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## BULLETIN BIBLIOGRAPHIQUE

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Stefaan CAENEPEEL, Freddy VAN OYSTAEYEN. — **Brauer groups and the cohomology of graded rings.** — Monographs and textbooks in pure and applied mathematics, vol. 121. — Un vol. relié,  $15,5 \times 23,5$  de x, 261 p. — Prix: US\$ 189.75 (US et Canada)/US\$ 107.50 (ailleurs). — Marcel Dekker, New York, 1988.

This contribution to theoretical algebra treats Azumaya algebras over  $Z$ -graded commutative rings and details the effect of the presence of the  $Z$ -gradation on the ground ring on classical methods and results. In addition, it derives significant information about classical ungraded objects defined over the graded ring by making use of graded data.

Konstantin Sergeevich SIBIRSKY. — **Introduction to the algebraic theory of invariants of differential equations.** — Nonlinear science : theory and applications. — Un vol. relié,  $16 \times 24$ , de vi, 169 p. — Prix: £32.50. — Manchester University Press, Manchester, 1988.

This monograph considers polynomial invariants and comitants of autonomous systems of differential equations with right-hand sides relative to various transformation groups of the phase space. Some questions connected with the construction of polynomial bases and complete systems of invariants and comitants are investigated and many applications to the qualitative theory of differential equations are indicated. The two-dimensional system with quadratic right-hand sides is investigated in detail.

**Proceedings of the First Japan Conference on Graph Theory and Applications, Hakone, Japan, June 1-5, 1986.** — Ed. by J. Akimaya, Y. Egawa, H. Enomoto. — Annals of discrete mathematics, vol. 38. — Un vol. relié,  $16,5 \times 24,5$  de vi, 418 p. — Prix: US\$ 122.00/Dfl. 250.00. — North-Holland Publishing Co., Amsterdam, 1988.

In the 1970s, there were few graph theorists among the 5000 members of the Japan Mathematics Society. The situation has changed over the last few years: the recent flourishing of Graph Theory is reflected in this volume. The conference was attended by 200 participants representing 22 countries. The overwhelming response encourages the editors to plan a second conference in Hakone in 1990.

Gregory KARPILOVSKY. — **Field theory : classical foundations and multiplicative groups.** — Monographs and textbooks in pure and applied mathematics, vol. 120. — Un vol. relié,  $18,5 \times 26$  de viii, 551 p. — Prix: US\$ 99.75 (US et Canada)/US\$ 119.50 (ailleurs). — Marcel Dekker, New York, 1988.

This book introduces classical foundations of the theory of field, emphasizing refinements and extensions achieved in light of recent developments ... demonstrates canonical fundamental



units of certain classes of pure cubic fields...proves Kneser's theorem on torsion groups of separable field extensions... etc. Additionally, the book investigates the isomorphism class of  $F^*$ , where  $F$  is a distinguished field such as local or global, etc.

C. ZUILY. — **Problems in distributions and partial differential equations.** — North-Holland mathematics studies, vol. 143. — Un vol. broché,  $16,5 \times 24$ , de 245 p. — Prix: US\$79.00/Dfl. 150.00. — North-Holland Publishing Co., Amsterdam, 1988.

The aim of this book is to provide a comprehensive introduction to the theory of distributions, by the use of solved problems. The first 6 chapters deal with classical theory, with special emphasis on the concrete aspects. The last chapter is a short introduction to the theory of partial differential equations, a field in analysis which can be considered as the most natural application of distributions.

Ernst BINZ, J. SNIATYCKI, Hans FISCHER. — **Geometry of classical fields.** — North-Holland mathematics series, vol. 154. — Notas de matemática, vol. 123. — Un vol. relié,  $17 \times 24,5$  de XVIII, 450 p. — Prix: US\$ 105.25/Dfl. 200.00. — North-Holland, Amsterdam, 1988.

This volume is an introduction to differential methods in physics. Part 1 contains a comprehensive presentation of the geometry of manifolds and Lie groups, including infinite dimensional settings. The differential geometric notions introduced in part 1 are used in part 2 to develop selected topics in field theory, from the basic principles up to the present state of the art. This second part is a systematic development of a covariant Hamiltonian formulation of field theory starting from the principle of stationary action.

A.S. TROELSTRA, D. VAN DALEN. — **Constructivism in mathematics : an introduction, vol. 2.** — Studies in logic and the foundations of mathematics, vol. 123. — Un vol. relié,  $15,5 \times 23$ , de XVII, p. 345-879, LII. — Prix: US\$86.75/Dfl. 165.00. — North-Holland, Amsterdam, 1988.

Volume 2 of this work in two parts contains mainly advanced topics of a proof-theoretical and semantical nature. The two volumes cover the principal approaches to constructivism in mathematics. They present a thorough introduction to the metamathematics of constructive mathematics, paying special attention to intuitionism, Markov's constructivism and Martin-Löf's type theory with its operational semantics.

**Differential geometrical methods in theoretical physics.** — Ed. by K. Bleuler, M. Werner. — NATO ASI series, series C : Mathematical and physical sciences, vol. 250. — Un vol. relié,  $17 \times 24,5$  de XVII, 471 p. — Kluwer Academic Publishers, Dordrecht, 1988.

These are the proceedings of the 16th International Conference on Differential Geometrical Methods in Theoretical physics held at the Centro di Cultura Scientifica "Alessandro Volta", Villa Olmo, Como, Italy, 24-29 August 1987. The talks were grouped under several sections : Mathematical contributions, Special aspects of string theory, Conformal invariance and integrable systems, Two classical domains : symplectic structures in physics, general relativity, Supersymmetric structures.

ZHU You-Lan, ZHONG Xi-Chang, CHEN Bing-Mu, ZHANG ZUO-Min. — **Difference methods for initial-boundary-value problems and flow around bodies.** — Un vol. relié,  $17 \times 24,5$  de VIII, 600 p. — Prix: DM 168.00. — Springer-Verlag, Berlin, 1988.

Since the appearance of computers, numerical methods for discontinuous solutions of quasi-linear hyperbolic systems of partial differential equations have been among the most important

research subjects in numerical analysis. The authors have developed a new difference method (named the singularity-separating method) for quasi-linear hyperbolic systems of partial differential equations. Its most important feature is that it possesses a high accuracy even for problems with singularities such as shocks, contact discontinuities, rarefaction waves and detonations.

Karl WEIERSTRASS. — **Einleitung in die Theorie der analytischen Funktionen : Vorlesung Berlin 1878.** — In einer Mitschrift von Adolf Hurwitz, bearbeitet von Peter Ullrich. — Dokumente zur Geschichte der Mathematik, Band 4. — Un vol. relié,  $16 \times 23$ , de XXVII, 184 p. — Prix: DM 58.00. — Friedr. Vieweg & Sohn, Braunschweig, 1988.

Mit der in diesem Band abgedruckten Vorlesung pflegte Weierstrass an der Universität Berlin seinen ständigen viersemestrigen Vorlesungszyklus zu eröffnen. Gerade diese grundlegende Vorlesung wurde jedoch, im Gegensatz zu den andern drei („Elliptische Funktionen“, „Abelsche Funktionen“ und „Variationsrechnung“), nicht in seine „Mathematischen Werke“ aufgenommen.

Bruno HALLAK, Hédi KALLAL. — **MATH SPE : réviser les mathématiques pour le concours.** — «J'intègre», vol. 106. — Un vol. broché,  $17,5 \times 25,5$  de 221 p. — Dunod/Bordas, Paris, 1988.

Cet ouvrage couvre l'ensemble du programme des classes de Mathématiques Spéciales ( $M, P, P'$ ). Il constitue un guide de révision complet permettant d'aborder les épreuves écrites des concours communs Centrale/Sup'Elec et Mines/Ponts.

Henri LEMBERG, B. GERARDIN, P. HEUDRON. — **Mathématiques HEC, ESSEC, ESCP, etc. : le cours par les problèmes.** — 23 problèmes-types inédits corrigés et commentés. «J'intègre», vol. 504. — Un vol. broché,  $17,5 \times 25,5$  de 223 p. — Dunod/Bordas, Paris, 1988.

Les auteurs se sont donné pour objectif de préparer les candidats à réussir l'épreuve de mathématiques en s'exerçant sur un large éventail de problèmes qui font appel tant à la capacité d'abstraction qu'à l'aptitude au calcul.

Joseph J. ROTMAN. — **An introduction to algebraic topology.** — Graduate texts in mathematics, vol. 119. — Un vol. relié,  $16 \times 24$ , de XIII, 433 p. — Prix: DM 108.00. — Springer-Verlag, Berlin, 1988.

This book is a clear exposition, with exercises, of the basic ideas of algebraic topology: homology (singular, simplicial, and cellular), homotopy groups, and cohomology rings. It is suitable for a two-semester course at the beginning graduate level, requiring as a prerequisite a knowledge of point set topology and basic algebra.

Robert DAUTRAY, Jacques-Louis LIONS. — **Mathematical analysis and numerical methods for science and technology, vol. 2: Functional and variational methods.** — Translated from the French by Ian Sneddon. — Un vol. relié,  $17 \times 25$ , de xv, 561 p. — Prix: DM 198.00. — Springer-Verlag, Berlin, 1988.

The 6 volumes set of this work compiles the mathematical knowledge required by researchers in mechanics, physics, engineering, chemistry and other branches of application of mathematics for the theoretical and numerical resolution of physical models on computers. Vol. 2, includes: functional transformations, Sobolev spaces, linear differential operators, operators in Banach spaces and in Hilbert spaces, linear variational problems, regularity, and an appendix on “distributions”.

Gennadi M. HENKIN, Jürgen LEITERER. — **Andreotti-Grauert theory by integral formulas.** — Progress in mathematics, vol. 74. — Un vol. relié, 15,5 × 23,5, de 270 p. — Prix: SFr. 68.00. — Birkhäuser, Boston, 1988.

