reed-Muller and generalized Reed-Muller codes. The last three chapters treat the applications of coding theory to some important classes of designs and Steiner systems, in particular the Witt systems. The book is aimed at mathematicians working in either coding theory or combinatorics, or related areas of algebra.

J.-J. RISLER. — **Mathematical methods for CAD.** — Un vol. broché,  $15 \times 23$ , de 196 p. — Prix: £18.95 (relié: £35.00). — Cambridge University Press, Cambridge, 1992.

As computers become the mainstay of most engineering design practices, there has been a growing interest in the theory of computational geometry and computer aided design. This book sets out the fundamental elements of this theory in a mathematically rigorous manner. Splines and Bézier curves are first tackled, leading to Bézier surfaces, triangulation and box splines. The final chapter is devoted to algebraic geometry and provides a firm theoretical basis for anyone wishing seriously to develop and investigate CAD systems.

**Probabilistic and stochastic methods in analysis with applications.** — Edited by J.S. Byrnes, Jennifer L. Byrnes, Kathryn A. Hargreaves, and Karl Berry. — NATO ASI series, ser. C: Mathematical and physical sciences, vol. 372. — Un vol. relié, 17 × 24,5, de xi, 699 p. — Prix: Dfl. 395.00/US\$ 234.00/£ 139.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume contains papers presented at the July 1991 NATO Advanced Study Institute held at Il Ciocco, Italy. The book contains three clear expositions on wavelets, frames and their applications, a description of holography and their image processing techniques, and works on sampling theory and methods. Part of the conference was devoted to the connections between probability and partial differential equations. Highlights of this section of the proceedings are in-depth introductions to stochastic optimal control and filtering theory. Another part of the conference deals with the application of probabilistic techniques to mathematical analysis.

Hans BANDEMER, Wolfgang NAETHER. — **Fuzzy data analysis.** — Theory and decision library, ser. B: Mathematical and statistical methods, vol. 20. — Un vol. relié, 16,5 × 24,5, de xii, 341 p. — Prix: Dfl. 180.00/US\$ 99.00/£ 62.00. — Kluwer Academic Publishers, Dordrecht, 1992.

Fuzzy data, such as marks, scores, verbal evaluations, imprecise observations, experts opinions and grey tone pictures, are quite common. In this book the authors collect their recent results providing the reader with ideas, approaches and methods for processing such data when looking for sub-structures in knowledge bases or for an evaluation of functional relationships, e.g. in order to specify diagnostic or control systems. The modeling presented uses ideas from fuzzy set theory and the suggested methods solve problems usually tackled by data analysis if the data are real numbers.

**Probability theory.** — Proceedings of the 1989 Singapore Probability Conference held at the National University of Singapore, June 8-16, 1989. — Edited by Louis H.Y. Chen, Kwok Pui Choi, Kaiyuan Hu, Jiann-Hua Lou. — Un vol. relié, 17,5 × 24,5, de x, 208 p. — Prix: DM 168.00/US\$ 98.00. — Walter de Gruyter, Berlin, 1992.

These proceedings contain most of the invited lectures presented at the Singapore Conference. Two workshop lectures on inverse questions in stochastic differential geometry and estimates on the heat kernel for second order divergence form operators by M.A. Pinsky and D.W. Stroock, respectively, form the first part of the book. The second part consists of a special invited lecture on Malliavin calculus by K. Itô. The rest of the book comprises 9 papers by C.C. Heyde, R. Gay, T. Hida, H. Kesten, S. Kotani, M.A. Pinsky, V. Wihstutz, J. Potthoff, J.A. Yan, D.O. Siegmund, C. Stein, S. Watanabe, based on one-hour lectures. Their contributions cover a wide range of topics of current research interest in probability theory.

Hellmut BAUMGAERTEL and Manfred WOLLENBERG. — **Causal nets of operator algebras: mathematical aspects of algebraic quantum field theory.** — Mathematische Lehrbücher und Monographien, II. Abteilung: Mathematische Monographien, Band 80. — Un vol. relié, 17,5 × 24,5, de xviii, 460 p. — Prix: DM 164.00. — Akademie Verlag, Berlin, 1992.



This book is intended to give a presentation of the theory of nets of operator algebras, in particular nets connected with a causality condition. Such nets appear in mathematical formulations of quantum statistical mechanics and of quantum field theory. In this book the emphasis lies on nets which are linked with the algebraic approach to quantum field theory. This is an attempt to present systematically essential parts of the theory in its mathematical language. For selected directions the treatment leads the reader to the frontiers of actual research; examples are the superselection theory, and the theory of types of local algebras.

Alphonse CHARLIER, Alain BERARD, Marie-France CHARLIER, Danièle FRISTOT. — **Tensors and the Clifford algebra: application to the physics of bosons and fermions.** — Pure and applied mathematics, vol. 163. — Un vol. relié, 16 × 23,5, de ix, 323 p. — Prix: US\$ 125.00. — Marcel Dekker, Inc., New York, 1992.

This practical reference text presents the applications of tensors, Lie groups, and algebra to Maxwell, Klein-Gordon, and Dirac equations, making elementary theoretical physics comprehensible and high-level theoretical physics accessible. With over 2800 display equations and 14 exhaustive appendixes, this book is a reference for mathematical physicists and applied mathematicians, and a text for upper-level undergraduate and graduate students in quantum mechanics, relativity, electromagnetism, theoretical physics, elasticity, and field theory courses.

Sylvie GUERRE-DELABRIERE. — **Classical sequences in Banach spaces.** — Pure and applied mathematics, vol. 166. — Un vol. relié, 16 × 23,5, de xiv, 207 p. — Prix: US\$ 99.55. — Marcel Dekker, Inc., New York, 1992.

This text offers in-depth coverage of those Banach spaces that contain either the space of sequences of integers tending to zero, or the space of  $p$ -summable sequences of integers. This book explains the use of such tools and techniques as Schauder bases, ultrapowers, spreading models, and stable Banach spaces. It is intended for graduate students, and was used for a course at the University of Paris. It requires only a basic knowledge of classical functional analysis and the theory of Banach spaces, and is mostly self-contained.

TRAN Van Hiep et Alain COMBROUZE. — **Mathématiques: analyse et programmation: cours et exercices corrigés.** — Collection Major. — Un vol. broché, 17 × 24, de xvi, 669 p. — Prix: FF 268.00. — Presses universitaires de France, Paris, 1992.

Ce manuel, spécialement destiné aux candidats des classes préparatoires HEC, s'adresse également aux étudiants du premier cycle universitaire. Ce volume permet d'acquérir une connaissance solide du sujet et une méthode de traitement des exercices et problèmes des concours et examens. Toutes les définitions et propositions sont illustrées par des exemples et commentaires. L'étudiant y trouve plus de 500 exercices entièrement corrigés, accompagnés de conseils utiles en vue de leur résolution.

**Contemporary design theory: a collection of surveys.** — Edited by Jeffrey H. Dinitz, Douglas R. Stinson. — Wiley-Interscience series in discrete mathematics and optimization. — Un vol. relié, 16 × 24,5, de xvi, 639 p. — Prix: £ 63.00. — John Wiley & Sons, Inc., New York, 1992.

J.H. Dinitz and D.R. Stinson: A brief introduction to design theory. — B. Alspach, K. Heinrich, G. Liu: Orthogonal factorizations of graphs. — F.E. Bennett and L. Zhu: Conjugate-orthogonal latin squares and related structures. — C.J. Collbourn and A. Rosa: Directed and Mendelsohn triple systems. J.H. Dinitz and D.R. Stinson: Room squares and

related designs. — Alan Hartman and K.T. Phelps: Steiner quadruple systems. — D. Jungnickel: Difference sets. — C.C. Lindner, C.A. Rodger: Decomposition into cycles II: cycle systems. — W.H. Mills and R.C. Mullin: Coverings and packings. — Alexander Rosa and C.J. Colbourn: Colorings of block designs. — J. Seberry and M. Yamada: Hadamard matrices, sequences, and block designs. — L. Teirlinck: Large sets of disjoint designs and related structures. — W.D. Wallis: One-factorizations of complete graphs.

**Stochastic partial differential equations and applications.** — Giuseppe Da Prato and Luciano Tubaro, editors. — Pitman research notes in mathematics series, vol. 268. — Un vol. broché,  $17 \times 24,5$ , de 286 p. — Prix: £30.00. — Longman Scientific and Technical, Harlow, Essex, 1992.

In these proceedings many problems of stochastic partial differential equations are presented: quantum random fields, control theory, quantum (non commutative) probability, and filtering theory. Whilst some of the papers deal with the stochastic partial differential equations only from a purely mathematical point of view, nevertheless their results are presented in such a way to be directly used in the various applications fields. Readership: Researchers in pure and applied mathematics, PhD students in probability and partial differential equations.

**Operator algebras and topology.** — Proceedings of the OATE 2 Conference: Romania 1989. — Edited by W.B. Arveson, A.S. Mishchenko, M. Putinar, M.A. Rieffel and S. Stratila. — Pitman research notes in mathematics series, vol. 270. — Un vol. broché,  $17 \times 24,5$ , de 196 p. — Prix: £22.00. — Longman Scientific and Technical, Harlow, Essex, 1992.

This volume contains papers concerned with the interrelationship between the subjects of operator algebras and topology. The authors were participants in the conference held in Craiova, Romania in the summer of 1989. The purpose of the conference was to expose some of the important new developments which have been taking place in the subject of operator algebras, and the papers in this volume reflect that purpose. The papers range from index theory and  $K$ -theory, through fractal  $C^*$ -algebras and analysis on infinite dimensional manifolds, to quantization and quantum groups.

Michael OBERGUGGENBERGER. — **Multiplication of distributions and applications to partial differential equations.** — Pitman research notes in mathematics series, vol. 259. — Un vol. broché,  $17 \times 24,5$ , de xvii, 312 p. — Prix: £33.00. — Longman Scientific and Technical, Harlow, Essex, 1992.

This volume addresses the theory and applications of mathematical models involving: nonlinear operations, differentiation, and the presence of singular objects. Specifically, the recent theories of algebras of generalized functions of J.F. Colombeau and E.E. Rosinger are studied, as well as their applications to partial differential equations obtained from 1985 onward. Applications involve: nonlinear wave equations and hyperbolic systems with singular initial data, shock waves in nonconservative systems, equations with discontinuous coefficients, global solutions for analytic partial differential equations, regularity theory, and various particular products of distributions arising in PDE and quantum field theory.

M. BAKONYI, T. CONSTANTINESCU. — **Schur's algorithm and several applications.** — Pitman research notes in mathematics series, vol. 261. — Un vol. broché,  $17 \times 24,5$ , de 190 p. — Prix: £26.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

From the preface: "The aim of this book is to present as many results and applications of the ideas in Schur's "Über Potenzreihen, die im Innern des Einheitskreises beschränkt sind" as

possible. We stick to the initial background of the theory of analytic functions in the unit disc, so that this book can be also regarded as an introduction to other volumes we intend to write in connection with Schur's algorithm. Thus non-stationary developments, connections with indefinite inner product spaces as well as continuous analogues of the problems discussed in this volume are to be described in these future volumes". This book contains six chapters: Schur algorithms. Two completion algorithms. Spectral factorisations. Orthogonal polynomials on the unit circle. A few "electrical engineering" applications. Other completion problems. Appendix: Some positive and contractive structures.

Joan H. McCARTER. — **Discovering calculus with graphing calculators : a manual of projects to enhance the understanding of single variable calculus.** — Un vol. broché,  $21,5 \times 25,5$ , de 167 p. — Prix: US\$ 14.50. — John Wiley & Sons, New York, 1992.

This manual has been written to be used as a supplement to any calculus text, but the topics are ordered to follow "Calculus" by Howard Anton. This hands-on learning experience helps students understand the concepts of calculus through the use of a graphing calculator. Carefully prepared calculator projects in the manual allow students to use graphs to visualize the problems, draw conclusions, and check their results. Each project includes the following: 1 — Beginning problems relate to the examples and exercises in the "Anton text". 2 — As the projects progress, the problems at the end get more complicated and require more conceptual understanding. 3 — Students will explore, discover and learn by doing. They will sometimes be required to write a comparison or description of their results.

**Discovering calculus with "MATHEMATICA".** — By Bart Braden, Donald K. Krug, Philip W. McCartney, Steven Wilkinson. — Un vol. relié, de  $21,5 \times 25,5$ , de 170 p. — Prix: US\$ 14.50. — John Wiley & Sons, New York, 1992.

This hands-on manual uses MATHEMATICA to offer students additional insights into calculus through graphics and animation as well as symbolic and numerical computation. Each chapter includes the following: 1 — Introduction to basic MATHEMATICA commands in a simple "interactive dialog" format. A sequence of commands is presented for students to type and execute, together with a brief commentary. Most of the output is absent, encouraging students to actually execute commands. 2 — Examples are worked out, with explanatory comments. Output is included when its interpretation is not obvious. 3 — Exercises are included. Some have been chosen from the new edition of Anton's "Calculus", fourth edition. In the later chapters the knowledge of the student regarding both calculus and MATHEMATICA has increased, and so the exercises become more challenging.

Pierre THUILLIER, Jean-Claude BELLOC. — **Mathématiques, fasc. 4 : algèbre, par Jean-Claude BELLOC.** — Instituts universitaires de technologie. — 2e éd. refondue. — Un vol. broché,  $16 \times 24$ , de VI, 294 p. — Prix: FF 146.00. — Masson, Paris, 1992.

Ce tome d'«Algèbre» rédigé par Jean-Claude BELLOC, présente: les ensembles de nombres et principalement les nombres complexes, les polynômes et les fractions rationnelles, les matrices et les systèmes linéaires. Certains concepts abstraits nécessitent des développements théoriques (ainsi pour les notions de structure algébrique, de linéarité). Mais une large part est laissée aux applications physiques (algèbre de Boole, impédance complexe...) ainsi qu'à des exercices de programmation (approximation polynomiale, algorithme de Gauss).

J. SANCHEZ-HUBERT, E. SANCHEZ-PALENCIA. — **Introduction aux méthodes asymptotiques et à l'homogénéisation: application à la mécanique des milieux continus.** — Collection Mathé-

matiques appliquées pour la maîtrise. — Un vol. broché, 16 × 24, de XII, 266 p. — Prix: FF 150.00. — Masson, Paris, 1992.

L'utilisation des méthodes asymptotiques est indispensable pour l'étude de systèmes physiques où apparaissent un ou plusieurs paramètres petits par rapport aux autres, mais dont l'influence est qualitativement important. L'originalité de cet ouvrage consiste à ce niveau à présenter des thèmes modernes d'actualité: homogénéisation pour l'étude des matériaux composites, introduction à l'étude des singularités (qui sont utilisées pour l'étude de la fissuration et pour l'endommagement des matériaux), problèmes raides qui interviennent dans des systèmes fortement hétérogènes, plaques et poutres laminées (mise en évidence du couplage de flexion et traction).

Charles VAN LOAN. — **Computational frameworks for the fast Fourier transform.** — Frontiers in applied mathematics, vol. 10. — Un vol. broché, 17,5 × 25,5, de XIII, 273 p. — Prix: £27.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1992.