In the last twenty years, integral representation formulas for solutions of the Cauchy-Riemann equation have had an important influence on the theory of functions of several complex variables. This monograph develops the Andreotti-Grauert theory, i.e. the theory of the Dolbeault cohomology of  $q$ -convex and  $q$ -concave manifolds, from this standpoint. New proofs are given, in which explicit integral formulas lead to strengthened versions of the classical results. Some of these versions are new and published here for the first time.

Efim M. POLISHCHUK. — **Continual means and boundary value problems in function spaces.** — Operator theory, vol. 31. — Un vol. relié, 17 × 24, de 160 p. — Prix: SFr. 62.00. Birkhäuser Verlag, Basel, 1988.

The present book is concerned with the theory of integration in infinite-dimensional spaces. Relationships between this theory, which goes back to earlier work by R. Gâteaux and P. Lévy, and various branches of classical and functional analysis, mathematical physics as well as applied theories are discussed.

**Complex analysis : articles dedicated to Albert Pfluger on the occasion of his 80th birthday.** — Edited by Joseph Hersch and Alfred Huber. — Un vol. relié, 17 × 24, de XII, 245 p. — Prix: SFr. 98.00 — Birkhäuser Verlag, Basel, 1988.

Albert Pfluger has influenced complex analysis not only by virtue of his own important contributions, but he has also greatly enhanced the development of this field by his cooperation with other outstanding research mathematicians. The present volume is a result of these international contacts. It contains articles pertaining to a wide variety of subjects such as conformal and quasiconformal mappings and related extremal problems, Riemann surfaces, meromorphic functions, subharmonic functions, approximation and interpolation, and other questions of complex analysis.

Stella BARUK. — **Wie alt ist der Kapitän : über den Irrtum in der Mathematik.** — Aus dem Französischen von Gerhard Herrgott. — Un vol. relié, 17,5 × 24, de 362 p. — Prix: SFr. 59.00. — Birkhäuser Verlag, Basel, 1988.

Eines schönen Tages im Jahre 1980 kommen einige Mathematiklehrer auf die Idee, Kindern aus der zweiten und dritten Klasse die folgende Frage zu stellen: „Auf einem Schiff sind 26 Schafe und 10 Ziegen. Wie alt ist der Kapitän?“. Und unversehens geraten die Lehrer dabei selbst mit an Bord — auf eine seltsame und beunruhigende Reise über den Ozean des Unsinn. In der Schule kommt man sich dumm und minderwertig vor, wenn man falsche Antworten gibt. Stella Baruk zeigt Lehrern, Schülern, Eltern, wie man anders damit umgehen kann: Die Irrtümer bringen heraus, wie die Mathematik zu verstehen ist; sie sind ein notwendiger — und sogar amüsanter — Bestandteil des Unterrichts.

**Numerical methods for fluid dynamics III.** — Ed. by K.W. Morton and M.J. Baines. — The Institute of Mathematics and its Applications Conference series. New series, vol. 17. — Un vol. relié, 16 × 24, de XVII, 529 p. — Prix: £ 50.00. — Clarendon Press, Oxford, 1988.

The third conference on numerical methods for fluid dynamics was held at Oxford University in March 1988 : it was the second such conference organised by the Institute for Computational Fluid Dynamics in association with the Institute of Mathematics and its Applications.

At this meeting three main themes were selected : numerical algorithms specific to CFD together with studies of their behavior and performance; grid generation techniques, adaptive grids and domain decomposition; unsteady flows, such as those which occur in aircraft flutter, tidal forcing, blade row interaction in turbines, vortex flows, etc.

Jagdish J. MODI. — **Parallel algorithms and matrix computation.** — Oxford applied mathematics and computing science series. — Un vol. relié,  $14 \times 22$ , de XI, 260 p. — Prix: £15.00 (broché)/£35.00 (relié). — Clarendon Press, Oxford, 1988.

The purpose of this textbook is to present the fundamental concepts in parallel computing. The emphasis is on the design and analysis of algorithms of particular importance in industry and academic research. The first part of the book discusses general principles and algorithmic techniques and contains the essentials of a final-year undergraduate course in computer science or computational mathematics. This is complemented in the second part by a detailed exposition of some of the key areas of application such as sorting, linear systems, partial differential equations, singular value decomposition, and eigenvalue analysis.

Aleksandr A. SAMARSKII, Evgenii S. NIKOLAEV. — **Numerical methods for grid equations, vol. 1: direct methods and vol. 2: iterative methods.** — Translated from the Russian by Stephen G. Nash. — 2 vol. reliés,  $17 \times 24$ , de xxxv, 242 p. et xv, 502 p. — Prix: SFr. 348.00. — Birkhäuser Verlag, Basel, 1989.

Since its publication in the Soviet Union ten years ago this work has become a classic. Revised in 1987 to include new developments, it is essential reading for every student and specialist who aims at subtle and complete knowledge of this subject. This book, consisting of two volumes, is devoted to the solution of differential equations arising in mathematical physics, and provides necessary foundations for a thorough understanding of techniques developed recently. In particular, it stresses the development of numerical methods for solving the systems of linear equations that arise from finite-difference approaches to this problem.

Karl Heinz MAYER. — **Algebraische Topologie.** — Un vol. broché,  $16,5 \times 23,5$ , de 279 p. — Prix: SFr. 66.00. — Birkhäuser Verlag, Basel, 1989.

Nach einem einleitenden Kapitel über mengentheoretische Topologie behandelt die vorliegende Einführung in die algebraische Topologie die folgenden Themen: Homotopie, Fundamentalgruppe, Kategorien und Funktoren, die singuläre Homologietheorie, Euler-Poincaré-Charakteristik sowie den Abbildungsgrad in verschiedenen Formen, als Umlaufzahl, Grad der Selbstabbildungen von Sphären, Ordnung, Brouwerschen Abbildungsgrad und Abbildungsgrad von Leray und Schauder.

Luis A. CORDERO, C.T.J. DODSON, Manuel de LEON. — **Differential geometry of frame bundles.** — Mathematics and its applications, vol. 47. — Un vol. relié,  $16,5 \times 24,5$ , de x, 234 p. — Prix: Dfl. 140.00. — Kluwer Academic Publishers, Dordrecht, 1989.

This book is the first devoted to a detailed treatment of the differential geometry of frame bundles. These are the prototypes of principal bundles, which are fundamental to modern geometry and algebraic topology and provide the backdrop for connection theory and hence for gauge theories in physics, while the frame bundle itself supports general relativity theory over a spacetime manifold.

**Deformation theory of algebras and structures and applications.** — Edited by Michiel Hazewinkel and Murray Gerstenhaber. — NATO ASI series, series C: mathematical and

physical sciences, vol. 247. — Un vol. relié,  $17 \times 24,5$ , de VIII, 1030 p. — Prix: Dfl. 390.00. — Kluwer Academic Publishers, Dordrecht, 1988.

This volume is a result of a meeting which took place in June 1986 at Il Ciocco in Italy. It is now abundantly clear that the “deformation theory of algebras” is indeed central to the whole philosophy of deformations/perturbations/stability. This is one of the main results of the 254 page paper by Gerstenhaber and Shack entitled “Algebraic cohomology and deformation theory”. The book is divided into five parts: deformations of algebras, perturbations of algebras in functional analysis and operator theory, deformations and moduli in geometry and differential equations and algebras, deformations of algebras and mathematical and quantum physics, deformations elsewhere.

**Bayesian statistics 3.** — Proceedings of the third Valencia International Meeting, June 1-5, 1987. — Edited by J.M. Bernardo, M.H. Degroot, D.V. Lindley and A.F.M. Smith. — Oxford science publications. — Un vol. relié,  $16 \times 24$ , de XI, 805 p. — Prix: 60.00. — Clarendon Press, Oxford, 1988.

These proceedings contain all the invited papers, with associated discussion, together with a selection of 33 contributed papers. The selection of topics, authors and discussants ensures that those proceedings provide a definitive up-to-date overview of current concerns and activity in Bayesian Statistics, encompassing a wide range of theoretical and applied research.

**Graph theory in memory of G.A. Dirac.** — Edited by L. Dovling Andersen, I. Taftberg Jakobsen, C. Thomassen, B. Toft, P.D. Vestergaard. — Annals of discrete mathematics, vol. 41. — Un vol. relié,  $17,5 \times 24,5$ , de X, 517 p. — Prix: Dfl. 250.00. — North-Holland, Amsterdam, 1989.

This volume is a tribute to the life and mathematical work of G.A. Dirac (1925-1984). The forty-two papers are all concerned with (or related to) Dirac's main lines of research. Most of the papers present new results. Some of the papers were originally presented at a meeting held in Denmark in 1985. A problems section is included, as well as a listing of Dirac's own publications.

**Numerical algorithms for modern parallel computer architectures.** — Edited by Martin Schultz. — The IMA volumes in mathematics and its applications, vol. 13. — Un vol. relié,  $16,5 \times 24$ , de XI, 232 p. — Prix: DM 48.00. — Springer-Verlag, New York, 1988.

Parallel computers have started to completely revolutionize scientific computation. Articles in this volume represent applied mathematics, computer science, and application aspects of parallel scientific computing. Major advances are discussed dealing with multiprocessor architectures, parallel algorithm development and analysis, parallel systems and programming languages. The optimization of the application of massively parallel architectures to real world problems will provide the impetus for the development of entirely new approaches to these technical situations.

**Numerical techniques for stochastic optimization.** — Edited by Yu. Ermoliev, R.J-B Wets. — Springer series in computational mathematics, vol. 10. — Un vol. relié,  $16 \times 24$ , de xv, 571 p. — Prix: DM 134.00. — Springer-Verlag, Berlin, 1988.

This is the first book devoted to this subject. It comprehensively covers all major advances in the field (both Western and Russian). It is only because of the recent developments in computer technology, that we have now reached a point where our computing power matches the inherent size requirements faced in this area. The book demonstrates that a large class of stochastic programming problems are now in the range of numerical capacities.