The author captures the interplay between mathematics and the design of effective numerical algorithms — a critical connection as more advanced machines become available. He uses a stylized Matlab notation which will be familiar to those engaged in high-performance computing. The fast Fourier transform (FFT) family of algorithms has revolutionized many areas of scientific computation. The FFT is one of the most widely used algorithms in science and engineering, with applications in almost every discipline.

Stephen F. McCORMICK. — **Multilevel projection methods for partial differential equations.** — CBMS-NSF regional conference series in applied mathematics, vol. 62. — Un vol. broché, 17,5 × 25, de VI, 114 p. — Prix: US\$18.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1992.

This book focuses on a new formalism called the multilevel projection method, which provides a framework for the development of multilevel algorithms in a very general setting. This methodology guides the choices of all the major multilevel processes, including relaxation and coarsening, and it applies directly to global or locally- refined discretizations. Contents: Fundamentals. Multilevel projection methods. Unigrid. Paradigms. Perspectives. References. Appendix A: Simple unigrid code. Appendix B: More efficient unigrid code. Appendix C: Modification to unigrid code for local refinement.

Harald NIEDERREITER. — **Random number generation and quasi-Monte-Carlo methods.** — CBMS-NSF regional conference series in applied mathematics, vol. 63. — Un vol. broché, 17 × 25, de VI, 241 p. — Prix: US\$34.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1992.

This volume contains recent important work in the areas of uniform pseudorandom number generation and quasi-Monte-Carlo methods. Some developments contained here have never before appeared in book form. Based on a series of 10 lectures presented by the author at the University of Alaska at Fairbanks in 1990 to a selected group of researchers, this book includes the discussion of: the integrated treatment of pseudorandom numbers and quasi-Monte-Carlo methods; the systematic development of the theory of lattice rules and the theory of nets and  $(t, s)$ -sequences; the construction of new and better low-discrepancy point sets and sequences; nonlinear congruential methods; the initiation of a systematic study of methods for pseudorandom vector generation; shift-register pseudorandom numbers.

John LUND, Kenneth L. BOWERS. — **Sinc methods for quadrature and differential equations.** — Un vol. relié,  $16 \times 23,5$ , de x, 304 p. — Prix: US\$42.50. — Society for Industrial and Applied Mathematics, Philadelphia, 1992.

The book is an elementary development of the Sinc-Galerkin method with the focal point being ordinary and partial differential equations. It explains this powerful computational method for treating differential equations. The authors' use of differential equations as a backdrop for the presentation of the material allows them to present a number of the applications of the Sinc method. Many of these applications are useful in numerical processes of interest quite independent of differential equations. Specifically, numerical interpolation and quadrature, while fundamental to the Galerkin development, are useful in their own right. Sinc approximation is a relatively new numerical technique. This book provides a much needed elementary level explanation.

**Interconnection networks.** — Edited by J.C. Bermond. — Reprinted from the journal "Discrete applied mathematics", vol. 37/38, 1992. — Topics in discrete mathematics, vol. 5. — Un vol. relié,  $20 \times 27$ , de 581 p. — Prix: US\$271.50/Dfl. 475.00. — North-Holland, Amsterdam, 1992.

The aim of the book is to gather 40 articles born of a specialized workshop, dealing with all the combinatorial aspects of interconnection networks, in particular in view of their use in parallel computing. New constructions are proposed based on different tools from discrete mathematics. Many new records have been established in the table of the maximum number of vertices of graphs. Properties of these networks (and of more classical ones) are analyzed in many of the other papers. About 40% of the articles deal with fault tolerance or vulnerability properties using either combinatorial tools or probabilistic ones.

**Combinatorics '90: recent trends and applications.** — Proceedings of the Conference on Combinatorics, Gaeta, Italy, 20-27 May, 1990. — Edited by W.B. A. Barlotti, A. Bichara, P.V. Ceccherini and G. Tallini. — Annals of discrete mathematics, vol. 52. — Un vol. relié  $17,5 \times 24,5$ , de ix, 566 p. — Prix: US\$165.50/Dfl. 290.00. — North-Holland, Amsterdam, 1992.

The present volume contains the proceedings of the International Conference "Combinatorics '90" held in Gaeta, from May 20th to May 27th, 1990. The book forms a valuable source of information on recent developments in research in combinatorics, with special regard to the geometric point of view. Topics covered include: finite geometries (arcs, caps, special varieties in a Galois space, generalized quadrangles, Benz planes, foundation of geometry), partial geometries, Buekenhout geometries, transitive permutation sets, flat-transitive geometries, design theory, finite groups, near-rings and semifields, MV-algebras, coding theory, cryptography and graph theory in its geometric and design aspects.

Florin N. DIACU. — **Singularities of the N-body problem : an introduction to celestial mechanics.** — Un vol. broché,  $17 \times 25$ , de ix, 175 p. — Les publications CRM, Université de Montréal, Montréal, 1992.

The  $N$ -body problem. The nature of singularities. The theorem of von Zeipel. The criteria of Pollard and Saari. Solutions free of pseudocollisions. Examples of pseudocollisions. Central configurations. Regularization of collisions. Triple collision in the rectilinear three-body problem. The collision manifold. Structural stability of homothetic orbits. Simultaneous binary collisions. Time regularization of partial collisions. The solution of the  $N$ -body problem.



Barry C. ARNOLD, N. BALAKRISHNAN, H.N. NAGARAJA. — **A first course in order statistics.** — Wiley series in probability and mathematical statistics. — Un vol. relié,  $16 \times 24$ , de xvii, 279 p. — Prix: £39.95. — John Wiley & Sons, Inc., New York, 1992.

Written in a simple style and in understandable terms, this work includes not only basic material but recent developments in the field. Some of the major topics discussed are: an introduction to distribution theory, the theory of discrete order statistics, characterizations, and an updated discussion of asymptotic theory. Some basic inference methods based on order statistics have been included which clearly indicate what the potential applications are of order statistics in different fields (for example: the theory of records values). Each chapter contains a set of exercises.

Edward H. JULIUS. — **Rapid math tricks & tips: 30 days to number power.** — Un vol. broché,  $17,5 \times 25,5$ , de ix, 229 p. — Prix: £11.50. — John Wiley & Sons, Inc., New York, 1992.

With the author's 30-day number power program, you will learn how to deal with common (and some not so common) math problems without a calculator. In fact, with the fun, easy-to-learn techniques in this book, you will be able to master difficult problems in addition, subtraction, multiplication and division — often in less time than it takes to use a calculator!

Peter BUSER. — **Geometry and spectra of compact Riemann surfaces.** — Progress in mathematics, vol. 106. — Un vol. relié,  $16,5 \times 24$ , de xiv, 454 p. — Prix: SFr. 124.00. — Birkhäuser, Boston, 1992.

This monograph is a self-contained introduction to the geometry of Riemann surfaces of constant curvature -1 and their length and eigenvalue spectra. It focuses on two subjects: the geometric theory of compact Riemann surfaces of genus greater than one, and the relationship of the Laplace operator with the geometry of such surfaces. The first part of the book is written in textbook form at the graduate level, with few requisites other than background in either differential geometry or complex Riemann surface theory. The second part of the book is a self-contained introduction to the spectrum of the Laplacian based on heat equation. The approach chosen yields a simple proof that compact Riemann surfaces have the same eigenvalues if and only if they have the same length spectrum. Later chapters deal with recent developments on isospectrality, Sunada's construction ... etc.

M.J. BERTIN, A. DECOMPS-GUILLOUX, M. GRANDET-HUGOT, M. PATHIAUX-DELEFOSSE, J.P. SCHREIBER. — **Pisot and Salem numbers.** — Un vol. relié,  $17,5 \times 24$ , de xiv, 291 p. — Prix: SFr. 158.00. — Birkhäuser Verlag, Basel, 1992.

The present volume, dedicated to the memory of Charles Pisot (1910-1984), organizes and makes accessible to a wide audience much material previously found only in the research literature. — Contents: Rational series. Compact families of rational functions. Meromorphic functions on  $D(0,1)$ . Generalized Schur algorithm. Generalities concerning distribution modulo 1 of real sequences. Pisot numbers, Salem numbers and distribution modulo 1. Limit points of Pisot and Salem sets. Small Pisot numbers. Some properties and applications of Pisot numbers. Algebraic number sets. Rational functions over rings of adeles. Generalizations of Pisot and Salem numbers to adeles. Pisot elements in a field of formal power series. Pisot sequences, Boyd sequences and linear recurrence. Generalizations of Pisot and Boyd sequences. The Salem-Zygmund theorem.

**Operator theory and complex analysis.** — Workshop on Operator Theory and Complex Analysis, Sapporo (Japan), June 1991. — Edited by T. Ando, I. Gohberg. — Operator theory, vol. 59. — Un vol. relié,  $17 \times 23,5$ , de x, 406 p. — Prix: SFr. 128.00. Birkhäuser Verlag, Basel, 1992.

The papers included in this volume, review recent advances in operator theory and complex analysis, and their interplay in applications to mathematical system and control theory. Special attention is paid to different extension and interpolation problems for matrix and operator valued functions. Other topics include operator inequalities and operator means, matrix completion problems, operators in spaces with indefinite scalar products and nonselfadjoint operators, scattering and inverse spectral problems.

Matyas BOGNAR. — **Foundations of linking theory.** — Un vol. relié,  $17 \times 24,5$ , de 163 p. — Prix: US\$20.00. — Akadémiai Kiado, Budapest, 1992.

This volume gives an exposition to an axiomatic approach to the idea of linking. The axiomatization of the homology theory due to Eilenberg and Steenrod raises a new problem, namely to develop a uniform theory of linking of homology theories applied to singular homology theories as well as to Čech homology theories and any other homology theories. This problem is examined in the present volume. Some geometric applications are also presented; in particular, the decomposition theorem (Aleksandrov's "Zerlegungssatz") and a few related theorems.

**The selected works of J. Frank Adams.** — Edited by J.P. May and C.B. Thomas. — 2 vol. reliés,  $18 \times 25,5$ , de xvi, 536 p. et xvi, 529 p. respectivement. — Prix: £40.00 chaque volume. — Cambridge University Press, Cambridge, 1992.

J. Frank Adams was one of the world's leading topologist. This selection of his work in two volume, brings together all his major research contributions. The first volume contains papers on: the cobar construction, the Adams spectral sequence, higher order cohomology operations, and the Hopf invariant one problem; applications of  $K$ -theory; generalised homology and cohomology theories. The second volume is mainly concerned with Adams' contributions to: characteristic classes and calculations in  $K$ -theory; modules of the Steenrod algebra, and their Ext groups; finite  $H$ -spaces and compact Lie groups; maps between classifying spaces of compact Lie groups.

Donald E. TAYLOR. — **The geometry of the classical groups.** — Sigma series in pure mathematics, vol. 9. — Un vol. relié,  $17,5 \times 24,5$ , de 229 p. — Prix: DM 76.00. — Heldermann Verlag, Berlin, 1992.

The book is the result of almost 10 years of teaching group theory. During the genesis increasing emphasis was placed on the "building" of the groups and their corresponding BN-pairs. Symplectic groups, unitary groups, orthogonal groups, and the Klein correspondance are thoroughly treated in individual chapters, each offering an abundance of exercises for deepening the understanding. The book can be regarded as the synthesis of didactical experience and a classical approach to the subject.

Friedrich HIRZEBRUCH, Thomas BERGER, Rainer JUNG. — **Manifolds and modular forms.** — Translated by Peter S. Landweber. — A publication of the Max-Planck-Institut für Mathematik, Bonn. — Aspects of mathematics, vol. E20. — Un vol. relié,  $16,5 \times 23$ , de xi, 211 p. — Prix: DM 68.00. — Vieweg, Braunschweig/Wiesbaden, 1992.

This book provides a comprehensive introduction to the theory of elliptic genera due to Ochanine, Landweber, Stong and others. The theory describes a new cobordism invariant for manifolds in terms of modular forms. After providing some background material elliptic genera are constructed, including the classical genera signature and the index of the Dirac operator as special cases. Various properties of elliptic genera are discussed, especially their behaviour in fibre bundles and rigidity for group actions. For stably almost complex manifolds the theory is extended to elliptic genera of higher level.

A.A. KARATSUBA, S.M. VORONIN. — **The Riemann zeta-function.** — Translated from the Russian by Neal Koblitz. — De Gruyter expositions in mathematics, vol. 5. — Un vol. relié, 18 × 25, de XII, 396 p. — Prix: DM 198.00/US\$ 112.00. — Walter de Gruyter, Berlin, 1992.

This monograph is devoted to a systematic exposition of the theory of the Riemann zeta-function. Emphasis is on results which have not yet appeared in book form. Contents: The definition and the simplest properties of the Riemann zeta-function. The Riemann zeta-function as a generating function in number theory. Approximate functional equations. Vinogradov's method in the theory of the Riemann zeta-function. Density theorems. Zeros of zeta-function on the critical line. Distribution of nonzero values of the Riemann zeta-function. Omega-theorems. Appendix.

Vladimir E. NAZAIKINSKII, Victor E. SHATALOV, Boris Yu. STERNIN. — **Contact geometry and linear differential equations.** — De Gruyter expositions in mathematics, vol. 6. — Un vol. relié, 17,5 × 24,5, de VII, 216 p. — Prix: DM 138.00/US\$ 69.00. — Walter de Gruyter, Berlin, 1992.

The book presents a new approach to the analysis of linear partial differential and pseudo-differential equations. This basic tool is to use contact rather than symplectic geometry. The main geometric object here is the projective bundle, which turns out to be the adequate phase space for the problem. This yields a more flexible theory which is capable of studying phenomena beyond the powers of conventional  $R +$ -theory such as the metamorphosis of discontinuity, lacunas in hyperbolic equations, etc.

**Topology '90.** — Editors: Boris Apanasov, Walter D. Neumann, Alan W. Reid, Laurent Siebenmann. — Ohio State University Mathematical Research Institute publications, vol. 1. — Un vol. relié, 17,5 × 24,5, de XII, 457 p. — Prix: DM 134.00/US\$ 54.95. — Walter de Gruyter, Berlin, 1992.

From the preface: "This volume consists of contributions from participants in a Research Semester in Low Dimensional Topology which took place at Ohio State University from February through June 1990. ... The main topics of the Research Semester included: the geometry and topology of 3-manifolds and their interactions with number theory; the "new" invariants of 3-manifolds related to quantum field theory; plane algebraic curves."

John D. BARROW. — **Pi in the sky: counting, thinking and being.** — Un vol. relié, 16 × 23,5, de XII, 317 p. — Prix: £ 14.95. — Clarendon Press, Oxford, 1992.

The author explores many tantalizing questions in this book which is a lively and illuminating study of the origins, the meaning and the mystery of mathematics. We learn of the origins of counting the world over, the propensities of the human mind for the numerical when in pursuit of the ineffable, and how the dethronement of Euclid's geometry ushered in a new world of philosophical relativism in which traditional truths were dissolved. We meet a host of peculiar individuals who have thought some of the deepest and strangest thoughts that human minds have ever thought.



**Ordinary and delay differential equations.** — Edited by Joseph Wiener and Jack K. Hale. — Pitman research notes in mathematics series, vol. 272. — Un vol. broché,  $17 \times 24,5$ , de 269 p. — Prix: £29.00. — Longman Scientific & Technical, Harlow Essex, 1992.

Readers interested in the qualitative theory of ordinary differential equations and dynamical systems will find in this volume important papers on homoclinic and periodic solutions in conservative and reversible systems, rotated vector fields and homoclinic loop bifurcations, bifurcation sets and limit cycles, gradient systems, and invariant manifolds. Several articles contain significant contributions to the stability theory of ordinary and functional differential equations. The book also includes contributions on equations that represent biological or technical models.

**Partial differential equations.** — Edited by Joseph Wiener and Jack K. Hale. — Pitman research notes in mathematics series, vol. 273. — Un vol. broché,  $17 \times 24,5$ , de 268 p. — Prix: £29.00. — Longman Scientific & Technical, Harlow Essex, 1992.

The papers included in this volume cover topics such as: mathematical problems in elasticity, asymptotic stability of partial differential equations, reaction-diffusion equations, existence theorems and the number of solutions for elliptic equations, localization of dependence for hyperbolic equations and decay of solutions for hyperbolic systems, existence of solutions for periodic parabolic problems, and finite extinction time for nonlinear parabolic equations. There are also articles concerned with optimal control, nonlinear evolution equations, variational methods, and numerical techniques.

**Progress in partial differential equations: elliptic and parabolic problems.** — Edited by C. Bandle, J. Bemelmans, J. Chipot, M. Grüter and J. Saint Jean Paulin. — Pitman research notes in mathematics series, vol. 266. — Un vol. broché,  $17 \times 24,5$ , de 289 p. — Prix: £28.00. — Longman Scientific & Technical, Harlow Essex, 1992.

This volume presents some recent advances in several important domains of partial differential equations and applied mathematics: equations and systems of elliptic and parabolic type, free boundary problems, modelling, numerical analysis and various applications in physics, mechanics and engineering.

**Progress in partial differential equations: calculus of variations, applications.** — Edited by C. Bandle, J. Bemelmans, M. Chipot, M. Grüter and J. Saint Jean Paulin. — Pitman research notes in mathematics series, vol. 267. — Un vol. broché,  $17 \times 24,5$ , de 314 p. — Prix: £30.00. — Longman Scientific & Technical, Harlow Essex, 1992.

This book is a collection of texts from conferences that were given in Pont-à-Mousson in June 1991 during the First European Conference on Elliptic and Parabolic Problems. The subjects addressed in this volume include calculus of variations, free boundary problems, homogenization, modelling, numerical analysis and various applications in physics, mechanics and engineering.

Mark Benevich BALK. — **Polyanalytic functions.** — Mathematical research = Mathematische Forschung, Bd. 63. — Un vol. broché,  $17 \times 24$ , de 197 p. — Prix: DM 78.00. — Akademie Verlag, Berlin, 1991.

The present monograph contains an introduction to some important aspects of the modern function theory of polyanalytic functions. In general it is not possible to transfer the statements of classical function theory to corresponding statements for polyanalytic functions. Nevertheless the application of various methods as for example the index theory, the theory of

meromorphic curves and Montel's theory of quasi-normal families yields results to the singularity- and the value distribution theory, about the boundary behaviour of polyanalytic functions and statements of Picard type. The last chapter is devoted to new research fields as the study of metaanalytic and radioanalytic functions ...

Frank K. HWANG, Dana S. RICHARDS, Pawel WINTER. — **The Steiner tree problem.** — Annals of discrete mathematics, vol. 53. — Un vol. relié, 16,5 × 24,5, de XI, 339 p. — Prix: Dfl. 205.00/US\$ 117.00. — North-Holland, Amsterdam, 1992.

This volume is devoted to the assimilation of the rich field of intriguing analyses and the consolidation of the fragments. A section has been given to each of the three major areas of interest which have emerged. The first concerns the Euclidean Steiner problem, historically the original Steiner tree problem proposed by Jarnik and Kössler in 1934. The second deals with the Steiner problem in networks, which was propounded independently by Hakimi and Levin and has enjoyed the most prolific research amongst the three areas. The rectilinear Steiner problem, introduced by Hanan in 1965, is discussed in the third part. Additionally, a fourth section has been included, with chapters discussing areas where the body of results is still emerging.

**Boolean function complexity.** — Edited by M.S. Paterson. — London Mathematical Society lecture note series, vol. 169. — Un vol. broché, 15 × 23, de 201 p. — Prix: £22.95. — Cambridge University Press, Cambridge, 1992.

By considering the size of the logical network needed to perform a given computational task, the intrinsic difficulty of that task can be examined. Boolean function complexity, the combinatorial study of such networks, is a subject that started back in the 1950s and has today become one of the most challenging and vigorous areas of theoretical computer science. The papers in this book stem from the London Mathematical Society Symposium on Boolean Function Complexity held at Durham University in July 1990. The range of topics covered will be of interest to the newcomer to the field as well as the expert, and overall the papers are representative of the research presented at the Symposium.

Abdul J. JERRI. — **Integral and discrete transforms with applications and error analysis.** — Pure and applied mathematics, vol. 162. — Un vol. relié, 16 × 23,5, de xv, 825 p. — Prix: US\$ 165.00. — Marcel Dekker, Inc., New York, 1992.

This monograph presents the background of the Fast Fourier Transform and explains how to choose the appropriate transform for solving a boundary value problem... discusses modeling of the basic partial differential equations, as well as the solutions in terms of the main special functions... considers the Laplace, Fourier, and Hankel transforms and their variations, offering a more logical continuation of the operational method... covers integral, discrete, and finite transforms and trigonometric Fourier and general orthogonal series expansion, providing an application to signal analysis and boundary-value problem... etc.

**Approximation by solutions of partial differential equations.** — Edited by B. Fuglede, M. Goldstein, W. Haussmann, W.K. Hayman and L. Rogge. — NATO ASI series, Series C: Mathematical and physical sciences, vol. 365. — Un vol. relié, 16,5 × 24, de XII, 201 p. — Prix: Dfl. 135.00/US\$ 79.00/£47.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume consists of the proceedings of a Workshop which was held at Hanstholm, Denmark. These proceedings include the main invited talks and contributed papers given during the workshop. The aim of these lectures was to present a selection of results of the latest research

in the field. In addition to covering topics in approximation by solutions of partial differential equations and quadrature formulae, this volume is also concerned with related areas, such as Gaussian quadratures, the Pompeiu problem, rational approximation to the Fresnel integral, distribution of values of meromorphic functions from the point of view of potential theory, boundary correspondence of univalent harmonic mappings, ... etc.

**Wave asymptotics: the proceedings of the meeting to mark the retirement of professor Fritz Ursell from the Beyer Chair of Applied Mathematics in the University of Manchester.** — Edited by P.A. Martin and G.R. Wickham. — Un vol. relié, 15,5 × 23,5, de XII, 244 p. — Prix: £22.95/US\$39.95. — Cambridge University Press, Cambridge, 1992.

Sir J. Lighthill: Asymptotic behaviour of anisotropic wave systems stimulated by oscillating sources. — J.N.L. Connor, P.R. Curtis & R.A.W. Young: Uniform asymptotics of oscillating integrals... — R.E. Meyer: Approximation and asymptotics. — F.G. Leppington: Matched asymptotic methods in surface wave theory. — V. Hutson: Asymptotics in some biological models. — J.N. Newman: Approximation of free-surface Green functions. — K. Eggers: On far-field approximations to the wave pattern around a ship travelling at constant velocity. — John P. Breslin: An analytical theory of propeller generated effective wakes. — E.O. Tuck: Analytical aspects of slender body theory. — D.V. Evans: Vertical barriers, sloping beaches and submerged bodies. — F. Ursell: Some unsolved and unfinished problems in the theory of waves.

**New developments in Lie theory and their applications.** — Edited by Juan Tirao and Nolan Wallach. — Progress in mathematics, vol. 105. — Un vol. relié, 16 × 24, de IX, 228 p. — Prix: SFr. 118.00. — Birkhäuser, Boston, 1992.

The representation theory of Lie groups continues to play an important role in many recent developments in mathematics, and particularly in today's dynamic interplay between mathematics and physics. Some of the major topics of this volume are: Lusztig's description of the structure of quantum enveloping algebras, Vogan's outline of the orbit method and its relationship with the structure of the unitary dual of a real reductive group, and Schmid's explanation of the use of the theory of hyperfunctions in representation theory. Imbedded in some of these expositions are intriguing conjectures that should lead the way to important new research.

**The Julius Petersen graph theory centennial.** — Guest editors: L. D. Andersen, J. Bang-Jensen, T.R. Jensen, L.K. Jorgensen, G. Sabidussi, C. Thomassen, B. Toft, P.D. Verstergaard. — Topics in discrete mathematics, vol. 6. — Un vol. relié, 19,5 × 26,5, de 695 p. — Prix: US\$228.50/Dfl. 400.00. — North-Holland, Amsterdam, 1992.

Julius Petersen's paper, "Die Theorie der regulären graphs" in *Acta Mathematica*, vol. 15(1891), stands at the beginning of graph theory as we know it today. The Danish group of graph theorists decided in 1985 to mark the 150th birthday of Petersen in 1989, as well as the centennial of his paper. However, the readily available information about Julius Petersen amounted to very little (not even a full bibliography existed) and virtually nothing was known about the circumstances that led him to write his famous paper. The study of Petersen's life and work has resulted in several papers, in particular a biography, a bibliography, an annotated edition of the letters surrounding Petersen's paper of 1891, an analysis of Petersen's paper and a annotated edition of parts of Petersen's correspondence with Sylow on Galois theory. The first four of these papers, together with a survey of matching theory, form the first part of this book. In addition to these five special papers, there are papers submitted in the celebration of the Petersen centennial.

**Numerical simulation of unsteady flows and transition to turbulence.** — Proceedings of the ERCOFTAC Workshop held at EPFL, 26-28 March 1990, Lausanne, Switzerland. — Edited by O. Pironneau, W. Rodi, I.L. Ryhming, A.M. Savill, T.V. Truong. — Un vol. relié,  $15,5 \times 23,5$ , de xi, 516 p. — Prix: £35.00/US\$59.95. — Cambridge University Press, Cambridge, 1992.

This volume presents the findings of the first test cases considered by ERCOFTAC. The workshop, held in Lausanne, Switzerland in 1990, studied five test cases: boundary layer in an S-shaped duct; periodic array of cylinders; transition in a boundary layer under the influence of free-stream turbulence; axisymmetric confined jet flows. These test cases reflect the interest of both the academic and industrial groups in discovering the limits of various model and codes to predict real problems supported by experimental data. The articles summarize the work of each group and point to refinements and further study to perfect the models.

TRAN VAN HIEP. — **Mathématiques: formulaire.** — Collection major. — Un vol. broché,  $11 \times 17$ , de xvii, 171 p. — Prix: FF 72.00. — Presses universitaires de France, Paris, 1992.

Ce formulaire réunit toutes les notions essentielles du programme d'analyse, d'algèbre, de probabilités, de statistiques et d'informatique des classes préparatoires HEC. Chaque chapitre du programme est résumé suivant un plan concis et clair. L'étudiant y trouvera toutes les définitions, propositions, théorèmes et formules qu'il doit savoir par coeur. De plus, de nombreux commentaires et exemples éclairent les notions délicates.

J.E. CREMONA. — **Algorithms for modular elliptic curves.** — Un vol. broché,  $22 \times 30$ , de 343 p. — Prix: £35.00. — Cambridge University Press, Cambridge, 1992.

This book presents a thorough treatment of many algorithms concerning the arithmetic of elliptic curves, with remarks on computer implementation. It is in three parts. First, the author describes in detail the construction of modular elliptic curves, giving an explicit algorithm for their computation using modular symbols. Secondly, a collection of algorithms for arithmetic of elliptic curves is presented. They include: finding torsion and non-torsion points, computing heights, finding isogenies and periods, and computing the rank. Finally, an extensive set of tables is provided giving the results of the author's implementations of the algorithms.

Hélène ESNAULT, Eckart VIEHWEG. — **Lectures on vanishing theorems.** — DMV Seminar, Bd. 20. — Un vol. broché,  $17 \times 24$ , 164 p. — Prix: SFr. 48.00. — Birkhäuser Verlag, Basel, 1992.

"This book, an extended collection of lectures delivered at "Schloss Reisenburg" during the DMV-Seminar "Algebraic geometry, 1991", aims at presenting Kodaira's vanishing theorem and several generalizations in a way which is as algebraic as possible. We develop the theory of logarithmic de Rham complexes, the use of corresponding spectral sequence, lifting properties for manifolds and their Frobenius morphisms in characteristic  $p=0$  and the proof of the degeneration of Hodge to de Rham spectral sequence with algebraic methods. We apply those methods to obtain vanishing theorems. Several typical applications and the generic theorems of M. Green and R. Lazarsfeld complete the picture."

Jacques VAUTHIER, Jean-Jacques PRAT. — **Cours d'analyse mathématique de l'agrégation.** — Un vol. broché,  $16 \times 24$ , de 199 p. — Prix: FF 145.00. — Masson, Paris, 1992.

Cet ouvrage présente une synthèse du cours d'analyse mathématique, épreuve reine de l'agrégation. Il permet d'aborder les problèmes du concours dans leur unité et leur cohérence

d'ensemble (alors que les diverses parties de la discipline sont enseignées dans des cours différents et s'échelonnant sur les deux premiers cycles). Il se présente donc comme une coupe transversale des lignes directrices de l'analyse, plutôt comme un traité exhaustif.

Keith DEVLIN. — **Mathématiques: un nouvel âge d'or.** — Traduit de l'anglais par Germain Kreweras. — Un vol. broché, 16 × 24, de x, 252 p. — Prix: FF 199.00. — Masson, Paris, 1992.

L'ouvrage présente une série de résultats parmi les plus significatifs obtenus par les mathématiciens contemporains: les nombres premiers et la théorie des codes secrets, l'indécidabilité, le dixième problème de Hilbert, le théorème des quatre couleurs, les systèmes chaotiques, la théorie des groupes, le dernier théorème de Fermat, les nombres complexes, la théorie des noeuds, quelques problèmes de topologie et, enfin, les algorithmes.

**Partial differential equations with real analysis.** — Edited by H. Begehr and A. Jeffrey. — Pitman research notes in mathematics series, vol. 263. — Un vol. broché, 17 × 24,5, de 239 p. — Prix: £25.00. — Longman Scientific & Technical, Harlow Essex, 1992.

This collection of papers on partial differential equations deals mainly with real analytic and functional analytic method and consists of two groups of topics. The first group of papers presents results on elliptic, hyperbolic, and evolution equations... Identification of coefficients is studied for elliptic as well for hyperbolic equations. The second group of papers relate to elasticity. Solutions to a partial differential-integral equation in radially symmetric thermo-elasticity are given in a constructive way. Using bianalytic functions, a mixed contact problem in orthotropic elasticity is reduced to a boundary value problem for two analytic functions.