**Charles Conley memorial volume.** — Edited by M.R. Herman, R. McGehee, J. Moser and E. Zehnder. — Special issue of "Ergodic theory and dynamical systems", vol. 8\*. — Un vol. relié, 18 × 26, de 409 p. — Prix: £45.00/\$69.50. — Cambridge University Press, Cambridge, 1988.

This special issue consists of papers dedicated to the memory of Charles Conley who died in 1984 at the age of 51. Conley wrote a number of penetrating and profound papers in ergodic theory and the breadth and significance of his work is reflected here. The contributors to this volume include many of the major figures working in the field today. The volume includes an unpublished paper by Conley and a short biography by R. McGehee.

John A. WINN, Jr. — **Asymptotic bounds for classical Ramsey numbers.** — Un vol. broché, 14 × 21, de 108 p. — Prix: \$11.00. — Polygonal Publishing House, Washington, NJ, 1988.

This book is an introduction to Ramsey theory whose main interest is to establish upper and lower bounds for Ramsey numbers. No previous knowledge of Ramsey theory is assumed, but rather the book starts by explaining what Ramsey numbers are (including a history of the concept) and then shows how the exact values of most of the known Ramsey numbers are found. After a description of these known numbers, the book focuses on its main interest: asymptotic bounds.

Wolfgang BREIDERT. — **George Berkeley: 1685-1753.** — Vita mathematica, Bd. 4. — Un vol. relié, 16 × 23, de 200 p. — Prix: SFr. 50.00. — Birkhäuser Verlag, Basel, 1989.

Berkeleys Beschäftigung mit der Mathematik und sein Einfluss auf die mathematische Grundlagendiskussion des 18. Jahrhunderts, die vor allem durch die Kontroverse um seinen „Analyst“ hervorgerufen wurde, wird sowohl im Hinblick auf das Gesamtwerk Berkeleys als auch in Bezug auf die Auseinandersetzungen der Mathematiker untereinander dargestellt. Dabei geht es nicht nur um einen Streit über die Grundlagen der Differential- und Integralrechnung, sondern auch um die Stellung der Mathematik im wissenschaftlichen und gesamtgesellschaftlichen Kontext.

**Séminaire de théorie des nombres, Paris 1986-87.** — Edited by Catherine Goldstein. — Progress in mathematics, vol. 75. — Un vol. relié, 15 × 23,5, de 475 p. — Prix: Sfr. 98.00. — Birkhäuser, Boston, 1988.

This is the seventh annual volume of papers based on lectures given at the Séminaire de théorie des nombres de Paris in 1986-87, including some additional papers of widespread interest. Contributors are: K. Alladi, P. Bayer, Ph. Cassou-Noguès, G. Christol, J.-L. Colliot-Thélène, C. Deninger, G. Diaz, D.R. Heath-Brown, U. Jannsen, J.-F. Jaulent, M. Langevin, T. N'Guyen Quang Do, A.N. Parshin, P. Philippon, R. Rumely, M.J. Taylor, G. Tenenbaum, A.J. van der Poorten, M. Waldschmidt, J.-P. Winterberger.

Blagovest SENDOV, Vasil A. POPOV. — **The average moduli of smoothness: applications in numerical methods and approximation.** — Pure and applied mathematics. — Un vol. relié, 16 × 24, de x, 181 p. — Prix: £24.95. — John Wiley & Sons, Chichester, 1988.

This book describes a new method of estimating the error in commonly used numerical methods such as interpolation, one-sided approximation of functions, approximation of functions by means of operators, spline approximations, quadrature formulae, and network methods for the numerical solution of integral and differential equations (finite differences, finite elements, collocation and others). This new method allows the error to be estimated for an

approximation method or numerical method without making any assumptions about the function involved beyond those imposed by the problem itself.

**Operator algebras and applications, vol. 1: Structure theory,  $K$ -theory, geometry and topology.** — Edited by David E. Evans and Masamichi Takesaki. — London Mathematical Society lecture note series, vol. 135. — Un vol. broché,  $15 \times 22,5$ , de VII, 244 p. — Prix: £17.50/\$29.95. — Cambridge University Press, Cambridge, 1988.

P. Baum, A Connes:  $K$ -theory for discrete groups. — B. Blackadar: Comparison theory for simple  $C^*$ -algebras. — L.G. Brown: Interpolation for multipliers. — R.G. Douglas: Elliptic invariants and operator algebras, toroidal examples. — E.G. Effros, R. Exel: On multilinear double commutant theorems. — E. Getzler, J.D.S. Jones, S.B. Petrack: Loop spaces, cyclic homology and the Chern character. — R.V. Kadison: The Weyl theorem and block decompositions. — J. Kaminker: Secondary invariants for elliptic operators and operator algebras. — N.C. Phillips: Inverse limits of  $C^*$ -algebras and applications. — J. Roe: Partitioning non-compact manifolds and the dual Toeplitz problem. — A.J. Wassermann: Cyclic cohomology of algebras of smooth functions on orbifolds.

**Operator algebras and applications, vol. 2: Mathematical physics and subfactors.** — Edited by David E. Evans and Masamichi Takesaki. — London Mathematical Society lecture note series, vol. 136. — Un vol. broché,  $15 \times 22,5$ , de VII, 240 p. — Prix: £17.50/\$29.95. — Cambridge University Press, Cambridge, 1988.

D.B. Abraham: Some recent results for the planar Ising model. — C.J.K. Batty, O. Bratteli, D.W. Robinson: The heat semigroup, derivations and Reynolds' identity. — J. Bellissard:  $C^*$ -algebras in solid state physics: 2D electrons in uniform magnetic field. — A.L. Carey: Spin groups, infinite dimensional Clifford algebras and applications. — V.F.R. Jones: Subfactors and related topics. — A. Ocneanu: Quantized groups, string algebras, and Galois theory for algebras. — S. Popa: On amenability in type II 1 factors. — R.T. Powers: An index for semigroups of  $*$ -endomorphisms of  $B(H)$ . — A.J. Wassermann: Coactions and Yang-Baxter equations for ergodic actions and subfactors. — H. Wenzl: Derived link invariants and subfactors.

**Iterative methods for the solution of linear systems.** — Edited by A. Hadjidimos. — Reprinted from the "Journal of computational and applied mathematics", volume 24, numbers 1 and 2. — Un vol. relié,  $20 \times 27$ , de 291 p. — Prix: US\$78.00/Dfl. 160.00. — North-Holland, Amsterdam, 1988.

This collection of 20 papers includes: extensions of the classical iterative methods of Jacobi, SOR etc., and others, for example the semiiterative and the conjugate gradient methods are developed, studied and applied; the consideration of square and rectangular coefficient matrices of the linear system, in the former case singular matrix coefficients matrices are also treated; the description of new computer packages for classes of iterative methods; the proposition of algorithms for sequential computers and parallel computers.

J. VAN MILL. — **Infinite-dimensional topology: prerequisites and introduction.** — North-Holland mathematical library, vol. 43. — Un vol. relié,  $16 \times 23$ , de XII, 401 p. — Prix: US\$73.25/Dfl. 150.00 (broché: US\$41.50/Dfl. 85.00. — North-Holland, Amsterdam, 1988.

The first part of this book is a text for graduate courses in topology. In the first chapters part of the basic material of plane topology, combinatorial topology, dimension theory and ANR theory is presented. Another chapter presents an introduction to infinite-dimensional topology.

The second part of this book is part of geometric topology and is meant for the more advanced mathematician interested in manifolds. One can look upon this book as a complete and self-contained proof of Toruńczyk's Hilbert cube manifold characterization theorem.

P. CONSTANTIN, C. FOIAS, B. NICOLAENKO, R. TEMAM. — **Integral manifolds and inertial manifolds for dissipative partial differential equations.** — Applied Mathematical Sciences, vol. 70. — Un vol. relié,  $16 \times 24$ , de x, 123 p. — Prix: DM 68.00. — Springer-Verlag, New York, 1989.

This work focuses on a new geometric explicit construction of inertial manifolds from integral manifolds generated by some initial dimensional surface. The method covers a large class of dissipative PDEs. The existence of a smooth integral manifold the closure of which is an inertial manifold  $M$  requires a more detailed analysis of the geometric properties of the infinite dimensional flow. The method is explicitly constructive, integrating forward in time and avoiding any fixed point theorems.

P. LOCHAK, C. MEUNIER. — **Multiphase averaging for classical systems, with applications to adiabatic theorems.** — Applied Mathematical Sciences, vol. 72. — Un vol. broché,  $15,5 \times 23,5$  de xi, 360 p. — Prix: DM 78.00. — Springer-Verlag, New York, 1988.

In the past decades, many significant results in averaging for systems of ODE's have been obtained. These results have not attracted attention in proportion to their importance, partly because they have been overshadowed by KAM theory, and partly because they remain widely scattered, and often untranslated, throughout the Russian literature. The present book seeks to remedy that situation by providing a summary, including proofs, of averaging and related techniques for single and multiphase systems of ODE's.

R. ABRAHAM, J.E. MARSDEN, T. RATIU. — **Manifolds, tensor analysis, and applications.** — Second edition. — Applied Mathematical Sciences, vol. 75. — Un vol. relié,  $16 \times 24$ , de xi, 654 p. — Prix: DM 118.00. — Springer-Verlag, New York, 1988.

This book provides core material in nonlinear analysis for mathematicians, physicists, engineers and mathematical biologists. The main goal is to provide a working knowledge of manifolds, dynamical systems, tensors and differential forms. Some applications to Hamiltonian mechanics, fluid mechanics, electromagnetism, plasma dynamics and control theory are given, using both invariant and index notation.

P.A. LAGERSTROM. — **Matched asymptotic expansions: ideas and techniques.** — Applied Mathematical Sciences, vol. 76. — Un vol. relié,  $16 \times 24$ , de xii, 250 p. — Prix: DM 78.00. — Springer-Verlag, New York, 1988.