**Partial differential equations with complex analysis.** — Edited by H. Begehr and A. Jeffrey. — Pitman research notes in mathematics series, vol. 262. — Un vol. broché, 17 × 24,5, de 214 p. — Prix: £23.00. — Longman Scientific & Technical, Harlow Essex, 1992.

This collection of papers on function theory and function-theoretic methods in partial differential equations is split into three main groups of topics. The first group contains results on elliptic and some related partial differential equations which are obtained by complex analytic methods, e.g. Bergman and Vekua integral operator methods... etc. The second group includes papers on classical complex analysis, including geometric function theory, singularities of series in special polynomials, and subharmonic functions. The last group of papers deal with Riemann and Riemann-Hilbert boundary value problems.

J.W. BRUCE, P.J. GIBLIN. — **Curves and singularities: a geometrical introduction to singularity theory.** — Second edition. — Un vol. broché, 15 × 23, de xviii, 321 p. — Prix: £15.95, (relié: £40.00). — Cambridge University Press, Cambridge, 1992.

The object of this book is to introduce to a new generation of students an area of mathematics that has received a tremendous impetus during the last twenty years or so from developments in singularity theory. The only prerequisites for students to follow this textbook are a familiarity with linear algebra and advanced calculus. This second edition has been thoroughly revised throughout and includes a multitude of new exercises and examples. A major new feature is the final chapter, which introduces the reader to the topic, which has central importance in the theory, of classification of functions of several variables.

Sylvie MELEARD, Claude PIQUET. — **Analyse et probabilités: avec rappels de cours, 1988-1992.** — Problèmes de mathématiques. Ecrits du C.A.P.E.S. — 3e édition. — Un vol. broché, 16 × 24, de 274 p. — Prix: FF 137.00. — Masson, Paris, 1992.



Cette édition comprend tous les textes des deux concours du CAPES (externe et interne) des années 1988 à 1992. Comme dans les précédentes éditions, des rappels de cours figurent dans cet ouvrage. En raison des modifications du programme des épreuves du CAPES, ces rappels sont tout à fait différents de ceux des éditions précédentes. Le programme est respecté... Le but de ces rappels de cours est de fournir à ceux qui préparent le CAPES l'essentiel des théorèmes à connaître pour mener à bien la résolution des textes des concours. Des exemples et contre-exemples ont été donnés, ainsi que des avertissements, fruits de l'expérience des auteurs assurant depuis plusieurs années, à l'Université Pierre et Marie Curie, les préparations aux deux concours.

Francette BORIES-LONGUET, Anne LEVY-BRUHL. — **Algèbre et géométrie: avec rappels de cours (1988-1992).** — Problèmes de mathématiques. Ecrit du C.A.P.E.S. — 3e éd. — Un vol. broché, 16 × 24, de 233 p. — Prix: FF 137.00. — Masson, Paris, 1992.

Cet ouvrage s'adresse principalement aux candidats au CAPES externe ou interne de Mathématiques. Il contient tous les énoncés et corrigés des épreuves écrites des CAPES externe et interne de Mathématiques des années 1988 à 1992 incluses. Un soin très particulier a été donné à la rédaction des corrigés qui a été voulue la plus claire et la plus pédagogique possible. Il offre d'autre part, un résumé de cours de toutes les notions nécessaires à la résolution des problèmes de concours. Ces rappels de cours... sont relativement succints mais soucieux d'une grande cohérence et présentent, dans un but pédagogique, des exemples et surtout des contre-exemples aux théorèmes énoncés...

Philippe LEMAIRE, HERAKLES. — **Mathématiques ENSI: 15 nouveaux problèmes corrigés posés aux concours ENSI, Ecole navale, ENSIETA, ISEP, E.N.T.P.E.** — J'intègre, vol. 113. — Un vol. broché, 17,5 × 25, de 254 p. — Prix: FF 135.00. — Dunod, Paris, 1992.

Cet ouvrage rassemble les problèmes proposés aux concours M et P des ENSI ou similaires, ces dernières années, dans les matières suivantes: Fonctions de plusieurs variables. Topologie. Polynômes. Endomorphismes en dimension infinie. Endomorphismes en dimension finie. Matrices et déterminants. Diagonalisation-Polynômes annulateurs. Espaces euclidiens et hermitiens. Géométrie du plan. Suites et séries numériques. Etudes de fonctions d'une variable réelle. Intégration. Séries entières. Questions liées à la convergence uniforme. Equations différentielles. Séries de Fourier.

Robert R. BORRELLI, Courtney S. COLEMAN, William E. BOYCE. — **Differential equations laboratory workbook: a collection of experiments, explorations and modeling projects for the computer.** — Un vol. broché, 23 × 28, de XVIII, 338 p. — Prix: £ 16.50. — John Wiley & Sons, Inc., New York, 1992.

The focus of this Workbook is on computer experiments that support and amplify the topics found in introductory ODE texts. The Workbook is intended as a supplement and not as a textbook. The experiments are largely self-contained and independent of any particular hardware/software platform or text. Most experiments begin with one or two problems that are accessible to students at any level, and progress in difficulty. Each experiment is a combination of pencil-and-paper work and computer work. The work may be straightforward and explicit but often the approach is open-ended and exploratory. Excellent 2- and 3-D graphics illustrate the range of qualitative behavior of solutions and are useful for benchmarking and "tuning" your own platforms.

**Queueing and related models.** — Edited by U. Narayan BHAT and Ishwar V. BASAWA. — Oxford statistical science series, vol. 9. — Oxford science publications. — Un vol. relié, 16 × 24, de XVII, 345 p. — Prix: £75.00. — Clarendon Press, Oxford, 1992.

Queueing theory is an active research area in the field of applied probability, reinforced by recent advances in technology. This book investigates new conceptual models, as well as sampling some of the significant trends in current developments. The various contributors provide insights into recent growth areas, such as inference and simulation techniques. The result is a valuable and comprehensive study of modern queueing theory.

Robert H. WASSERMAN. — **Tensors and manifolds with applications to mechanics and relativity.** — Un vol. relié,  $16 \times 24$ , de XIV, 409 p. — Prix: £25.00. — Oxford University Press, New York, 1992.

From the preface: This book gives an introductory perspective to young students intending to go into a field of pure mathematics, and who, with the usual “pigeon-holed” graduate curriculum, will not get an overall perspective for several years, much less any idea of application. At the same time, it gives a glimpse of a variety of pure mathematics for applied mathematics and physics students who will have to be carefully selective of the pure mathematics courses they can fit into their curriculum.

G.A. EDGAR and Louis SUCHESTON. — **Stopping times and directed processes.** — Encyclopedia of mathematics and its applications, vol. 47. — Un vol. relié,  $16,5 \times 24$ , de XII, 428 p. — Prix: US\$54.95/£35.00. — Cambridge University Press, Cambridge, 1992.

From the preface: “The main themes of this book are: stochastic, almost sure, and essential convergence, stopping times, martingales and amarts, process indexed by directed sets, multi-parameter processes, and Banach-valued processes.” In this book the technique of stopping times is applied to prove convergence theorems for stochastic processes — in particular processes indexed by direct sets — and in sequential analysis. Applications of convergence theorems are seen in probability, analysis, and ergodic theory... A study of martingales yields laws of large numbers for martingale differences, with application to “star-mixing” processes... A recurrent theme of the book is the unification of martingale and ergodic theorems.

**Experimental mathematics, vol. 1, no 1(1992).** — Chief editor: D.B.A. Epstein. — Editor: S. Levy. — Associate editors: F.J. Almgren, H. Cohen, R.L. Devaney, R.L. Graham, D.A. Hoffman, R. de la Llave, D. Mumford, U. Pinkall, P.C. Sarnak. — Advisory board H.W. Lenstra Jr., A. Marden, J.-P. Serre, W.P. Thurston. — Publié trimestriellement. — Prix: Abonnement annuel: US\$130.00. — Jones and Bartlett Publishers, Boston.

From the preface by D.Epstein, S. Levy and R. de la Llave: “Experimental mathematics was founded in the belief that theory and experiment feed on each other, and the mathematical community stands to benefit from a more complete exposure to the experimental process... The essential ingredients of a paper published in “Experimental mathematics” are two: some experimental aspect, and relevance to mathematics proper. The word “experimental” is conceived broadly: many mathematical experiments these days are carried out on computers, but others are still the result of pencil-and-paper work, and there are other experimental techniques, like building physical models”.

Sterling K. BERBERIAN. — **Linear algebra.** — Un vol. broché  $19 \times 23,5$ , de XIV, 356 p. — Prix: £19.50. — Oxford University Press, Oxford, 1992.

This textbook provides a rigorous introduction to the main concepts of linear algebra which will be suitable for all students coming to the subject for the first time. The book is in two parts: Part one develops the basic theory of vector spaces and linear maps, including dimension,

determinants, and eigenvalues and eigenvectors. Part two goes on to develop more advanced topics and in particular the study of canonical forms for matrices. There is an abundant supply of exercises to reinforce the reader's grasp of the material and to elaborate on ideas from the text. As a result, this book presents a well-rounded and mathematically sound first course in linear algebra.

H.M. SRIVASTAVA and R.G. BUSCHMAN. — **Theory and applications of convolution integral equations.** — Mathematics and its applications, vol. 79. — Un vol. relié, 16,5 × 24,5, de xx, 240 p. — Prix: Dfl. 165.00/US\$96.00/£56.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume presents a state-of-the-art account of the theory and applications of integral equations of convolution type, and of certain classes of integro-differential and non-linear integral equations. An extensive and well-motivated discussion of some open questions and of various important directions for further research is also presented. The book has been written so as to be self-contained, and includes a list of symbols with their definitions. For users of convolution integral equations, the volume contains numerous, well-classified inversion tables which correspond to the various convolutions and intervals of integration.

Gheorghe MICULA and Paraschiva PAVEL. — **Differential and integral equations through practical problems and exercises.** — Kluwer texts in the mathematical sciences, vol. 7. — Un vol. relié, 16,5 × 24,5, de ix, 395 p. — Prix: Dfl. 240.00/US\$139.00/£82.00. — Kluwer Academic Publishers, Dordrecht, 1992.

The various chapters of the book deal with: the classical type of differential equations of first and higher order, problems relating to existence and uniqueness theorems, linear differential equations, the method of the Laplace transform, integral and integro-differential equations, numerical and approximation methods, first-order partial differential equations. The final chapter presents a miscellaneous selection of problems and exercises dealing with the deepest areas of differential, integral and partial differential equations... This volume provides a guide to the solving of differential and integral equations and can be recommended to all researchers, students and teachers, whose work involves this fundamental aspect of mathematics.

**Chemical graph theory: reactivity and kinetics.** — Edited by Danail Bonchev and Dennis H. Rouvray. — Mathematical chemistry series, vol. 2. — Un vol. relié, 15,5 × 23,5, de xii, 266 p. — Prix: US\$60.00/£34.00. — Abacus Press an imprint of Gordon and Breach Science Publishers, Philadelphia, 1992.

This volume examines the application of graph theory to the study of chemical kinetics and reaction mechanisms. Methods of handling kinetic data are explained, with emphasis on the derivation of rate laws and related problems. Graph-based classification and coding of reaction mechanisms along with approaches for determining their complexity are described, providing researchers with a useful tool in their search for new reaction mechanisms. Also discussed are the operator set approach to the structural and dynamic interrelations between chemical species (which is presented as a methodology for discovering new selection and prohibition rules), the reaction lattice technique and its applications to aromaticity and pericyclic reaction, and the DARC/PELCO method, a topological tool for QSAR searching.

O.A. OLEINIK, A.S. SHAMEV, G.A. YOSIFIAN. — **Mathematical problems in elasticity and homogenization.** — Studies in mathematics and its applications, vol. 26. — Un vol. relié, 16 × 23, de xiii, 398 p. — Prix: Dfl. 225.00. — North-Holland, Amsterdam, 1992.



The main part of the work deals with homogenization problems in elasticity as well as some mathematical problems related to composite and perforated elastic materials. This study of processes in strongly non-homogeneous media brings forth a large number of purely mathematical problems which are very important for applications. Although the methods suggested deal with stationary problems, some of them can be extended to non-stationary equations.

Frédéric PHAM. — **Géométrie et calcul différentiel sur les variétés: cours, études et exercices pour la maîtrise de mathématiques.** — Un vol. broché,  $16 \times 23$ , de XIII, 286 p. — Prix: FF 195.00. — InterEditions, Paris, 1992.

La 1ère partie de ce livre, consacrée aux variétés plongées, reprend et approfondit les acquis essentiels du calcul différentiel de la licence. La 2ème partie présente la théorie intrinsèque des variétés (avec comme objectif la compréhension des notions de fibré tangent et fibré normal) et enchaîne sur les premiers rudiments de la topologie algébrique (homotopie et revêtements). Elle se termine par une ébauche de la théorie de l'intégration sur les variétés, où l'on aborde l'homologie et la cohomologie. Des paragraphes spéciaux à la fin de chaque chapitre ont pour but de montrer les concepts en action dans un contexte. De nombreux exercices sont proposés.

**Mathematical morphology in image processing.** — Edited by Edward R. Dougherty. — Optical engineering, vol. 34. — Un vol. relié,  $16 \times 23,5$ , de XVI, 530 p. — Prix: US\$ 160.00. — Marcel Dekker, Inc., New York, 1992.

Providing both the theoretical foundations of mathematical morphology and its latest applications in image processing, this exhaustive reference presents the statistical analysis of morphological filters and their automatic optimal design, the development of morphological features for image signatures, and the design of efficient morphological algorithms. With over 1000 literature citations, figures, tables, and display equations, this book is a tool for engineers, applied mathematicians, as well as for graduate-level students.

Birger IVERSEN. — **Hyperbolic geometry.** — London Mathematical Society student texts, vol. 25. — Un vol. broché,  $15 \times 22,5$ , de VII, 298 p. — Prix: £13.95 (relié: £29.95). — Cambridge University Press, Cambridge, 1992.

Although it arose from purely theoretical considerations of the underlying axioms of geometry, the work of Einstein and Dirac has demonstrated that hyperbolic geometry is a fundamental aspect of modern physics. In this book, the rich geometry of the hyperbolic plane is studied in detail, leading to the focal point of the book, Poincaré's polygon theorem and the relationship between hyperbolic geometries and discrete groups of isometries. Hyperbolic 3-space is also discussed, and the directions that current research in this field is taking are sketched.

P.N. HOFFMAN and J.F. HUMPHREYS. — **Projective representations of symmetric groups: Q-functions and shifted tableaux.** — Oxford mathematical monographs. — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de IX, 304 p. — Prix: £40.00. — Clarendon Press, Oxford, 1992.

Contents: Projective representations and representation groups. Representation groups for the symmetric group. A construction for groups. Representations of objects in  $G$ . A construction for negative representations. The basic representation. The  $Q$ -functions. The irreducible negative representations of  $S_n$ . Explicit  $Q$ -functions. Reduction, branching and degree formulae. Construction of the irreducible negative representations. Combinatorial and skew  $Q$ -functions. The shifted Knuth algorithm. Deeper insertion, evacuation and the product theorem.