The central theme of the book are the basic ideas and resulting techniques in the method of Matched Asymptotic Expansions (MAE), more specifically the concept of matching. The point of view here is based on the fundamental ideas enunciated by Saul Kaplan in the mid-fifties. In particular, matching is possible only when the relevant expansions have a domain of overlap and matching is thus in essence intermediate matching.

David MUMFORD. — **The red book of varieties and schemes.** — Lecture notes in mathematics, vol. 1358. — Un vol. broché,  $16,5 \times 24$ , de v, 309 p. — Prix: DM 50.00. — Springer-Verlag, Berlin, 1988.



The original "Red Book" was a set of lecture notes entitled "Introduction to Algebraic Geometry: preliminary version of the first 3 chapters". It evolved into a plan for a 2-volume work of which the first appeared in 1976 as "Algebraic Geometry I: complex projective varieties". Volume II was written jointly with D. Eisenbud and J. Harris and is due soon. For several years, the "Red Book" has been out of print. The author has agreed to reissue it in the "Lecture notes in mathematics" series without essential changes, as it is still in demand as a quick and informal introduction to the subject.

Chris PRESTON. — **Iterates of piecewise monotone mappings on an interval.** — Lecture notes in mathematics, vol. 1347. — Un vol. broché,  $16,5 \times 24$ , de v, 166 p. — Prix: DM 28.50. — Springer-Verlag, Berlin, 1988.

Piecewise monotone mappings on an interval provide simple examples of discrete dynamical systems whose behaviour can be very complicated. These notes are concerned with some of the properties of such mappings. This account can be regarded as a sequel to "Iterates of maps on an interval" (Lecture Notes in Math. vol. 999).

F. BORCEUX (ed.). — **Categorical algebra and its applications: proceedings, Louvain-la-Neuve, 1987.** — Lecture notes in mathematics, vol. 1348. — Un vol. broché,  $16,5 \times 24$ , de VIII, 375 p. — Prix: DM 57.50. — Springer-Verlag, Berlin, 1988.

This work contains several fundamental papers on general category theory by the top specialists in the field, and many papers on the applications of category theory in functional analysis, algebraic topology, algebraic geometry, general topology, ring theory, cohomology, differential geometry, group theory, mathematical logic and computer sciences.

J.C. ALEXANDER (ed.). — **Dynamical systems : proceedings, University of Maryland, 1986-87.** — Lecture notes in mathematics, vol. 1342. — Un vol. broché,  $16,5 \times 24$ , de VIII, 726 p. — Prix: DM 108.00. — Springer-Verlag, Berlin, 1988.

Some of these papers are lectures given at conferences held in Maryland between October 1986 and March 1987, others are work which was in progress during the Special Year. In addition, a paper of J. Milnor and W. Thurston, versions of which had been available as notes but not yet published, is included.

Hanno ULRICH. — **Fixed point theory of parametrized equivariant maps.** — Lecture notes in mathematics, vol. 1343. — Un vol. broché,  $16,5 \times 24$ , de VII, 147 p. — Prix: DM 28.50. — Springer-Verlag, Berlin, 1988.

The first part of this research monograph discusses general properties of Euclidean neighbourhood retracts over  $B$  with action of a compact Lie group  $G$ , and their relations with fibrations, continuous submersions, and fibre bundles. The second part presents equivariant cohomology theory showing that equivariant fixed point theory is isomorphic to equivariant stable cohomotopy theory.

**Potential theory surveys and problems.** — Proceedings of a conference held in Prague, July 19-24, 1987. — Edited by J. Král, J. Lukes, I. Netuka, J. Vesely. — Lecture notes in mathematics, vol. 1344. — Un vol. broché,  $16,5 \times 24$ , de VIII, 270 p. — Prix: DM 42.50. — Springer-Verlag, Berlin, 1988.

The volume comprises eleven survey papers which deal with both classical and abstract potential theory and its relations to partial differential equations, stochastic processes and other

branches such as numerical analysis and topology. A collection of problems from potential theory, compiled on the occasion of the conference, is included.

**Holomorphic dynamics.** — Proceedings of the second International Colloquium on Dynamical Systems, held in Mexico, July 1986. — Edited by X. Gómez-Mont, J. Seade, A. Verjovski. — Lecture notes in mathematics, vol. 1345. — Un vol. broché, 16,5 × 24, de vii, 321 p. — Prix: DM 50.00. — Springer-Verlag, Berlin, 1988.

17 exposés par: J.C. Alexander, A. Verjovsky. — B. Branner, A. Douady. — F. Cano. — M. Chaperon. — A. El Kacimi. — D. Fried. — X. Gómez-Mont, J. Muciño. — E. Gutkin, A. Katok. — E. Lacombe, G. Sienra. — A. Lins-Neto. — S. López de Medrano. — G. Pourcin. — K. Reichard, K. Spallek. — H.J. Reiffen. — F. Sánchez-Bringas. — A.M. Silva. — R. Thom.

Erich NOVAK. — **Deterministic and stochastic error bounds in numerical analysis.** — Lecture notes in mathematics, vol. 1349. — Un vol. broché, 16,5 × 24, de v, 113 p. — Prix: DM 23.00. — Springer-Verlag, Berlin, 1988.

Deterministic error bounds: Basic assumptions and definitions, deterministic error bounds and  $n$ -widths, results for special problems. — Error bounds for Monte Carlo methods: Basic properties, results for special problems. — Average error bounds: Averages over the class of problem elements, the average over the set of information. — Existence and uniqueness of optimal algorithms.

**Differential topology.** — Proceedings of the second Topology Symposium, held in Siegen, FRG, Jul. 27 — Aug. 1, 1987. — Edited by U. Koschorke. — Lecture notes in mathematics, vol. 1350. — Un vol. broché, 16,5 × 24, de vi, 269 p. — Prix: DM 42.50. — Springer-Verlag, Berlin 1988.

The main subjects of this symposium are reflected in this collection of 16 research and expository papers. They center around differential topology and, more specifically, around linking phenomena in 3, 4 and higher dimensions, tangent fields, immersions and other vector bundle morphisms. Manifold categories,  $K$ -theory and group actions are also discussed.

**Topology and geometry: Rohlin Seminar. Edited by O. Ya. Viro.** — Lecture notes in mathematics, vol. 1346. — Un vol. broché, 16,5 × 24, de xi, 581 p. — Prix: DM 92.00. — Springer-Verlag, Berlin, 1988.

This volume is a collection of papers dedicated to the memory of V.A. Rohlin (1919-1984), an outstanding mathematician and the founder of the Leningrad topological school. It includes survey and research papers on topology of manifolds, topological aspects of the theory of complex and real algebraic varieties, topology of projective configuration spaces and spaces of convex polytopes.

**Complex analysis, Joensuu, 1987.** — Proceedings of the 13th Rolf Nevanlinna Colloquium, held in Joensuu, Finland, Aug. 10-13, 1987. — Edited by I. Laine, S. Rickman, T. Sorvali. — Lecture notes in mathematics, vol. 1351. — Un vol. broché, 16,5 × 24, de xv, 378 p. — Prix: DM 57.50. — Springer-Verlag, Berlin, 1988.

The articles in this volume are for the most part research articles related mainly to the theory of quasiconformal and quasiregular mappings, Riemann surfaces and potential theory. This volume was also dedicated to Lars V. Ahlfors on the occasion of his 80th birthday. Many articles in this volume reflect his mathematical interests.

L.L. AVRAMOV, K.B. TCHAKERIAN (Eds.). — **Algebra : some current trends.** — Proceedings of the 5th National School in Algebra, held in Varna, Bulgaria, Sept. 24-Oct. 4, 1986. — Lecture Notes in Mathematics, vol. 1352. — Un vol. broché, 16,5 × 24, de ix, 240 p. — Prix: DM 35.00. — Springer-Verlag, Berlin, 1988.

The contributions to these proceedings can be grouped around the following main topics and themes: Structure of finite groups; Representation of discrete groups; Applications of Lie groups and algebraic geometry to number theory; Hodge theory; Structure of non-commutative rings and Lie rings; Applications of non-commutative rings to commutative algebra.

Richard S. PALAIS, Chuu-lian TERNG. — **Critical point theory and submanifold geometry.** — Lecture Notes in Mathematics, vol. 1353. — Un vol. broché, 16,5 × 24, de x, 272 p. — Prix: DM 42.50. — Springer-Verlag, Berlin, 1988.

Part 1 of this book is a modern introduction to submanifold geometry, but it studies submanifolds of Hilbert space as well as of Euclidean spaces. Part 2 is devoted to critical point theory, and here again the theory is developed in the setting of Hilbert manifolds. The two parts are inter-related through the Morse Index Theorem.

Hans VOLKMER. — **Multiparameter eigenvalue problems and expansion theorems.** — Lecture Notes in Mathematics, vol. 1356. — Un vol. broché, 16,5 × 24, de vi, 157 p. — Prix: DM 28.50. — Springer-Verlag, Berlin, 1988.

This book provides treatment of two of the main problems of multiparameter spectral theory: the existence of eigenvalues and the expansion in series of eigenfunctions. The results are first obtained in abstract Hilbert spaces and then applied to integral operators and differential operators. Special attention is paid to various definiteness conditions which can be imposed on multiparameter eigenvalue problems.

S. HILDEBRANDT, R. LEIS (Eds.). — **Partial differential equations and calculus of variations.** — Lecture Notes in Mathematics, vol. 1357. — Un vol. broché, 16,5 × 24, de vi, 423 p. — Prix: DM 65.00. — Springer-Verlag, Berlin, 1988.

This volume contains 18 papers by members and guests of the former Sonderforschungsbereich 72 (SFB 72) „Approximation und Mathematische Optimisierung in einer anwendungsbezogenen Mathematik“, who have, over the years, collaborated in the research group „Lösung partieller Differentialgleichungen und Variationsrechnung“. It is an account of 15 years of research. The emphasis of these papers is on existence and regularity results for variational problems and for nonlinear differential equations, on special equations of mathematical physics, and on problems of scattering theory.

P. EYMARD, J.-P. PIER (Eds.). — **Harmonic analysis : proceedings, Luxembourg, 1987.** — Lecture Notes in Mathematics, vol. 1359. — Un vol. broché, 16,5 × 24, de viii, 287 p. — Prix: DM 42.50. — Springer-Verlag, Berlin, 1988.

The International Symposium held at Centre universitaire of Luxembourg, September 7-11, 1987, was intended to focus on various aspects of abstract harmonic analysis. General surveys aimed at shedding some light on present trends of the theory, put in the frame of its recent historical evolution.

C. ANDERSON, C. GREENGARD (Eds.). — **Vortex methods : proceedings, Los Angeles, 1987.** — Lecture Notes in Mathematics, vol. 1360. — Un vol. broché, 16,5 × 24, de v, 141 p. — Prix: DM 23.00. — Springer-Verlag, Berlin, 1988.

These papers are based on talks given at the UCLA Workshop on Vortex Methods, held May 20-22, 1987. One aim of the workshop was to bring together people carrying out theoretical and numerical investigations. Vortex methods, by which we mean numerical schemes in which the computational elements are pieces of vorticity, were particularly emphasized.

T. TOM DIECK (Ed.). — **Algebraic topology and transformation groups : proceedings, Göttingen, 1987.** — Lecture Notes in Mathematics, vol. 1361. — Un vol. broché, 16,5 × 24, de vi, 298 p. — Prix: DM 50.00. — Springer-Verlag, Berlin, 1988.

These are the papers resulting from the proceedings held in Göttingen, FRG, August 23-29, 1987. They are authored by: S. Bauer; C.-F. Bödigheimer and F.R. Cohen; G. Dylawerski; R. Lee and S.H. Weintraub; L.G. Lewis, Jr.; W. Lück and A. Ranicki; R.J. Milgram; D. Notbohm; W. Puppe; P. Vogel.

P.L. HENNEQUIN (Ed.) — **Ecole d'été de probabilités de Saint-Flour XV-XVII, 1985-87.** — Lecture Notes in Mathematics, vol. 1362. — Un vol. broché, 16,5 × 24, de v, 459 p. — Prix: DM 73.00. — Springer-Verlag, Berlin, 1988.

Ce volume rassemble six des cours qui ont été donnés à l'Ecole de Calcul des Probabilités de Saint-Flour durant les années 1985, 1986 et 1987. S.R.S. Varadhan: Large deviations. — P. Diaconis: Applications of non-commutative Fourier analysis to probability problems. — H. Föllmer: Random fields and diffusion processes. — G.C. Papanicolaou: Waves in one-dimensional random media. — D. Elworthy: Geometric aspects in diffusion on manifolds. — E. Nelson: Stochastic mechanics and random fields.

EULER. — **Introduction to analysis of the infinite. Book 1.** — Translated by J.D. Blanton. — Un vol. relié, 16 × 24, de xv, 327 p. — Prix: DM 98.00. — Springer-Verlag, New York, 1988.

In 1979, Professor André Weil remarked that students in mathematics would profit much more from a study of Euler's "Introductio in Analysin Infinitorum" rather than of the available modern textbooks. The work had been translated into French, German, and Russian, but no trace of a translation of the complete work into English was found. This was the impetus for the present translation.

George ADOMIAN. — **Nonlinear stochastic systems theory and applications to physics.** — Mathematics and its applications, vol. 46. — Un vol. relié, 16,5 × 24,5, de XX, 224 p. — Prix: Dfl.140.00. — Kluwer Academic Publishers, Dordrecht, 1989.

This book addresses the need for realistic solutions of nonlinear and/or stochastic dynamical system problems arising in the modelling of many areas of science. The innovative methodology of the author avoids linearization, perturbation, or discretization and the resulting massive computations, or the customary assumptions of statistical separability, unphysical stochastic processes, weak nonlinearity, small fluctuations, and quasi-monochromatic assumptions. Thus the modelling can be more sophisticated and need not be tailored to machine computation or the use of customary theorems.

Serge LANG. — **Basic mathematics.** — Un vol. broché, 15,5 × 23,5, de xv, 475 p. — Prix: DM 58.00. — Springer-Verlag, New York, 1988.

De la préface : "The present book is intended as a text in basic mathematics. As such, it can have multiple uses: for a one-year course in the high schools during the 3rd or 4th year ... ; for a complementary reference in earlier high school grades ... ; for a one-semester course at the

college level, to review or to get a firm foundation in the basic mathematics necessary to go ahead in calculus, linear algebra, or other topics."

B. ENGQUIST, M. LUSKIN, A. MAJDA, eds. — **Computational fluid dynamics and reacting gas flows**. — IMA volumes in mathematics and its applications, vol. 12. — Un vol. relié, 16 × 24, de XI, 346 p. — Prix: DM 68.00. — Springer-Verlag, Berlin, 1988.

This volume contains 15 papers that were presented at the workshop on computational fluid dynamics and reacting gas flows during September, 1986. Topics presented were numerical problems connected with weather prediction, recent progress in vortex methods for incompressible flows, new computational research in aerodynamical fluid dynamics, reacting gas flows, non-Newtonian flows.

B.A. ROSENFELD. — **A history of non-Euclidean geometry : evolution of the concept of a geometric space**. — Studies in the history of mathematics and physical sciences, vol. 12. — Un vol. relié, 16 × 24, de XI, 471 p. — Prix: DM 184.00. — Springer-Verlag, New York, 1988.

This is an investigation of the mathematical and philosophical factors underlying the discovery of the concept of non-euclidean geometries, and the subsequent extension of the concept of space. Chapters 1-5 are devoted to the evolution of the concept of space, leading up to chapter 6 which describes the discovery of non-Euclidean geometry, and the corresponding broadening of the concept of space.

Hans-Georg MUELLER. — **Nonparametric regression analysis of longitudinal data**. — Lecture notes in statistics, vol. 46. — Un vol. broché, 16,5 × 24, de VI, 199 p. — Prix: DM 41.00. — Springer-Verlag, Berlin, 1988.

This monograph reviews some of the work that has been done for longitudinal data in the rapidly expanding field of nonparametric regression. The aim is to give the reader an impression of the basic mathematical tools that have been applied, and also to provide intuition about the methods and applications.

G. KARPILOVSKY. — **Topics in field theory**. — North-Holland mathematics studies, vol. 155. — Notas de matemática, vol. 124. — Un vol. broché, 17 × 24,5, de XII, 546 p. — Prix: Dfl. 275.00/US\$ 144.75. — North-Holland, Amsterdam, 1989.

This book is intended for the student who has completed the equivalent of a standard first-year graduate algebra course. Thus it is assumed that the reader is familiar with basic ring-theoretic and group-theoretic concepts. A chapter on algebraic preliminaries is included, as well as a fairly large bibliography of works which are either directly relevant to the text or offer supplementary material of interest.

Piergiorgio ODIFREDDI. — **Classical recursion theory : the theory of functions and sets of natural numbers**. — Studies in logic and the foundations of mathematics, vol. 125. — Un vol. relié, 15,5 × 23, de XVIII, 668 p. — Prix: US\$ 110.50/Dfl. 210.00. — North-Holland, Amsterdam, 1989.

1988 marks the first centenary of Recursion Theory, since Dedekind's 1888 paper on the nature of number. This book is intended to be both a comprehensive reference for the subject and a textbook starting from first principles. Among the subjects covered are: various equivalent approaches to effective computability and their relations with computers and programming



languages; a discussion of Church's thesis; a modern solution to Post's problem; global properties of Turing degrees; and a complete algebraic characterization of many-one degrees.

R. SIVARAMAKRISHNAN. — **Classical theory of arithmetic functions.** — Pure and applied mathematics, vol. 126. — Un vol. relié,  $16 \times 23,5$ , de XII, 386 p. — Prix: \$99.75 (USA et Canada), \$119.50 (autres pays). — Marcel Dekker, Inc., New York, 1989.

This volume focuses on the classical theory of number-theoretic functions, emphasizing algebraic and multiplicative techniques. It contains many structure theorems basic to the study of arithmetic functions, including several proofs that have never appeared in published form.

E.B. DAVIES. — **Heat kernels and spectral theory.** — Cambridge tracts in mathematics, vol. 92. — Un vol. relié,  $16 \times 23,5$ , de IX, 197 p. — Prix: \$49.50. — Cambridge University Press, Cambridge, 1989.

While the study of the heat equation is a classical subject, this book sets a precedent in that it is the first account of dramatic recent improvements in our quantitative understanding of heat kernels. The author considers variable coefficient operators on regions in Euclidean space and Laplace-Beltrami operators on complete Riemannian manifolds. He also includes results pertaining to the heat kernels of Schrödinger operators.

D.J. SAUNDERS. — **The geometry of jet bundles.** — London Mathematical Society lecture note series, vol. 142. — Un vol. broché,  $15 \times 23$ , de 293 p. — Prix: £20.00/\$29.95. — Cambridge University Press, Cambridge, 1989.

The purpose of this book is to provide an introduction to the theory of jet bundles for mathematicians and physicists who wish to study differential equations, particularly those associated with the calculus of variations, in a modern geometric way. One of the themes of the book is that first-order jets may be considered as the natural generalisation of vector fields for studying variational problems in field theory, and so many of the constructions are introduced in the context of first- or second-order jets, before being described in their full generality.

Gregory NABER. — **Spacetime and singularities : an introduction.** — London Mathematical Society student texts, vol. 11. — Un vol. relié,  $15,5 \times 23,5$ , de IX, 178 p. — Prix: £22.50 (relié), £7.95 (broché)/\$39.50 (relié), \$16.95 (broché). — Cambridge University Press, Cambridge, 1988.

This book is an elementary introduction to the geometrical methods and notions used in special and general relativity. Particular emphasis is placed on the ideas concerned with the structure of space time and those which play a role in the Penrose-Hawking singularity theorems. Indeed, the author's prime purpose is to give a rigorous proof of the simplest of these theorems yet one which is representative of the whole.