**The arithmetic of function fields.** — Proceedings of the workshop at the Ohio State University, June 17-26, 1991. — Edited by David Goss, David R. Hayes, Michael I. Rosen. — Ohio State University Mathematical Research Institute publications, vol. 2. — Un vol. relié, 18 × 24,5, de VIII, 482 p. — Prix: DM 138.00. — Walter de Gruyter, Berlin, 1992.

The theory of Drinfeld modules has been growing rapidly over the past few years. Still, for most mathematicians, the subject remain a mystery. Thus many of the papers contained in this volume are expositions of the foundations of the subject. The reader will find introductions to Drinfeld modules, their use in explicit class field theory, the structure of their moduli spaces, the theory of the associated modular forms, their transcendence theory, etc... There are also papers on the new special functions related to Drinfeld modules that have arisen. These functions are fascinating in that their theory reflects so much of classical structure that had been thought lost to function theory.

Victor BRYANT. — **Aspects of combinatorics: a wide ranging introduction.** — Un vol. broché, 17,5 × 25, de VIII, 266 p. — Prix: £16.95 (relié: £35.00). — Cambridge University Press, Cambridge, 1993.

Combinatorics is a broad and important area of mathematics, and this textbook provides the beginner with the ideal introduction to many of the different aspects of the subject. By building up from the basics, and demonstrating the relationships between the various branches of combinatorics, Victor Bryant provides a readable text that presents its results in a straightforward way. Numerous examples and exercises, including hints and solutions, are included throughout and serve to lead the reader to some of the deeper results of the subject, many of which are usually excluded from introductory texts.

J.H. van LINT and R.M. WILSON. — **A course in combinatorics.** — Un vol. broché, 17,5 × 25, de XII, 530 p. — Prix: £19.95 (relié: £45.00). — Cambridge University Press, Cambridge, 1992.

This major textbook, a product of many years' teaching, will appeal to all teachers of combinatorics who appreciate the breadth and depth of the subject. The authors exploit the fact that combinatorics requires comparatively little technical background to provide not only a standard introduction but also a view of some contemporary problems. All of the 36 chapters are in bite-size portions; they cover a given topic in reasonable depth and are supplemented by exercises, some with solutions, and references. To avoid an ad hoc appearance, the authors have concentrated on the central themes of designs, graphs and codes.

N.Ja. VILENKIN and A.U. KLIMYK. — **Representation of Lie groups and special functions. Volume 3: Classical and quantum groups and special functions.** — Mathematics and its applications (Soviet series), vol. 75. — Un vol. relié 16,5 × 25, de XIX, 629 p. — Prix: Dfl. 460.00/US\$ 292.00/£158.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This is the last of three major volumes which present a comprehensive treatment of the theory of the main classes of special functions from the point of view of the theory of group representations. This volume deals with  $q$ -analogs of special functions, quantum groups and algebras (including Hopf-algebras), and (representations of) semi-simple Lie groups. Also treated are special functions of a matrix argument, representations in the Gel'fand-Tsetlin basis, and, finally, modular forms, theta-functions and affine Lie algebras. This volume builds upon results of the previous two volumes, and presents many new results.

A.A. RANICKI. — **Algebraic L-theory and topological manifolds.** — Cambridge tracts in mathematics, vol. 102. — Un vol. relié  $16 \times 23,5$ , de 358 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1992.

The abstract theory of quadratic forms on chain complexes developed by the author provides a comprehensive framework for understanding the connection between quadratic forms and manifolds. This book presents the definitive account of the applications of this algebra to the surgery classification of topological manifolds. The central result is the identification of manifold structure in the homotopy type of a Poincaré duality space with a local quadratic structure in the chain homotopy type of the universal cover. The difference between the homotopy types of manifolds and Poincaré duality spaces is identified with the fibre of the algebraic  $L$ -theory assembly map, which passes from local to global quadratic duality structures on chain complexes. The algebraic  $L$ -theory assembly map is used to give a purely algebraic formulation of the Novikov conjectures on the homotopy invariance of the higher signatures; any other formulation necessarily factors through this one.

Yuri A. BAHTURIN, Alexander A. MIKHALEV, Viktor M. PETROGRADSKY, Mikhail V. ZAI-CEV. — **Infinite dimensional Lie superalgebras.** — De Gruyter expositions in mathematics, vol. 7. — Un vol. relié,  $18 \times 24,5$ , de x, 250 p. — Prix: DM 158.00/US\$89.00. — Walter de Gruyter, Berlin, 1992.

Basic facts about Lie superalgebras. — The structure of free Lie superalgebras. — Composition techniques in the theory of Lie superalgebras. — Identities in enveloping algebras. — Irreducible representations of Lie superalgebras. — Finiteness conditions for colour Lie superalgebras with identities.

A. DZHURAEV. — **Degenerate and other problems.** — Pitman monographs and surveys in pure and applied mathematics, vol. 61. — Un vol. relié,  $16 \times 24,5$ , de 316 p. — Prix: £56.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This book is a collection of some problems that arise in partial differential equations which are not solvable for any right-hand sides modulo finite dimensional subspaces. Among them are: elliptic systems on a bounded domain which degenerate at all or part of the boundary, the Cauchy problem for elliptic systems, overdetermined systems, and systems which degenerate principal symbols. All of these problems are investigated in an elementary way by means of complex analysis.

Randy K. YOUNG. — **Wavelet theory and its applications.** — The Kluwer international series in engineering and computer science, vol. 189. — Un vol. broché,  $16 \times 24$ , de xiv, 223 p. — Prix: Dfl. 130.00/£40.25/US\$67.50. — Kluwer Academic Publishers, Boston, 1993.

This book reviews, extends, and applies wavelet theory, concentrating on the practical applications of wavelet theory. Wavelet theory is integrated with other general theories, including linear systems theory and template matching or matched filtering... In addition, by demonstrating the effectiveness of wavelet theory in these general applications, many other specific applications may be improved. Temporal and spatial signals and systems are considered. The properties of the wavelet transform representation are sensitive to the chosen mother wavelet... These properties are examined and techniques for analyzing these sensitivities are presented. Wavelet theory is extended with new mother mapper operator ...

**Mathematical topics in fluid mechanics.** — Proceedings of the summer course held in Lisbon, Portugal, September 9-13, 1991. — Edited by J.F. Rodriguez and A. Sequeira. — Pitman research notes in mathematics series, vol. 274. — Un vol. broché,  $17 \times 24,5$ , de 261 p. — Prix: US\$28.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This book presents several recent contributions and mathematical studies in fluid mechanics, namely in non-Newtonian and viscoelastic fluids and on the Navier-Stokes equations in unbounded domains, reviews on the mathematical analysis of incompressible and compressible flows, as well as new results in magnetohydrodynamic and electrohydrodynamic stability, and in thermoconvective flows of Boussinesq-Stefan type.

**Graphs, matrices, and design.** — Edited by Rolf S. Rees. — Lecture notes in pure and applied mathematics, vol. 139. — Un vol. broché,  $18 \times 25,5$ , de xv, 314 p. — Prix: US\$ 125.00. — Marcel Dekker, New York, 1993.

This Festschrift in honor of Norman J. Pullman's sixtieth birthday reflects and enhances his important contributions to a wide range of topics in matrix theory, linear algebra, and graph theory. Containing over 450 references, tables, figures, and display equations, and providing significant advances in many areas, "Graphs, matrices, and designs" examines partitions and covers of graphs and digraphs... latin squares... pairwise balanced designs with prescribed block sizes... ranks and permanents... extremal graph theory... Hadamard matrices... graph factorizations... etc.

Howard ANTON. — **Multivariable calculus.** — With contributions from Albert Herr. — Fourth edition. — Un vol. broché,  $21 \times 26$ , de 650 p. — Prix: £ 37.95. — John Wiley & Sons, Inc., New York, 1992.

Review of single-variable calculus. Three-dimensional space, vectors. Vector-valued functions. Partial derivatives. Multiple integrals. Topics in vector calculus. Second-order differential equations. Cramer's rule. Complex numbers. Infinite series. First-order differential equations and applications.

Michael FIELD and Martin GOLUBITSKY. — **Symmetry in chaos : a search for pattern in mathematics, art and nature.** — Un vol. relié  $22,5 \times 28,5$ , de xii, 218 p. — Prix: £ 19.95. — Oxford University Press, Oxford, 1992.

The authors have two purposes in writing this book: to present the pictures of symmetric chaos and to present the ideas of symmetry and chaos -as they are used by mathematicians-, what are needed to understand how these pictures are formed. Symmetry, a traditional and highly developed area of mathematics, would seem to lie at the opposite end of the spectrum. From the branching of trees to the rose windows of great cathedrals, symmetric patterns seem the antithesis of such chaotic systems as weather patterns. M. Field and M. Golubitsky offer an enganging look at where these two fields meet. In the process, they have generated mathematically a series of stunning computer images linking symmetry and chaos.

Karl-Eberhard HELLWIG, Bernd WEGNER. — **Mathematik und theoretische physik I: ein integrierter Grundkurs für physiker und mathematiker.** — De Gruyter Lehrbuch. — Un vol. broché,  $15,5 \times 23$ , de xi, 443 p. — Prix: DM 98.00. — Walter de Gruyter, Berlin, 1992.

Dieses zweibändige Lehrbuch ist Begleittext zu einem Curriculum in Mathematik für Physiker, das in Kooperation zwischen den Fachbereichen Mathematik und Physik der TU Berlin entwickelt wurde. Mit der hier vorgestellten Kombination von Mathematik und theoretischer Physik in einem integrierten Grundkurs wird eine bessere Koordinierung der Vermittlung des Basiswissens in beiden Disziplinen erreicht. Inhaltliche Schwerpunkte des ersten Bandes sind: -Affine Räume und Vektorräume — Lineare Abbildungen und lineare Gleichungssysteme — Euklidische Räume — Konvergenz und Stetigkeit in Euklidischen Räumen -Integrationstheorie — Eigenwerte und Bilinearformen -Ergänzungen zur Analysis — Bewegung, Raum und Zeit — Einige Anwendungen - Bezugssysteme und Galileische Relativitätstheorie — Das elektromagnetische Feld.

Ryszard ENGELKING, Karol SIEKLUCKI. — **Topology: a geometric approach.** — Sigma series in pure mathematics, vol. 4. — Un vol. broché,  $17,5 \times 24,5$ , de VIII, 429 p. — Prix: DM 148.00. — Heldermann Verlag, Berlin, 1992.

Contents: Introduction. — Metric spaces. — Polyhedra. — Homotopy. — The topology of Euclidean spaces. — Manifolds. — Metric spaces II. — Topological spaces.

M.G. GARRONI and J.L. MENALDI. — **Green functions for second order parabolic integro-differential problems.** — Pitman research notes in mathematics series, vol 275. — Un vol. broché,  $17 \times 24$ , de 417 p. — Prix: £39.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

The main purpose of this book is the construction and investigation of properties of the Green function for a large class of parabolic integro-differential operators that arise from diffusion processes with jumps. Important developments in the study of stochastic processes with jumps have been achieved in recent years through the analytical approach. In this approach the Green function plays a key role. To construct the Green function for integro-differential problems we introduce, as essential tools, the so-called Green function spaces... By using the constructed Green function, it is possible to generate a Markov-Feller jump diffusion process with an oblique reflection at the boundary in general situations. The results contained in this book provide the tools with which the invariant measure can be constructed.

Heinrich BEGEHR and Robert P. GILBERT. — **Transformations, transmutations, and kernel functions, vol. 1.** — Pitman monographs and surveys in pure and applied mathematics, vol. 58. — Un vol. relié,  $16,5 \times 24,5$ , de 399 p. — Prix: £70.00. — Longman Scientific & Technical, Harlow Essex, 1992.

Complex analytic methods are a powerful tool for special partial differential equations and systems. In order to make these methods applicable for a wider class one uses transformations and transmutations. This monograph collects recent results, many of which the authors were involved with. They range from plane elasticity to second- and higher-order elliptic equations, from boundary value problems to moving boundary value problems, and from generalized analytic to generalized hyperanalytic functions. Applications to elasticity and to underwater acoustics are also included.

Xavier GUYON. — **Champs aléatoires sur un réseau : modélisations, statistique et applications.** — Techniques stochastiques. — Un vol. broché,  $16 \times 24$ , de 226 p. — Prix: FF 260.00. — Masson, Paris, 1993.

Ce livre est consacré à l'étude théorique des modèles spatiaux, en particulier des champs de Markov sur un réseau, régulier ou non et des statistiques associées. En s'appuyant sur des résultats de la mécanique statistique, l'auteur présente de manière unifiée des résultats probabilistes récents sur les processus spatiaux (mélange, ergodicité, grandes déviations, TCL) et leur statistique asymptotique (minimum de contraste en situation non ergodique, identification p.s. de modèles de champs faiblement dépendants). Des algorithmes stochastiques (simulation, optimisation, estimation) sont proposés et explicités, puis utilisés en traitement d'image. De nombreux exemples sont décrits et permettent une vue d'ensemble des différents domaines d'application. Des exercices complètent chaque chapitre.

Giuseppe DA PRATO, Jerzy ZABCZYK. — **Stochastic equations in infinite dimensions.** — Encyclopedia of mathematics and its applications, vol. 44. — Un vol. relié,  $16,5 \times 24$ , de XVIII, 454 p. — Prix: £50.00. — Cambridge University Press, Cambridge, 1992.



The main purpose of this book is to give a systematic treatment of the theory of stochastic differential equations and stochastic flows of diffeomorphisms, and through the former to study the properties of stochastic flows. The book is based on various sets of lectures given by Professor Kunita and can be used with advanced courses on probability theory or for self-study. The author begins with a discussion of Markov processes, martingales, and Brownian motion followed by a review of Itô's stochastic analysis. A chapter deals with continuous semimartingales with spatial parameters... Stochastic flows and their relation with this generalized equation are considered. Another chapter is devoted to limit theorems involving stochastic flows, and the book ends with a treatment of stochastic partial differential equations through the theory of stochastic flows.

**Software systems for structural optimization.** — Edited by H.R.M. Hörnlein, K. Schittkowski. — International Series of Numerical Mathematics (ISNM), vol. 110. — Un vol. relié, 17 × 24, de 283 p. — Prix: SFr. 108.00. — Birkhäuser, Basel, 1993.

This book deals with software systems for the optimal design of mechanical structures, where the analysis is based on a finite element formulation. The numerical algorithms used for analysis and optimization are outlined. Each paper describes the design optimization problem, i.e. optimization objectives, design variables, constraints, and how the structural analysis and the calculation of sensitivities are performed. Moreover, some information on the system architecture, the pre- and postprocessing and practical applications are presented.

A.G. KUZ'MIN. — **Non-classical equations of mixed type and their applications in gas dynamics.** — International series of numerical mathematics (ISNM), vol. 109. — Un vol. relié, 17 × 24, de IX, 288 p. — Prix: SFr. 158.00. — Birkhäuser, Basel, 1992.

The author sets out to prove how important communication among mathematicians and physicists really is. He develops his arguments by focusing on the theory of mixed type equations and the theory of transonic gas dynamics. Kuz'min seeks to rectify the information gap by acquainting the reader with a wide variety of existing differential equations of mixed elliptic-hyperbolic type. Boundary-value problems for mixed-type equations are posed, and contemporary methods of solving the boundary value problems, as well as results obtained by these methods within the last 15 years, are described. Various direct problems of transonic gas dynamics are considered, and related aspects of linear stability are analyzed for stationary, nonstationary, nonisentropic, and magnetogasdynamics flows in nozzles and diffusers.

A. ARNOLD, I. GUESSARIAN. — **Mathématiques pour l'informatique.** — Logique mathématiques informatique, vol. 10. — Un vol. relié, 16 × 24, de XIV, 349 p. — Prix: FF 179.00. — Masson, Paris, 1993.

Les auteurs ont rassemblé dans cet ouvrage les notions mathématiques dont la connaissance est indispensable pour les études en informatique en deuxième cycle universitaire (licence, maîtrise). Sont ainsi exposés et explicités: les principes d'induction et les définitions par récurrence; les ensembles ordonnés et les algèbres de Boole; une introduction à la logique avec une initiation au calcul propositionnel et au calcul des prédicats, les suites récurrentes et les séries génératrices, les comportements asymptotiques, des éléments de la théorie des graphes, les langages rationnels et les automates finis, les probabilités discrètes et les chaînes de Markov finies. De nombreux exercices corrigés permettent l'assimilation de ces notions.

Guy VIDAL-NAQUET, Annie CHOQUET-GENIET. — **Réseaux de Petri et systèmes parallèles.** — Acquis avancés de l'informatique. — Un vol. broché, 13,5 × 21, de VII, 151 p. — Prix: FF 130.00. — Armand Colin, Paris, 1992.

Tout système complexe comporte des activités qui sont effectuées en parallèle et doivent coopérer pour réaliser un but commun. Pour maîtriser de tels systèmes, il est absolument indispensable d'avoir des méthodes de description et d'analyse. Le modèle des réseaux de Petri présenté dans cet ouvrage offre un outil permettant d'exprimer les relations temporelles et causales existant dans les systèmes parallèles, et permet d'obtenir, en plus de la simulation, les diagnostics à l'aide de techniques de type mathématique.

Raymond M. SMULLYAN. — **Gödel's incompleteness theorems.** — Oxford logic guides, vol. 19. — Un vol relié, 16 × 24,5, de XIII, 139 p. — Prix: £20.00. — Oxford University Press, New York, 1992.

This introduction to Gödel's incompleteness theorems is written for the general mathematician, philosopher, computer scientist and any other curious reader who has at least a nodding acquaintance with the symbolism of first-order logic (the logical connectives and quantifiers) and who can recognize the logical validity of a few elementary formulas. The book contains eleven chapters: The general idea behind Gödel's proof. Tarski's theorem for arithmetic. The incompleteness of Peano arithmetic with exponentiation. Arithmetic without the exponential. Gödel's proof based on [omega]-consistency. Rosser systems. Shepherson's representation theorems. Definability and diagonalization. The unprovability of consistency. Some general remarks on provability and truth. Self-referential systems.

E. SERNESI. — **Linear algebra: a geometric approach.** — Translated by J. Montaldi. — Chapman & Hall Mathematics. — Un vol. relié, 16 × 24, de IX, 369 p. — Prix: £35.00. — Chapman & Hall, London, 1993.

This undergraduate textbook is suitable for use alongside most linear algebra courses. The principal feature distinguishing this book is that it clearly develops the linear algebra hand-in-hand with the geometry of linear, or affine, spaces in such a way that the understanding of each reinforces the other. The text is divided into two parts: Part One introduces linear algebra and affine geometry, finishing with a chapter on transformation groups; Part Two is on quadratic forms and their geometry (Euclidean) including a chapter on finite subgroups of  $O(2)$ . Each chapter contains many examples and concludes with a generous helping of exercises.

Marek Wojciech KALINOWSKI. — **Riemann waves and their applications.** — Pitman research notes in mathematics series, vol. 276. — Un vol. broché, 17 × 24,5, de 228 p. — Prix: £28.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This volume develops a method for solving a quasilinear nonelliptical equation of the second order, giving a classification and parametrization of simple elements of the equation... Attention is also focused on the construction of nontrivial models in nonlinear quantum theory, which may be connected by means of the known axioms of quantum field theory, abstracted from a linear theory. Classical nonlinear (quasilinear) field theory provides some information on how to change these axioms. A program of quantization of these theories using Riemann waves, multiple simple waves and simple elements based on some results from the study of quasilinear hyperbolic systems of partial differential equations and nonlinear functional analysis is also proposed.

Stephen C. POWER. — **Limit algebras: an introduction to subalgebras of  $C^*$ -algebras.** — Pitman research notes in mathematics series, vol. 278. — Un vol. broché, 17 × 24,5, de 201 p. — Prix: £23.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This book has grown out of graduate lecture courses and seminars given at Lancaster University of Waterloo. The author gives a detailed introduction to current research on non-

self-adjoint subalgebras of  $C^*$ -algebras and their classification. The simplest examples are the Banach algebra limits of subalgebras of complex matrix algebras, and these form the main focus. Prerequisites have been kept to a minimum to make the notes of effective use for graduate students and nonspecialists. A first course in functional analysis including the Gelfand theory for abelian  $C^*$ -algebras should give adequate preparation. On the other hand much of the material is very recent, or original, or presented in simplified or unified form, and this will interest specialists.

Daniel DANERS and Pablo KOCH MEDINA. — **Abstract evolution equations, periodic problems and applications.** — Pitman research notes in mathematics series, vol. 279. — Un vol. broché,  $17 \times 24,5$ , de 249 p. — Prix: £28.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

The authors have endeavoured to give an introduction to the theory of abstract semilinear evolution equations of parabolic type, with special emphasis on periodic problems. Throughout they have made use of the theory of interpolation spaces rather than fractional power spaces. While the latter involves a lot of technicalities, the former allows a more elegant and complete treatment of semilinear problems, and brings conceptual clarity. It is shown how these abstract results can be applied to concrete reaction-diffusion equations. Many of the results appear for the first time in book form and thus these notes should serve as a useful reference.

Mario MARTELLI. — **Discrete dynamical systems and chaos.** — Pitman monographs and surveys in pure and applied mathematics, vol. 62. — Un vol. de 282 p. — Prix: £40.00. — Longman Scientific & Technical, Harlow, Essex, 1992.

This book brings to undergraduate level some of the fundamental ideas, definitions, and results on dynamical systems and chaos. This largely new and interdisciplinary field of study is necessary for understanding the frequently unexpected behaviour of many dynamical processes of great interest to physics, chemistry, biology, engineering, medicine, economics, etc... Primary emphasis is given to the mathematical aspects of the theory, but many applications play a considerable role throughout. Four dynamical systems derived from the current research literature are analysed in the last chapter using the ideas and techniques presented in the book. Among them, the reader will find the system proposed by E.N. Lorenz to model atmospheric changes and the neural network model developed by J.J. Hopfield.

M.I. VISHIK. — **Asymptotic behaviour of solutions of evolutionary equations.** — Lezioni Lincee. — Un vol. broché,  $13,5 \times 21,5$ , de 155 p. — Prix: £10.95 (Relié £22.95). — Cambridge University Press, Cambridge, 1992.

The theme of this book is the investigation of globally asymptotic solutions of evolutionary equations. Locally asymptotic solution of the Navier-Stokes equations and reaction-diffusion equations are the starting point, and by considering perturbed evolutionary equations, global approximations are constructed. The author has collated here his lecture notes, and has added an appendix describing his recent work on attractors deriving from dynamical systems.

N.Th. VAROPOULOS, L. SALOFF-COSTE, T. COULHON. — **Analysis and geometry on groups.** — Cambridge tracts in mathematics, vol. 100. — Un vol. relié,  $16 \times 23,5$ , de VIII, 155 cm. — Prix: £25.00. — Cambridge University Press, Cambridge, 1992.

The geometry and analysis that is discussed in this book extends to classical results for general discrete or Lie groups, and the methods used are analytical but have little to do with what is described these days as real analysis. Most of the results described in this book have a dual formulation; they have a "discrete version" related to a finitely generated discrete group,



and a continuous version related to a Lie group. The authors chose to centre this book around Lie groups but could quite easily have pushed it in several other directions as it interacts with the theory of second-order partial differential operators, and probability theory, as well as with group theory.

Antonio AMBROSETTI, Giovanni PRODI. — **A primer of nonlinear analysis.** — Cambridge studies in advanced mathematics, vol. 34. — Un vol. relié,  $15,5 \times 23,5$ , de VIII, 171 p. — Prix: £25.00. — Cambridge University Press, Cambridge, 1993.

This is an introduction to nonlinear functional analysis, in particular to those methods based on differential calculus in Banach spaces. It is in two parts; the first deals with the geometry of Banach spaces and includes a discussion of local and global inversion theorems for differentiable mappings. In the second part, the authors are more concerned with bifurcation theory, including the Hopf bifurcation. They include plenty of motivational and illustrative applications, which indeed provide much of the justification of nonlinear analysis. In particular, they discuss bifurcation problems arising from such areas as mechanics and fluid dynamics.

A. FRÖLICH, M.J. TAYLOR. — **Algebraic number theory.** — Cambridge studies in advanced mathematics, vol. 27. — Un vol. broché,  $15 \times 23$ , XI, de 355 p. — Prix: £17.95. — Cambridge University Press, Cambridge, 1993.

The authors of the book 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 be treated at this level but can usually only be found in research monographs or original papers, for instance: module theory of Dedekind domains, tame and wild ramifications, Gauss series and Gauss period, binary quadratic forms; Brauer relations.

Bernadette BOUCHON-MEUNIER. — **La logique floue.** — Que sais-je?, vol. 2702. — Un vol. broché,  $11,5 \times 17,5$ , de 127 p. — Presses Universitaires de France, Paris, 1993.

D'après l'introduction: «Le but de ce livre est d'expliquer aussi simplement que possible en quoi consiste la logique floue et ce qu'elle peut apporter à ses utilisateurs potentiels, mais également de montrer qu'elle repose sur une théorie rigoureuse et de présenter des éléments méthodologiques qui vont bien au-delà des applications simples, concernant par exemple des appareils électroménagers, actuellement mis en lumière...».

**Mathematical theory of control.** — Proceedings of the international conference. — Edited by Mohan C. Joshi, A.V. Balakrishnan. — Lecture notes in pure and applied mathematics, vol. 142. — Un vol. broché,  $18 \times 25,5$ , de XI, 420 p. — Prix: US\$125.00. — Marcel Dekker, New York, 1993.

This monograph offers an authoritative overview of the most recent developments in control theory and provides practical examples of effective interaction on topics of common interest to the fields of mathematics and control engineering. The book contains contributions by leading international experts who examine boundary control and control in immunology and cancer... control in structural and mechanical systems... controllability and optimal control... linear programming... stability and stabilization of control systems... filtering theory and semi-group theory in control... stochastic control and white noise analysis... etc.

S.H. KULKARNI, B.V. LIMAYE. — **Real function algebras.** — Pure and applied mathematics, vol. 168. — Un vol. relié, 15,5 × 23,5, de VIII, 186 p. — Prix: US\$99.75. — Marcel Dekker, New York, 1992.

This self-contained reference/text presents a thorough, up-to-date account of the theory of real function algebras. Employing the intrinsic approach, avoiding the complexification technique, and generalizing the theory of complex function algebras, this single-source volume includes an introduction to real Banach algebras... various generalizations of the Stone-Weierstrass theorem... Gleason parts... Choquet and Shilov boundaries... isometries of real function algebras... extensive references and a detailed bibliography.

Eutiquio C. YOUNG. — **Vector and tensor analysis.** — Second edition, revised and expanded. — Pure and applied mathematics, vol. 172. — Un vol. relié, 16 × 23,5, de XI, 498 p. — Prix: US\$110.00. — Marcel Dekker, Inc., New York, 1993.

Revised and updated throughout, the book presents the fundamental concepts of vector and tensor analysis with their corresponding physical and geometric applications — emphasizing the development of computational skills and basic procedures and exploring highly complex and technical topics in simplified settings. Maintaining the features that made the first edition so popular, this informative reference/text incorporates transformation of rectangular cartesian coordinate systems and the invariance of the gradient, divergence, and the curl into the discussion of tensors... combines the test for independence of path and the path independence sections... offers new examples and figures that demonstrate computational methods as well as clarify concepts, etc.

**Finite fields, coding theory, and advances in communications and computing.** — Edited by Gary L. Mullen, Peter Jau-Shyong Shiue. — Lecture notes in pure and applied mathematics, vol. 141. — Un vol. broché, 18 × 25,5, de XXIV, 443 p. — Prix: US\$145.00. — Marcel Dekker, Inc., New York, 1993.

This volume presents the refereed proceedings of the first International Conference on Finite Fields, Coding Theory, and Advances in Communications and Computing, held August 7-10, 1991, at the University of Nevada, Las Vegas establishing and encouraging more interaction between the theoretical branches of finite fields and applications in many areas including information theory as well as providing a list of all conference participants and set of open problems and conjectures designed to stimulate finite field research. The book explores various theoretical aspects of finite fields, including permutation polynomials, character sums, primitive elements and polynomials, and matrices over finite fields... considers diverse applications of finite fields, such as cryptology, error-correcting coding theory, pseudo-random number generation, and communications and information theory... etc.

Eldon HANSEN. — **Global optimization using interval analysis.** — Monographs and textbooks in pure and applied mathematics ; vol. 165. — Un vol. relié 16 × 23,5, de XIII, 230 p. — Prix: US\$49.75. — Marcel Dekker, New York, 1992.

This reference text presents the theory and applications of powerful algorithms for computing the global solutions to optimization problems. Discussing constrained, unconstrained, and inequality constrained global optimization, the author provides to give an introduction to interval analysis and explanations of interval methods for finding and bounding all solutions to linear equations with uncertain coefficients and systems of nonlinear equations... This book is a day-to-day reference for pure, applied, and industrial mathematicians, systems analysts, operations research specialists, and electrical and electronic engineers, as well as graduate students in mathematics and applications courses.

David S. MOORE, George P. McCABE. — **Introduction to the practice of statistics.** — Second edition. — Un vol. relié,  $19,5 \times 24,5$ , de XXIII, 854 p. — Prix: £19.95. — W.H. Freeman and Company, New York, 1993.

The book is an elementary but serious introduction to modern statistics for general college audiences. The focus of the changes in this second edition is to make the book more accessible to students and more teachable for instructors. Several supplements are available free to adopters. Contents: Chapter 1: Looking at data: distributions. Chapter 2: Looking at data: relationships. Chapter 3: Producing data. Chapter 4: Probability: the study of randomness. Chapter 5: From probability to inference. Chapter 6: Introduction to inference. Chapter 7: Inference of distributions. Chapter 8: Inference for count data. Chapter 9: Inference for regression. Chapter 10: Analysis of variance. Data appendix, solutions to selected exercises and 7 tables.