François R. COSSEC, Igor V. DOLGACHEV. — **Enriques surfaces I.** — Progress in mathematics, vol. 76. — Un vol. relié,  $15 \times 23,5$ , de IX, 397 p. — Prix: SFr. 78.00. — Birkhäuser, Boston, 1989.

Enriques surfaces, first constructed by F. Enriques in 1896, are key examples of the classification theory of complex algebraic surfaces. Using the arithmetic and combinatorial structures on the Picard group, this book explores the geometry of these surfaces by purely geometric methods, involving delicate combinatorial analysis, valid in arbitrary characteristics. This book is the first of a 2-volume, extensive account of the theory of this class of projective algebraic surfaces.

**Computers in geometry and topology.** Ed. by **Martin C. Tangora**. — Lecture notes in pure and applied mathematics, vol. 114. — Un vol. broché,  $17,5 \times 25,5$ , de VIII, 317 p. — Prix: \$99.75 (US et Canada) / \$119.50 (autres pays). — Marcel Dekker, New York, 1989.

This book explores the use of modern computer techniques across a spectrum of research problems, from the Mandelbrot set to homotopy theory and the cohomology of algebras and groups. It presents a conjectural description of the Feigenbaum limit of iterated period doubling and its generalization to iterated period  $p$ -tupling, reports on a program designed to compute homotopy groups and spheres enjoying the EHP sequence on a 64K computer, etc.

**D. REES**. — **Lectures on the asymptotic theory of ideals**. — London Mathematical Society lecture note series, vol. 113. — Un vol. broché,  $15 \times 22,5$  de VIII, 201 p. — Prix: £15.00/\$24.95. — Cambridge University Press, Cambridge, 1988.

The author's aim is to introduce and prove some of the main results of the asymptotic theory of ideals. He sets out to prove his valuation theorem, strong valuation theorem and degree formula and to develop their consequences. The last part of the book is devoted to mixed multiplicities. Here the author develops his theory of general elements of ideals and gives a proof of a generalised degree formula.

**Jonathan R. PARTINGTON**. — **An introduction to Hankel operators**. — London Mathematical Society student texts, vol. 13. — Un vol. broché,  $15,5 \times 22,5$  de 103 p. — Prix: £20.00/\$34.50 (relié), £7.50/\$12.95 (broché). — Cambridge University Press, Cambridge, 1988.

Hankel operators are of wide application in mathematics (functional analysis, operator theory, approximation theory) and engineering (control theory, systems analysis). The book is based on graduate lectures given to an audience of mathematicians and control engineers, but to make it reasonably self-contained, the author has included several appendices on mathematical topics unlikely to be met by undergraduate engineers.

**Jean-Marie ARNAUDIES, Henri FRAYSSE**. — **Cours de mathématiques 3: compléments d'analyse**. — Classes préparatoires 1er cycle universitaire. — Un vol. relié,  $16 \times 24,5$  de VI, 522 p. — Paris: Dunod, 1989.

Ce volume 3 du «Cours de mathématiques» fournit les compléments d'analyse indispensables tant aux concours d'entrée aux grandes écoles que pour entreprendre des études scientifiques à dominante mathématique. Cet ouvrage propose 126 théorèmes avec leur démonstration, 103 exemples et 500 exercices, du plus simple au plus élaboré.

**Jacques DOUCHET et Bruno ZWAHLEN**. — **Calcul différentiel et intégral, vol. 4 : Fonctions réelles de plusieurs variables réelles: exercices résolus**. — Un vol. broché,  $16 \times 24$ , de 177 p. — Prix: SFr. 34.50. — Presses polytechniques romandes, Lausanne, 1989.

Les exercices proposés avec, pour chacun d'eux, une solution détaillée illustrent les chapitres traités dans l'ouvrage «Calcul différentiel et intégral vol. 2 : Fonctions réelles de plusieurs variables réelles».

**Albert J. GETSON, Francis C. HSUAN**. — **2-inverses and their statistical application**. — Lecture notes in statistics, vol. 47. — Un vol. broché,  $16,5 \times 24,5$  de VIII, 110 p. — Prix: DM 28.50. — Springer-Verlag, New York, 1988.

This book addresses the special, but heretore ignored, role of 2-inverses in statistics. The relationships among various kinds of generalized inverses and their construction in terms of

2-inverses are explored. For each topic, the simplification of both the concepts and the notation which results from a 2-inverse approach is stressed and illustrated with examples.

G. Larry BRETTHORST. — **Bayesian spectrum analysis and parameter estimation.** — Larry BRETTHORST estimation. — Lecture notes in statistics, vol. 48. — Un vol. broché,  $16,5 \times 24,5$ , de XII, 209 p. — Prix: DM 41.00. — Springer-Verlag, New York, 1988.

This book is primarily a research document on the application of probability theory to the parameter estimation problem in rather general models. In particular when the model consists of a single stationary sinusoid it is shown that the direct application of probability theory will yield frequency estimates an order of magnitude better than a discrete Fourier transform in signal-to-noise of one.

Steffen L. LAURITZEN. — **Extremal families and systems of sufficient statistics.** — Lecture notes in statistics, vol. 49. — Un vol. broché,  $16,5 \times 24,5$  de xv, 268 p. — Prix: DM 49.00. — Springer-Verlag, New York, 1988.

This book surveys results in the area sometimes denoted as “partial exchangeability” of “de Finetti type theorems”. It is to be seen as an attempt to give sense to the general idea that there is a strong coupling between a statistical model and the statistical analysis. So strong that there is a canonical mathematical construction leading from the analysis to the model.

Ole E. BARNDORFF-NIELSEN. — **Parametric statistical models and likelihood.** — Lecture notes in statistics, vol. 50. — Un vol. broché,  $16,5 \times 24,5$  de VII, 276 p. — Prix: DM 49.00. — Springer-Verlag, New York, 1988.

The book gives an account of the mathematical-statistical theory of the main classes of parametric statistical models, i.e. transformation models and exponential models, and of likelihood based inference. The emphasis is on recent developments and the mathematical techniques employed include parts of the theory of group actions and invariant measures, differential geometry, and asymptotic analysis.

Serge LANG. — **A first course in calculus.** — 5th ed. — Undergraduate texts in mathematics. — Un vol. relié,  $16 \times 24$ , de 367 p. — Prix: DM 128.00. — Springer-Verlag, New York, 1986.

This is the 5th ed. of Lang's calculus book. It covers all of the topics traditionally taught in the first-year calculus sequence. Each of the 5 sections contains examples and applications of the topic covered.

Warren DICKS, M.J. DUNWOODY. — **Groups acting on graphs.** — Cambridge studies in advanced mathematics, vol. 17. — Un vol. relié,  $15,5 \times 23,5$ , de XIII, 283 p. — Prix: £30.00/\$54.50. — Cambridge University Press, Cambridge, 1989.

This is an advanced text and research monograph on groups acting on low-dimensional topological spaces, and for the most part the viewpoint is algebraic. Much of the book occurs at the one-dimensional level, where the topology becomes graph theory. Here the treatment includes several of the standard results on groups acting on trees, as well as many original results on ends of groups and Boolean rings of graphs.

D.C. CHAMPENEY. — **A handbook of Fourier theorems.** — Un vol. broché,  $15 \times 23$ , de IX, 185 p. — Prix: £8.95/\$17.95. — Cambridge University Press, Cambridge, 1989.



This handbook comprises a collection of the most important theorems in Fourier analysis, presented without proof in a form that is accurate but also accessible to a reader who is not a specialist mathematician. The technique of Fourier analysis is today of particular importance in communications theory and signal analysis. Existing books on the subject are either rigorous treatments, intended for mathematicians, or are intended for non-mathematicians, and avoid the finer points of the theory. This book bridges the gap between the two types.

Michel HERVE. — **Analyticity in infinite dimensional spaces.** — De Gruyter studies in mathematics, vol. 10. — Un vol. relié,  $17,5 \times 24,5$ , de VIII, 206 p. — Prix: DM 118.00. — Walter de Gruyter, Berlin, 1989.

This book provides a systematic introduction to complex analysis in locally convex spaces (also called infinite dimensional holomorphy). In recent years, infinite dimensional holomorphy has been the object of intensive research, both in its own right and because of the often unexpected, nontrivial applications to other areas such as potential theory and quantum field theory. Much of the impetus for the study of holomorphic functions in infinite dimensions has been provided by the investigation of topological properties of spaces of such mappings. The aim of this book is to present the analytic aspects of the theory in its setting of complex analysis in locally convex spaces.

**Handbook of Boolean algebras.** — Ed. by J. Donald Monk, with the coop. of Robert Bonnet. — 3 vol. reliés,  $17 \times 24,5$  de 1440 p. au total. — Prix: US\$309.75/Dfl. 635.00. — North-Holland, Amsterdam, 1989.

This work treats those parts of the theory of Boolean algebras of most interest to pure mathematicians: the set-theoretical abstract theory and applications and relationships to measure theory, topology and logic. It is divided into 2 parts published in 3 volumes. Part 1 is a comprehensive, self-contained introduction to the set-theoretical aspects of the theory of Boolean algebras. It includes, in addition to a systematic introduction of basic algebra and topological ideas, recent developments such as the Balcar-Franek and Shelah-Shapiro results on free subalgebras. Part 2 (volumes 2 and 3) contains articles on special topics describing the most recent results in special areas such as automorphism groups, Ketonen's theorem, recursive Boolean algebras, and measure algebras.

Richard M. DUDLEY. — **Real analysis and probability.** — The Wadsworth & Brooks/Cole Mathematics series. — Un vol. relié,  $17 \times 24$ , de XI, 436 p. — Prix: US\$52.95. — Wadsworth & Brooks/Cole, Pacific Grove, 1989.

De la préface : "This is a text at the beginning graduate level... I looked for the best and shortest available proofs for the theorems. Short proofs that have appeared in journal articles, but in few if any other textbooks, are given for the completion of metric spaces, Daniell-Stone integration theory, the strong law of large numbers, the ergodic theorem, the martingale convergence theorem, the subadditive ergodic theorem, and the Hartman-Wintner law of the iterated logarithm..."

Clark JEFFRIES. — **Mathematical modeling in ecology: a workbook for students.** — Mathematical modeling, no. 3. — Un vol. relié,  $16 \times 24$ , de x, 193 p. — Prix: SFr. 49.50. — Birkhäuser, Basel, 1989.

This book introduces the student to the study of deterministic ecosystem models, particularly patterns of organization associated with mathematical stability. The basic notions of dynamical

systems are couched in nonmathematical terms so that the student whose main interests is in ecosystems, not in mathematics itself, will be led without undue mystery into the world of large scale but well behaved models.

C. CUVELIER... et al. — **Eléments d'équations aux dérivées partielles pour ingénieurs Tome 1: Théorie et méthodes numériques.** — Cahiers mathématiques de l'Ecole Polytechnique Fédérale de Lausanne. — Un vol. broché,  $15 \times 21$ , de 301 p. — Prix: SFr. 58.00. — Presses polytechniques romandes, Lausanne, 1988.

Ce cours s'adresse aux ingénieurs de l'industrie et aux chercheurs des institutions universitaires qui désirent approfondir leurs connaissances dans le domaine des équations différentielles et de leur résolution numérique. Il devrait leur permettre, notamment, d'accéder plus facilement à la littérature spécialisée. Chaque sujet est simultanément étudié du point de vue théorique (propriétés mathématiques des équations) et numérique.

Jonathan HILLMAN. — **2-knots and their groups.** — Australian Mathematical Society lecture series, vol. 5. — Un vol. broché,  $15 \times 23$ , de x, 164 p. — Cambridge University Press, Cambridge, 1989.

In this book the author draws on a variety of techniques to attack certain problems in four-dimensional knot theory. He focuses on knots in  $S^4$ , whose fundamental groups contain abelian normal subgroups. Homological group theory and three-dimensional topology are used to determine all such 2-knot groups in which the abelian subgroup is sufficiently large. New work in four-dimensional topology is also applied in later chapters to the problem of classifying 2-knots.

Joel ROBERTS. — **Projective embeddings of algebraic varieties.** — Monografias del Instituto de matematicas, vol. 19. — Un vol. broché,  $16,5 \times 23$ , de II, 84 p. — Universidad nacional autonoma de Mexico, Mexico, 1988.

The topics are related to the questions of classifying nonsingular varieties which can be embedded in projective spaces of low dimension, (for example, less than two times the dimension of the given variety), and studying the singularities of the image of a nonsingular variety under a generic projection.

**Analysis at Urbana.** — Proceedings of the Special Year in Modern Analysis at the University of Illinois, 1986-87. — Edited by Earl R. Berkson, N.T. Peck and J. Uhl. — London Mathematical Society lecture note series, vol. 137 et 138. — Deux vol. brochés,  $15 \times 22,5$ , de 422 p. et 356 p. — Prix: £22.50 et \$20.00. — Cambridge University Press, Cambridge, 1989.

Throughout the academic year 1986-87, the University of Illinois was host to a Symposium on Mathematical Analysis which was attended by some of the leading figures in the field. This book arises out of this special year and lays emphasis on the synthesis of modern and classical analysis at the current frontiers of knowledge. The contributed articles by participants cover the gamut of mainstream topics. This book will be essential to researchers in mathematical analysis

V. LAKSHMIKANTHAM, S. LEELA, A.A. MARTYNYUK. — **Stability analysis of nonlinear systems.** — Pure and applied mathematics, vol. 125. — Un vol. relié,  $16 \times 23,5$ , de IX, 315 p. — Prix: \$89.75 (USA et Canada) et \$107.50 (tout autre pays). — Marcel Dekker, Inc., New York 1989.

This book provides a systematic treatment of the field and presents up-to-date developments illustrative examples and useful applications on stability analysis of nonlinear systems. Thi

work investigates stability theory in terms of two different measures and treats the theory of a variety of inequalities, and demonstrates manifestations of the general Lyapunov method.

N.A. WATSON. — **Parabolic equations on an infinite strip.** — Pure and applied mathematics, vol. 127. — Un vol. relié,  $16 \times 23,5$ , de xii, 289 p. — Prix: \$99.75 (USA et Canada), \$119.50 (le reste du monde). — Marcel Dekker, Inc., New York, 1989.

This book is concerned with solutions of second order, linear, parabolic partial differential equations on an infinite strip. Particular attention is paid to their integral representation, their initial values in several senses, and the relations between these. The main purpose is to provide a text that takes graduate students rapidly into an area of current research. Apart from standard undergraduate analysis, the only background knowledge required for reading this book is some general analysis and measure theory.

Monique PAVEL. — **Fundamentals of pattern recognition.** — Pure and applied mathematics, vol. 124. — Un vol. relié,  $16 \times 23,5$ , de ix, 183 p. — Prix: \$89.75 (USA et Canada), \$107.50 (tout autre pays). — Marcel Dekker, Inc., New York, 1989.

The fundamental problem of pattern recognition. — Images and shapes: the topological framework. — Objects or images, structures or patterns, classification and recognition: the structural framework. — General formalization of the recognition problem: the categorical framework.

V.A. CHULAEVSKY. — **Almost periodic operators and related nonlinear integrable systems.** — "Nonlinear science" series. — Un vol. relié,  $16 \times 24$ , de vi, 105 p. — Prix: £29.95. — Manchester University Press, Manchester, 1989.

This advanced monograph deals with recent advances in the mathematical theory of non-ideal crystalline structures: the spectral theory of differential and finite-difference operators with almost periodic coefficients. These exhibit a rich behaviour: Cantor spectra, Anderson localisation typical for random potentials, as well as the usual Bloch spectrum. Schrödinger operators with quasi-periodic potentials also occur in inverse scattering theory.

D.E. EDMUNDS, W.D. EVANS. — **Spectral theory and differential operators.** — Oxford mathematical monographs. — Un vol. broché,  $14,5 \times 23$ , de xvi, 574 p. — Prix: £25.00. — Clarendon Press, Oxford, 1989.

This book contains an up-to-date account of those parts of the theory of bounded and closed linear operators in Banach and Hilbert spaces relevant to spectral problems involving differential equations. The main themes are essential spectra, measures of non-compactness, entropy numbers, approximation numbers, eigenvalues, and their interrelationships. The abstract theory is illustrated by results for embedding maps between Sobolev spaces, and strong emphasis is placed on applications of boundary-value problems for general second-order linear elliptic equations in an arbitrary domain in  $\mathbb{R}^n$ .

Ian ANDERSON. — **Combinatorics of finite sets.** — Oxford science publications. — Un vol. broché,  $15 \times 23$ , de xv, 250 p. — Prix: £9.95. — Clarendon Press, Oxford, 1989.

It is the aim of this book to provide for the first time a coherent and up-to-date account of the basic methods and results of the combinatorial study of finite set systems. Much of the material in the book concerns subsets of a set, but there are chapters dealing with more general partially ordered sets. Each chapter ends with a collection of exercises for which outline solutions are provided, and there is an extensive bibliography.

M.S.P. EASTHAM. — **The asymptotic solution of linear differential systems : applications of the Levinson theorem.** — London Mathematical Society monographs, new series, vol. 4. — Oxford science publications. — Un vol. relié,  $16,5 \times 24$ , de x, 240 p. — Prix: £ 30.00. — Clarendon Press, Oxford, 1989.

De la préface: The purpose of this book is to show that many of the asymptotic results from 1948 onwards can be deduced directly from the Levinson theorem by means of certain well-defined techniques. These techniques involve transformations of the solution vectors of the differential systems, and our general theme is to show how the various transformations are used both individually and in combinations... Some of the material in the book is new, some is a re-presentation of existing theory in line with the main theme of the book, and much of it has appeared only recently in the research literature.

**Approximation and optimization.** — Proceedings of the International Seminar held in Havana, Cuba, Jan. 12-16, 1987. — Edited by Juan A. Gómez-Fernandez, Francisco Guerra-Vazquez, Miguel A. Jiménez-Poso. — Lecture notes in mathematics, vol. 1354. — Un vol. broché,  $16,5 \times 24$ , de vi, 280 p. — Prix: DM 42.50. — Springer-Verlag, Berlin, 1989.

*From the contents:* — Z. Ciesielski: Nonparametric polynomial density estimation in the  $L_p$  norm. — W. Dahmen, T.N.T. Goodman, C.A. Micchelli: Local spline interpolation schemes in one and several variables. — A. Gonchar, E.A. Rakhnianov: On the rate of rational approximation of analytic functions. — D. Hinrichsen, M. Motscha: Optimization problems in the robustness analysis of linear space systems. — R. Hernández, G. López: Relative asymptotics of orthogonal polynomials with respect to varying measures. — L. Lorch, D. Russell: On some contributions of Halász to the Turan power-sum theory. Etc...

Peter G. CASAZZA, Thaddeus J. SHURA. — **Tsirelson's space. With an appendix by J. Baker, O. Slotterbeck and R. Aron.** — Lecture notes in mathematics, vol. 1363. — Un vol. broché,  $16,5 \times 24$ , de viii, 204 p. — Prix: DM 35.00. — Springer-Verlag, Berlin, 1989.

This monograph provides a structure theory for the increasingly important Banach space discovered by B.S. Tseelson. Bounded linear operators are studied through the use of finite-dimensional decompositions, and complemented subspaces are studied at length. A myriad of variant constructions are presented. Two appendices are attached: one dealing with a computer program which computes norms of finitely-supported vectors; the other surveys recent work on weak Hilbert spaces.

Robert R. PHELPS. — **Convex functions, monotone operators and differentiability.** — Lecture notes in mathematics, vol. 1364. — Un vol. broché,  $16,5 \times 24$ , de ix, 115 p. — Prix: DM 25.00. — Springer-Verlag, Berlin, 1984.