James R. CLAY. — **Nearrings: geneses and applications.** — Oxford science publications. — Un vol. relié,  $16,5 \times 24$ , de x, 469 p. — Prix: £55.00. — Oxford University Press, Oxford, 1992.

This book is written with advanced graduate students in mind. It reflects over 30 years of activity with nearrings. A nearring is a (not necessarily) additive group with an associative multiplication, not necessarily commutative, such that at least one of the left and right distributive laws is satisfied. The book explores some general properties of nearrings. Then various families of nearrings are considered with numerous applications to geometry, group theory, combinatorics, coding theory, cryptography, etc. in view.

Haruzo HIDA. — **Elementary theory of  $L$ -functions and Eisenstein series.** — London mathematical society student texts, vol. 26. — Un vol. relié,  $15,5 \times 23,5$ , de ix, 386 p. — Prix: £40.00. — Cambridge University Press, Cambridge, 1993.

The theory of  $p$ -adic and classic modular forms, and the study of arithmetic and  $p$ -adic  $L$ -functions has proved to be a fruitful area of mathematics over the last decade. This book provides the reader with an elementary but detailed insight into the theory of  $L$ -functions. The presentation is self-contained and concise, and the subject is approached using only basic tools from complex analysis and cohomology theory, a summary of which is supplied as an appendix. Exercises and examples are included throughout; answers to some are also given.

Wolodymyr V. PETRYSHYN. — **Approximation-solvability of nonlinear functional and differential equations.** — Monographs and textbooks in pure and applied mathematics, vol. 171. — Un vol. relié,  $16 \times 23,5$ , de xi, 372 p. — Prix: US\$115.00. — Marcel Dekker, New York, 1993.

This reference/text develops an essentially constructive theory of solvability of linear and nonlinear abstract and differential equations involving  $A$ -proper operator equations in separable Banach spaces, treats the problem of existence of a solution for equations involving pseudo- $A$ -proper and weakly- $A$ -proper mappings, and illustrates their applications. Contents: Solvability of equations involving  $A$ -proper and pseudo- $A$ -proper mappings. Equations involving linear  $A$ -proper mappings. Fixed-point and surjectivity theorems for  $P[\gamma]$ -compact and  $A$ -proper type maps. Generalized degree for  $A$ -proper mappings and applications. Solvability of PDEs and ODEs and bifurcation problems.

Geoffrey HEMION. — **The classification of knots and 3-dimensional spaces.** — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de 162 p. — Prix: £25.00. — Oxford University Press, Oxford, 1992.

This book is concerned with the fundamental question of the classification of knots, and more generally with the classification of arbitrary (compact) topological objects which occur in our normal spaces of physical reality. The author explains his classification algorithm — using the method of normal surfaces — in a simple and concise way. The reader is thus shown the relevance of such traditional mathematical objects as the Klein bottle or the hyperbolic plane to this basic classification theory.

J. ALAJBEGOVIC and J. MOCKOR. — **Approximation theorems in commutative algebra: classical and categorical methods.** — Mathematics and its applications, East European series, vol. 59. — Un vol. relié,  $16,5 \times 24,5$ , de XVIII, 330 p. — Prix: Dfl. 220.00/US\$ 139.00/£ 76.00. — Kluwer Academic Publishers, Dordrecht, 1992.

Various types of approximation theorems have been found to be useful tools in valuation theory, the theory of Abelian lattice ordered groups, multiplicative ideal theory etc... Part I of this volume is devoted to the investigation of approximation theorems from a classical point of view. The chapters of this part deal with fields and rings, partly ordered groups, and with multirings and d-groups. Part II investigates approximation theorems from a general, categorical point of view. This part is essentially self contained and requires only a basic knowledge of category theory and first-order logic.

K.O. GEDDES, S.R. CZAPOR, G. LABAHN. — **Algorithms for computer algebra.** — Un vol. relié,  $16 \times 24$ , de XVIII, 585 p. — Prix: Dfl. 275.00/US\$ 140.00/£ 84.00. — Kluwer Academic Publishers, Boston, 1992.

The book first develops the foundational material from modern algebra that is required for subsequent topics. It then presents a thorough development of modern computational algorithms for such problems as multivariate polynomial arithmetic and greatest common divisor calculations, factorization of multivariate polynomials, symbolic solution of linear and polynomial systems of equations, and analytic integration of elementary functions. Numerous examples are integrated into the text as an aid to understanding the mathematical development. The algorithms developed for each topic are presented in a Pascal-like computer language. An extensive set of exercises is presented at the end of each chapter.

Anders BJÖRNER, Michel LAS VERGNAS, Bernd STURMFELS, Neil WHITE, Günter M. ZIEGLER. — **Oriented matroids.** — Encyclopedia of mathematics and its applications, vol. 46. — Un vol. relié,  $16,5 \times 24$ , de XII, 516 p. — Prix: £ 60.00. — Cambridge University Press, Cambridge, 1993.

Oriented matroids are a very natural mathematical concept which presents itself to us in many different guises, and which has connections and applications to many different areas. Contents: A first orientation session. A second orientation session. Axiomatics. From face lattices to topology. Topological models for oriented matroids. Arrangements of pseudolines. Construction. Realizability. Convex polytopes. Linear programming.

Graham ELLIS. — **Rings and fields.** — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de VIII, 169 p. — Prix: £ 25.00. — Clarendon Press, Oxford, 1992.

This book provides an accessible introduction that will give the reader an appreciation of the power of algebraic techniques to handle diverse and difficult problems. Rather than presenting theory in abstract terms, chapters begin by introducing a problem and then go on to develop the necessary algebraic techniques for its solutions in a purposeful manner. Although

prior knowledge of group theory is unnecessary to understand the rest of the book, for those interested there is a chapter which states the axioms for a group and provides the group theoretic results needed in Galois theory.

Juha HEINONEN, Tero KILPELAEINEN and Olli MARTIO. — **Nonlinear potential theory of degenerate elliptic equations.** — Oxford mathematical monographs. — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de v, 363 p. — Prix: £40.00. — Clarendon Press, Oxford, 1993.

The authors explore the ground where partial differential equations, harmonic analysis, and function theory meet. The quasilinear equations considered in this book involve a degeneracy condition given in terms of a weight function and therefore most results appear here for the first time in print. Contents: Weighted Sobolev spaces. Capacity. Supersolutions and the obstacle problem. Refined Sobolev spaces. Variational integrals.  $A$ -harmonic functions.  $A$ -superharmonic functions. Balayage. Perron's method, barriers, and resolutivity. Polar sets.  $A$ -harmonic measure. Fine topology. Harmonic morphisms. Quasiregular mappings.  $A_p$ -weights and Jacobians of quasiconformal mappings. Axiomatic nonlinear potential theory. Appendices: The existence of solutions. The John-Nirenberg lemma.

LIN Zhengyan and LU Chuanrong. — **Strong limit theorems.** — Mathematics and its applications (Chinese series). — Un vol. relié,  $16 \times 24,5$ , de x, 195 p. — Prix: Dfl. 160.00/US\$99.00/£56.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume presents an overview of the most significant developments concerning strong convergence in probability theory. This book comprises three chapters. The first deals with Wiener and Gaussian processes. Chapter 2 is devoted to the increments of partial sums of independent random variables. Chapter 3 concentrates on the strong laws of processes generated by infinite dimensional Ornstein-Uhlenbeck processes.

Rolf SCHNEIDER. — **Convex bodies: the Brunn-Minkowski theory.** — Encyclopedia of mathematics and its applications, vol. 44. — Un vol. relié,  $16 \times 24$ , de XIII, 490 p. — Prix: £60.00. — Cambridge University Press, Cambridge, 1993.

At the heart of this monograph is the Brunn-Minkowski theory. It can be used to great effect in studying such ideas as volume and surface area and the generalizations of these. In particular the notions of mixed volume and mixed area arise naturally and the fundamental inequalities that are satisfied by mixed volumes are considered in detail. The author presents a comprehensive introduction to convex bodies and gives full proofs for some deeper theorems which have never previously been brought together. Many hints and pointers to connections with other fields are given, and an exhaustive reference list is included.

James G. OXLEY. — **Matroid theory.** — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de XI, 532 p. — Prix: £45.00. — Oxford University Press, Oxford, 1992.

The study of matroids is a branch of discrete mathematics with basic links to graphs, lattices, codes, transversals, and projective geometries. Matroids are of fundamental importance in combinatorial optimization and their applications extend into electrical engineering and statics. This book falls into two parts: the first provides a comprehensive introduction to the basics of matroid theory, while the second treats more advanced topics. The book contains over five hundred exercises and includes short proofs of all but one of the major theorems in the subject. The final chapter lists sixty unsolved problems and describes progress towards their solutions.



**Fourth Czechoslovakian Symposium on Combinatorics, Graphs and Complexity.** — Edited by Jaroslav Nesetril, Miroslav Fiedler. — *Annals of discrete mathematics*, vol. 51. — Un vol. relié, 17,5 × 24,5, de ix, 400 p. — Prix: Dfl. 245.00. — North-Holland, Amsterdam, 1992.

This volume brings together contributions by renowned researchers in combinatorics, graphs and complexity. The conference on which this book is based was the fourth in a series which began in 1963, which was the first time specialists from East and West were able to come together. The 1990 meeting attracted 170 mathematicians and computer scientists from around the world, so this book represents an international, detailed view of recent research.

**A collection of contributions in honour of Jack Van Lint.** — Edited by P.J. Cameron, H.C.A. van Tilborg. — *Topics in discrete mathematics*, vol. 7. — Un vol. relié, 20 × 26,5 de 504 p. — Prix: Dfl. 425.00. — North-Holland, Amsterdam, 1992.

This collection of contributions is offered to Jack van Lint on the occasion of his sixtieth birthday and appears simultaneously in the series "Topics in discrete mathematics" and as a special double volume of "Discrete mathematics" (volumes 106/107). It is hoped that the papers selected, all written by experts in their own fields, represent the many areas that together constitute the discipline of discrete mathematics. It is in this sphere that van Lint has become the acknowledged "master" and this volume serves to demonstrate the enormous significance he has had on the development of discrete mathematics during the last 30 years.

E. RAMIS, C. DESCHAMPS, J. ODOUX. — **Cours de mathématiques spéciales, Classes préparatoires et enseignement supérieur (1er cycle), volume 4: Séries, équations différentielles et intégrales multiples.** — 3e édition. — Un vol. broché, 16 × 24, de viii, 326 p. — Prix: FF 250.00. — Masson, Paris, 1993.

Ce volume fait partie d'un cours devenu au fil des années, un véritable classique de la préparation aux Grandes Ecoles scientifiques françaises. Les auteurs ont voulu avant tout donner un exposé détaillé, clair et vigoureux d'un programme dont ils se sont efforcés de respecter les limites. Le point de vue concret et pratique n'a pas été oublié. Le développement est accompagné de remarques, exemples, et contre-exemples. Quelques exercices de travaux pratiques ont été traités à fond (dans ce tome: calcul de la somme d'une série, étude qualitative des courbes intégrales d'une équation différentielle...). Chaque chapitre se termine par un choix d'exercices qui sont tantôt de simples applications du cours, tantôt des questions à approfondir.

Adolf RIEDE. — **Mathematik fuer Biologen: eine Grundvorlesung.** — Un vol. broché, 16 × 23, de xii, 321 p. — DM 39.80. — Friedr. Vieweg & Sohn, Braunschweig, Wiesbaden, 1993.

Ziel des Buches ist es, in einer dem Biowissenschaftler angemessenen Weise die mathematischen Begriffe, Methoden und Techniken zu erklären, die zur Aufstellung und Analysierung mathematischer Modelle benötigt werden. Die Betonung liegt also auf der Vermittlung mathematischen Verständnisses und Fertigkeiten direkt am Beispiel aus der Biologie. Wo mathematisch etwas weiter ausgeholt werden musste, wurden Abschnitte eingeschoben, aus denen Sinn und Bedeutung der mathematischen Konstruktionen für die Anwendung ersichtlich sind.

G.H. HARDY. — **A course of pure mathematics.** — Tenth edition. — *Cambridge mathematical library.* — Un vol. broché, 15 × 23, de xii, 509 p. — Prix: £14.95/US\$21.95. — Cambridge University Press, Cambridge, 1992.

Since its publication in 1908, this textbook has been a classic work to which successive generations of budding mathematicians have turned at the beginning of their undergraduate

courses. In its pages, Hardy combines the enthusiasm of the missionary with the rigour of the purist in his exposition of the fundamental ideas of the differential and integral calculus, of the properties of infinite series and of other topics involving the notion of limit.

Jacques GAUVIN. — **Théorie de la programmation mathématique non convexe.** — Les publications CRM, vol. P-15. — Un vol. broché,  $17 \times 25$ , de vvi, 63 p. — Prix: CDN\$ 16.00/US\$ 14.00. — Les Publications CRM, Montréal, 1992.

Table des matières: — Introduction: Formulation, définitions et conventions. Lagrangien et dualité. Bijection locale, changement de variables et chemins implicites. — Conditions d'optimalité: Condition nécessaire du premier ordre. Condition nécessaire du second ordre. Conditions suffisantes du second ordre. — Stabilité, sensibilité et analyse paramétrique: Stabilité et continuité de la valeur optimale. Comportement des solutions optimales. Dérivée directionnelle de la valeur optimale.

Pierre FERLAND, Claude TRICOT, Axel VAN DE WALLE. — **Analyse fractale: Application Window TM 3.x d'initiation aux ensembles fractals. Version 1.0-Novembre 1992: guide de l'utilisateur.** — Un vol. broché,  $17,5 \times 25$ , de v, 37 p. — Prix: CDN\$ 35.00. — Centre de Recherches Mathématiques, Université de Montréal, 1992.

«Analyse fractale» est un logiciel pédagogique qui permet la conception et la visualisation rapide d'un type d'images fractales fort connu: les attracteurs de systèmes d'applications affines itérés (SFI)... La facilité d'utilisation et l'approche géométrique de ce programme le rendent idéal pour illustrer ces concepts dans le cadre d'un cours ou d'une conférence... Ce logiciel touche également aux diverses méthodes de calcul de la dimension fractale, telles que la méthode des boîtes et de la saussice de Minkowski. «Analyse fractale» laisse l'utilisateur participer au choix des paramètres qui contrôlent ces calculs, tout en illustrant bien chacune des étapes.

D.V. VOICULESCU, K.J. DYKEMA, A. NICA. — **Free random variables: a noncommutative probability approach to free products with applications to random matrices, operator algebras and harmonic analysis on free groups.** — CRM monograph series, vol. 1. — Un vol. relié,  $18 \times 26$ , de v, 70 p. — American Mathematical Society, Providence R.I., 1992.

Contents: Free products. Free random variables in noncommutative probability theory. Free harmonic analysis. Random matrices and asymptotic freeness. Free product factors.

Piotr BILER, Tadeusz NADZIEJA. — **Problems and examples in differential equations.** — Pure and applied mathematics, vol. 164. — Un vol. relié,  $16 \times 24$ , de viii, 244 p. — Prix: US\$ 55.00. — Marcel Dekker, Inc., New York, 1992.