These notes start with an introduction to the differentiability of convex functions on Banach spaces, leading to the study of Asplund spaces and their intriguing relationship to monotone operators and Banach spaces with the Radon-Nikodym property. Considerable attention is paid to contemporary results on variational principles and perturbed optimization in Banach spaces, exhibiting their close connections with Asplund spaces.

J. ACZEL, J. DHOMBRES. — **Functional equations in several variables, with applications to mathematics, information theory and to the natural and social sciences.** — Encyclopaedia of mathematics and its applications, 31. — Un vol. relié,  $16 \times 24$ , de xiii, 462 p. — Prix: £ 50.00/US\$ 89.50. — Cambridge University Press, 1989.

In this treatise, the authors have chosen to emphasise applications, though not at the expense of theory, so they have kept the prerequisites to a minimum (calculus and elementary algebra, Lebesgue integration). Where, for certain applications, more advanced topics are needed, the authors have included references and explained the results used. Moreover, the book has been designed so that the chapters can be read almost independently of each other, enabling a selection of material to be chosen for introductory and advanced courses. The history of functional equations is well documented in a final chapter which is complemented by an encyclopedic bibliography running to over 1600 items.

László REDEI. — **Endliche p-Gruppen.** — Hrsg. von L. Marki und P.P. Palfy. — Un vol. relié,  $17 \times 24$ , de 303 p. — Prix: US\$ 36.00. — Akadémiai Kiadó, Budapest, 1989.

In seinem letzten Buch stellt Laszlo Rédei (1900-1980) die Ergebnisse seiner Untersuchungen aus den 70er Jahren vor. Der grösste Teil des Buches liefert Resultate des Autors, die hier im Detail zum ersten Mal veröffentlicht werden. Rédei entwirft eine neue Theorie der endlichen p-Gruppen. Anders als in der klassischen Theorie, die vorwiegend mit Untergruppen arbeitet, wird hier meist explizit mit Gruppenelementen gerechnet.

Ian STEWART. — **Does God play dice?: the mathematics of chaos.** — Un vol. relié,  $15,5 \times 23,5$  de 317 p. — Prix: £ 15.00. — Basil Blackwell, Oxford, 1989.

The new science of chaos is forcing scientists to rethink the most fundamental ideas about the way in which the universe behaves. It has already shown that systems obeying precise laws can nevertheless act in a random manner. Perhaps God plays dice, within a cosmic game of complete law and order. In terms that anyone can understand, this book tells the story of this entirely new science and the implications chaos has for notions of predictability and the verification of scientific theories.

**Topics in calculus of variations.** — Lectures given at the 2nd 1987 Session of the Centro Internazionale Matematico Estivo (C.I.M.E.) held at Montecatini Terme, Italy, July 20-28, 1987. — Edited by M. Giaquinta. — Lecture notes in mathematics, vol. 1365. — Un vol. broché,  $16,5 \times 24$ , de x, 196 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1989.

H. Brezis:  $S^k$ -valued maps with singularities. — L.A. Caffarelli: Free boundary problems, a survey. — J. Moser: Minimal foliations on a torus. — L. Nirenberg: Variational methods in nonlinear problems. — R.M. Schoen: Variational theory for the total scalar curvature functional for Riemannian metrics and related topics. — A.J. Tromba: A classical variational approach to Teichmüller theory.

Norman LEVITT. — **Grassmannians and Gauss maps in piecewise-linear topology.** — Lecture notes in mathematics, vol. 1366. — Un vol. broché,  $16,5 \times 24$ , de v, 203 p. — Prix: DM 37.00. — Springer-Verlag, Berlin, 1989.

The book explores the possibility of extending the notions of "Grassmannian" and «Gauss map» to the PL category. They are distinguished from «classifying map» which are essentially homotopy-theoretic notions. The analogs of Grassmannian and Gauss map defined incorporate geometric and combinatorial information. Principal applications involve characteristic class theory, smoothing theory, and the existence of immersion satisfying certain geometric criteria, e.g. curvature conditions.

Manfred KNEBUSCH. — **Weakly semialgebraic spaces.** — Lecture notes in mathematics, vol. 1367. — Un vol. broché,  $16,5 \times 24$ , de xx, 376 p. — Prix: DM 61.00. — Springer-Verlag, Berlin, 1989.



The book is the second part of an intended three-volume treatise on semialgebraic topology over an arbitrary real closed field  $R$ . In the first volume (LNM 1173) the category  $LSA(R)$  or regular paracompact locally semialgebraic spaces over  $R$  was studied. The category  $WSA(R)$  of weakly semialgebraic spaces over  $R$ , the focus of this volume, contains  $LSA(R)$  as a full subcategory. The theory is new although it borrows from algebraic topology. A highlight is the proof that every generalized topological (co)homology theory has a counterpart in  $WSA(R)$  with in some sense “the same”, or even better, properties as the topological theory.

Jean DIEUDONNE. — **A history of algebraic and differential topology, 1900-1960.** — Un vol. relié,  $16 \times 14$ , de XXI, 648 p. — Prix: SFr. 140.00. — Birkhäuser, Boston, 1989.

This book traces the history of algebraic topology beginning with its creation by H. Poincaré in 1900, and describing in detail the important ideas introduced in the theory before 1960. In its first 30 years the field seemed limited to applications in algebraic geometry, but this changed dramatically in the 1930s with the creation of differential topology by Georges de Rham and Elie Cartan and of homotopy theory by Witold Hurewicz and Heinz Hopf. The influence of topology began to spread to more and more branches as it gradually took on a central place in mathematics.

Kevin J. HASTINGS. — **Introduction to the mathematics of operations research.** — Pure and applied mathematics, vol. 128. — Un vol. relié,  $15,5 \times 23,5$  de VIII, 407 p. — Prix: US\$99.75 (USA et Canada)/\$119.50 (ailleurs). — Marcel Dekker, New York, 1989.

This textbook presents mathematical treatment of four major areas of operations research: algorithm graph theory (including spanning tree, flow and matching problems), linear programming (the optimization of linear functions subject to linear constraints), stochastic processes (systems moving in a nondeterministic way) and stochastic dynamic programming (the study of the optimization of randomly evolving systems' optimization).

Igor R. SHAFAREVICH. — **Collected mathematical papers.** — Un vol. relié,  $17,5 \times 25$  de VI, 769 p. — Prix: DM 184.00. — Springer-Verlag, Berlin, 1989.

Igor R. Shafarevich has made a big impact on mathematics: he has worked in the fields of algebra, algebraic number theory, algebraic geometry and arithmetic algebraic geometry. His papers reflect his broad interests and include topics such as the realization of groups as Galois groups of number fields, class field towers, algebraic surfaces (in particular K3 surfaces), elliptic curves, and finiteness results on abelian varieties and algebraic curves over number fields. The volume contains almost all his mathematical papers. They appear in English translations (with two exceptions where the papers are in French and German).

David S. MOORE, George P. McCABE. — **Introduction to the practice of statistics.** — Un vol. relié,  $19,5 \times 24$  de XIX, 790 p. + A-49 p. — Prix: \$19.95. — W.H. Freeman, New York, 1989.

De la préface: “This book is an elementary ... introduction to modern statistics for general college audiences ... The title of the book expresses our intent to introduce readers to statistics as it is used in practice. Statistics in practice is concerned with gaining understanding from data; it is focused on problem-solving rather than on methods that may be useful in specific settings.”

**Random fluctuations and pattern growth: experiments and models.** — Edited by H. Eugene Stanley and Nicole Ostrowsky. — NATO ASI series. Advanced Science Institutes Series, Ser. E:

Applied Sciences, vol. 157. — Un vol. broché,  $16 \times 24$ , de xii, 355 p. — Prix: Dfl. 65.00. — Kluwer Academic Publishers, Dordrecht, 1988.

The interplay between random fluctuations and statistical physics on the one hand, and organized structures on the other, is a topic that has recently attracted increased attention from workers in physics, chemistry, biology, and mathematics. The interdisciplinary study of this interplay is the theme that unites the contributions to this work, which contains articles on topics ranging from membranes and liquid crystals to turbulence.

Alain ROBERT. — **Advanced calculus for users.** — Un vol. relié,  $17,5 \times 24$  de xvi, 364 p. — Prix: US\$60.50/DFl. 115.00/SFr. 60.00. — North-Holland, Amsterdam, and Presses Académiques Neuchâtel, Case postale 1420, 2001 Neuchâtel, Suisse, 1989.

The central idea of the course is linearization. It occurs in the notion of derivative (tangent linear map) and differential forms (fields of linear forms). In these first two sections, finite dimensional vector spaces play the central role. The third part is an introduction to functional analysis and therefore many infinite dimensional function spaces are introduced and examined. The final part, a study of Fourier series, includes a section on historical applications. This applications oriented book is intended to serve as textbook for second-year university students in science and engineering. Special emphasis is laid on understanding the meaning of the various mathematical concepts. Some technical proofs are not included (Stokes', local inversion, ...). This book could also be used by mathematicians as companion volume to "Principles of mathematical analysis" by W. Rudin and as reference for scientists involved with applications of calculus. Exercises are supplied, some with numerical answers. Several tables (on the cross product, classical polynomials, on convergence) are also included.

Ian ANDERSON. — **A first course in combinatorial mathematics.** — Second edition. — Oxford applied mathematics and computing science series. — Un vol. broché,  $14 \times 21,5$  de x, 134 p. — Prix: £10.95 (broché)/£25.00 (relié). — Clarendon Press, Oxford, 1989.

This concise introduction to the basic combinatorial tools, such as recurrence relations, generating functions, incidence matrices, and the inclusion-exclusion principle, will give the reader a flavour of the distinctive characteristics of this attractive and increasingly important branch of mathematics. In preparing this 2nd edition, the author has revised much of the material in response to comments from numerous lecturers who have used his book. The greatest changes are in chapter 7 where the Steiner triple systems are constructed. Consequently this last chapter culminates in a unified presentation of the Leech lattice, the Golay code, and Steiner systems.