Classroom tested by the authors in graduate courses and research experience, the book considers classic as well as modern subjects... offers a collection of advanced-level problems and many examples and counterexamples previously scattered in the literature and not easily accessible... furnishes concise answers to the problems so readers can work out methodologies on their own... examines theorems and information to point out far-reaching generalizations and give a better understanding of results... explores the wide scope of the theory of differential equations... describes current research on simplified models of important questions under study, etc...

Yau-Chuen WONG. — **Introductory theory of topological vector spaces.** — Pure and applied mathematics, vol. 167. — Un vol. relié,  $15,5 \times 23,5$ , de x, 420 p. — Prix: US\$ 59.75. — Marcel Dekker Inc., New York, 1992.

This book contains an overview of the basic theories and techniques of functional analysis and its applications... explores fundamental results on Banach spaces, together with Grothendieck's structure theorem for compact sets in Banach spaces and Helley's selection theorem... examines vector topologies and vector bornologies in parallel, and studies their internal and external relationships... presents recent developments on compact and weakly compact operators, operators ideals, applications to the important class of Schwartz spaces, and over 200 exercices etc.

I.T. KIGURADZE and T.A. CHANTURIA. — **Asymptotic properties of solutions of non-autonomous ordinary differential equations.** — Mathematics and its applications, vol. 89. — Un vol. relié, 16,5 × 25, de XIV, 331 p. — Prix: Dfl. 230.00/US\$ 154.00/£92.50. — Kluwer Academic Publishers, Dordrecht, 1993.

This volume provides a comprehensive review of the developments which have taken place during the last thirty years concerning the asymptotic properties of solutions of nonautonomous ordinary differential equations. The conditions of oscillation of solutions are established, and some general theorems on the classification of equations according to their oscillatory properties are proved. In addition, the conditions are found under which nonlinear equations do not have singular, proper, oscillatory and monotone solutions. The five chapters of the book deals with linear differential equations, quasilinear equations, with general nonlinear differential equations, and with higher-order and second-order differential equations of the Emden-Fowler type.

**Asymptotic and numerical methods for partial differential equations with critical parameters.** — Edited by Hans G. Kaper and Marc Garbey, technical editor Gail W. Piper. — NATO ASI series, Series C: Mathematical and physical sciences, vol. 384. — Un vol. relié, 16,5 × 24,5, de XVIII, 372 p. — Prix: Dfl. 245.00/US\$ 156.00/£95.00. — Kluwer Academic Publishers, Dordrecht, 1993.

This volume provides a record of the workshop on asymptotic-induced numerical methods for partial differential equations, critical parameters and domain decomposition, held at Beaune, France. Discussing new computational methods, recent algorithm developments, and state-of-the-art techniques in mathematical modeling, the book explores important topics in theory and application, including: modeling of complex fluid dynamics systems; asymptotic-induced domain decomposition methods; analysis of strongly nonlinear problems; tools available for modern numerical analysis and symbolic manipulation tools for multiscale problems. This book presents a panoramic view of areas where asymptotic analysis, numerical analysis and scientific computing are beginning to be integrated effectively.

D.S. MITRINOVIC, J.E. PECARIC and A.M. FINK. — **Classical and new inequalities in analysis.** — Mathematics and its applications (East european series), vol. 61. — Un vol. relié 16,5 × 24,5, de XVII, 740 p. — Prix: Dfl.425.00/US\$ 285.00/£ 170.50. — Kluwer Academic Publishers, Dordrecht, 1993.

This volume presents a comprehensive compendium of classical and new inequalities as well as some recent extensions to well-known ones. Variations of inequalities ascribed to Abel, Jensen, Cauchy, Chebyshev, Hölder, Minkowski, Steffensen, Gram, Fejér, Jackson, Hardy, Littlewood, Polya, Schwarz, Hadamard and a host of others can be found in this volume. The more than 1200 cited references include many from the last 10 years which appear in book form for the first time. The 30 chapters are all devoted to inequalities associated with a given classical inequality, or give methods for the derivation of new inequalities.

J.M. AARTS, T. NISHIURA. — **Dimension and extensions.** — North-Holland mathematical library, vol. 48. — Un vol. relié,  $15,5 \times 23$ , de XII, 331 p. — Prix: Dfl. 170.00. — North-Holland, Amsterdam, 1993.

Two types of seemingly unrelated extension problems are discussed in this book. Their common focus is a long-standing problem of Johannes de Groot, the main conjecture of which was recently resolved. As is true of many important conjectures, a wide range of mathematical investigations had developed, which have been grouped into the two extension problems. The first concerns the extending of spaces, the second concerns extending the theory of dimension by replacing the empty space with other spaces. — Contents: The separable case in historical perspective. Mappings into spheres. Functions of inductive dimensional type. Functions of covering dimensional type. Functions of basic dimensional type. Compactifications. Charts: The absolute Borel Classes. Compactness dimension functions.

John LOUSTAU, Meighan DILLON. — **Linear geometry with computer graphics.** — Pure and applied mathematics, vol. 170. — Un vol. relié,  $15,5 \times 23,5$ , de X, 440 p., 1 logiciel "GraphLib 1.0", IBM PC et compatibles sur 1 disquette 3 1/2 pouces. — Prix: US\$55.00. — Marcel Dekker, New York, 1993.

Stressing the interplay between theory and its practice, this book presents the construction of linear models that satisfy geometric postulate systems and develops geometric topics in computer graphics, illustrating the power of geometric principles through graphics applications. The book is organized in self-contained units that allow for the mathematics or computer graphics sections to be learned independently of each other. The book also includes a Computer Graphics Utility Library (disk) of specialized subroutines, supporting an effective means of computer-aided instruction through writing graphics programs.

Ipo LAINE. — **Nevanlinna theory and complex differential equations.** — De Gruyter studies in mathematics, vol. 15. — Un vol. relié,  $17,5 \times 24,5$ , de VIII, 341 p. — Prix: DM 154.00. — Walter de Gruyter, Berlin, 1993.

This book contains a concise treatment of Nevanlinna theory applications to the theory of complex differential equations, beginning from classical results up to current research. Main emphasis of the book is on growth estimates and zero-distribution of meromorphic solutions of differential equations in the complex plane. The types of differential equations covered in the text include linear differential equations, basic non-linear differential equations like the Riccati, Painlevé and Schwarzian differential equations, and algebraic differential equations. The classical Malmquist theorem and its extension is discussed in a separate chapter, including the related classification of first order and some related differential equations.

**Random and computational dynamics.** — Editors: Marc A. Berger and Shui-Nee Chow. — A new journal, published quarterly. — Vol. 1 covering years 1992/1993. — ISSN 1061-835X. — Prix: US\$195.00 (Institutional rate), ou US\$97.50 (Individual rate). — Marcel Dekker, Inc., New York.

Many current problems in stochastic processes and dynamical systems stem from applications such as image processing and compression, fractal geometry and terrain modelling, curve and surface generation, wavelets and multi-scale dilation equations, chaos and scientific computations, etc... This new journal focuses on applied problems in dynamical systems. Its purpose is to provide a large audience of applied researchers with a home for their works, and to enable an even larger audience of academic and industrial scientists working in dynamical systems to find a source to consult and interact with for their own applied problems.

William C. BROWN. — **Matrices over commutative rings.** — Pure and applied mathematics, vol. 169. — Un vol. 16 × 23,5, de VIII, 281 p. — Prix: US\$115.00. — Marcel Dekker, Inc., New York, 1993.

This self-contained reference/text covers the most important aspects of the theory of matrices whose entries come from some given commutative ring. Providing proofs that follow from concrete matrix calculations, the book discusses the rank of a matrix, systems of linear equations, the Cayley-Hamilton theorem, resultants, Fitting ideals, and the Smith and Frobenius normal forms of matrices. It studies linear algebra when the base ring is an arbitrary commutative ring, not necessarily a field, and clarifies what the theory says when the base ring is a field, explaining the classical linear algebra results.

**Methods in module theory.** — Edited by Gene Abrams, Jeremy Haefner, K.M. Rangaswamy. — Lecture notes in pure and applied mathematics, vol. 140. — Un vol. broché, 18 × 25, de XIV, 325 p. — Prix: US\$115.00. — Marcel Dekker, Inc., New York, 1993.

Containing the contributions of over 30 participants of the 1991 Methods in Module Theory Conference at the University of Colorado at Colorado Springs, this book examines the relationship between the structure of rings, their modules, the endomorphism rings of their modules, and homological algebra... investigates locally equivalent maps between modules and more generally locally equivalent complexes of modules... covers the homological behavior of finite dimensional algebras... discusses the interface between integral representation theory and the rest of ring and module theory... studies the structure of finitely generated modules over 45 commutative Noetherian rings, etc... 350 bibliographic citations are listed.

**Complex geometry.** — Proceedings of the Osaka International Conference. — Edited by Gen Komatsu, Yusuke Sakane. — Lecture notes in pure and applied mathematics, vol. 143. — Un vol. broché, 17,5 × 25,5, de VII, 229 p. — Prix: US\$110.00. — Marcel Dekker, Inc., New York, 1993.

A. Bahri: Yamabe-type and scalar curvature equations. — L. Boutet de Monvel: Singularity of the Bergman kernel. — W.M. Goldman: Complex hyperbolic Kleinian groups. — C.R. Graham: Invariant theory of parabolic geometries. — K. Hirachi: Scalar pseudo-Hermitian invariants and the Szegő kernel on three-dimensional CR manifolds. — K. Hirachi, G. Komatsu, N. Nakazawa: Two methods of determining local invariants in the Szegő kernel. — A. Katsue: Measured Hausdorff convergence of Riemannian manifolds and Laplace operator II. — S. Kobayashi: Some problems in hyperbolic complex analysis. — M. Kuranishi: The frame bundles of CR structures and the Bergman kernel (II). — P. Li and Sh.-T. Yau: Asymptotically flat complete Kähler manifolds. — M. Namba: Pfaffian systems with finite monodromy. — J. Noguchi: An example of a hyperbolic fiber space without hyperbolic embedding into compactification. — Y. Sakane: Homogeneous Einstein metrics on a principal circle bundle. R.M. Schoen: The role of harmonic mappings in rigidity and deformations problems. — P.-M. Wong: Holomorphic curves in spaces of constant curvature.

Kurt ARBENZ et Otto BACHMANN. — **Eléments d'analyse numérique et appliquée.** — Méthodes mathématiques pour l'ingénieur, vol. 7. — Un vol. broché, 16 × 24, de X, 118 p. — Prix: Sfr. 38.00. — Presses polytechniques et universitaires romandes, Lausanne, 1992.

Ce livre a pour objet de présenter quelques notions et méthodes fondamentales de l'analyse numérique et appliquée. On y trouve la méthode d'interpolation par des splines cubiques, des méthodes analytiques, numériques et graphiques pour résoudre des équations différentielles ordinaires et aux dérivées partielles, des méthodes d'intégration numérique, les notions de



transformée de Fourier discrète et transformée en  $z$ , l'algorithme de transformée de Fourier rapide et la méthode du simplexe pour résoudre des problèmes de programmation linéaire. Les démonstrations formelles et les développements théoriques ont été réduits au minimum nécessaire au profit d'une présentation plus intuitive des idées de base. Chaque chapitre se termine par des exercices.

**D-modules and microlocal geometry.** — Proceedings of the International Conference on D-Modules and Microlocal Geometry, held at the University of Lisbon (Portugal), October 29-November 2, 1990. — Editors M. Kashiwara, T. Monteiro Fernandes, P. Schapira. — Un vol. relié, 17,5 × 24,5, de VIII, 198 p. — Prix: DM 198.00/US\$98.00. — Walter de Gruyter, Berlin, 1993.

The 14 articles contained in this book cover different areas of mathematics, and the common feature is "the microlocal point of view". The idea of working in the cotangent bundle to a manifold in order to understand local problems on the base manifold comes originally from the theory of linear partial differential equations and — as is demonstrated by the contributions to this book — is now widely used in other fields, such as singularity theory, complex analysis, group representation, etc. Topics covered include:  $D$ -modules and distributions, holonomic systems and its variants,  $q$ -difference holonomic systems, diffraction, equivariant index theorems, index theorems for sheaves and  $D$ -modules, complex partial differential equations, second microlocalization.

**Probability theory and applications: essays to the memory of József Mogyorödi.** — Edited by Janos Galambos and Imre Kátai. — Mathematics and its applications, vol. 80. — Un vol. relié, 16,5 × 25, de XVII, 350 p. — Prix: Dfl. 240.00/US\$149.00/£81.00. — Kluwer Academic Publishers, Dordrecht, 1992.

This volume contains twenty-two original contributions by leading scientists in many important areas of probability theory and its applications. The material also includes significant new results. Together this collection of papers provides a good state-of-the-art survey of current research in the following areas: inequalities, limit theorems, renewal theory and reliability theory, characterizations of distributions, infinite divisibility of polynomials of normal variables, limiting distributions for order statistics, stochastic processes, functional equations in engineering model building, and probabilistic number theory.

Chamont WANG. — **Sense and nonsense of statistical inference: controversy, misuse, and subtlety.** — Popular statistics, vol. 6. — Un vol. relié, 16 × 23, de XIII, 244 p. — Prix: US\$39.75. — Marcel Dekker, Inc., New York, 1993.

This volume focuses on the abuse of statistical inference in scientific and statistical literature as well as in variety of other sources — presenting examples of misused statistics to show that many scientists and statisticians are unaware of, or unwilling to challenge, the chaotic state of statistical practices. Explaining that statistical inference, if used improperly, can do more harm than good to science, this book provides examples of ubiquitous statistical tests taken from the biomedical and behavioral sciences, economics, etc... discusses conflicting views of randomization, emphasizing certain aspects of induction and epistemology... treats constructive uses of statistics such as a modern version of Fisher's puzzle, Bayesian analysis, Shewhart control chart, etc...

**Proof theory : a selection papers from the Leeds Proof Theory Programme 1990.** — Edited by Peter Aczel, Harold Simmons and Stanley S. Wainer. — Logic for IT. — Un vol. relié, 15,5 × 24 cm, de x, 306 p. — Prix: £30.00. — Cambridge University Press, Cambridge, 1992.

S. Wainer and L. Wallen: Basic proof theory. — W. Pohlers: A short course in ordinal analysis. — H. Schwichtenberg: Proofs as programs. — W. Buchholz: A simplified version of local predicativity. — S. Buss: A note on bootstrapping intuitionistic bounded arithmetic. — E. Cichon: Termination orderings and complexity characterisations. — S. Feferman: Logics for termination and correctness of functional programs, II. Logics of strength PRA. — D. Howe: Reflecting the semantics of reflected proof. — M. Rathjen: Fragments of Kripke-Platek set theory with infinity. — J. Tucker and J. Zucker: Provable computable selection functions on abstract structures.

Christian SOIZE. — **Méthodes mathématiques en analyse du signal.** — Enseignement de la physique. — Un vol. broché, 16 × 24, de XVIII, 594 p. — Prix: FF 270.00. — Masson, Paris, 1993.

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