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## BULLETIN BIBLIOGRAPHIQUE

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**Multifunctions and integrands.** — Stochastic analysis, approximation and optimization: proceedings of a conference held in Catania, Italy, June 7-16, 1983. — Ed. by G. Salinetti. — Lecture notes in mathematics, vol. 1091. — Un vol. broché, 16,5 × 24, de v, 234 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This conference was organized with the objective of surveying the current state of the art, reporting on recent progress and identifying further directions of research in the area of Multifunctions and integrands, with emphasis on the aspects of stochastic analysis, approximation and optimization. Special attention was given to applications. Main themes are: approximation and convergence theory, differential inclusions, stochastic evolution equations, stochastic processes and limit laws and stochastic optimization and control.

**Complete intersections.** — Lectures given at the 1st 1983 session of the Centro internazionale matematico estivo (CIME) held at Acireale (Catania), Italy, June 13-21, 1983. — Ed. by S. Greco and R. Strano. — Lecture notes in mathematics, vol. 1092. — Un vol. broché, 16,5 × 24, de vii, 299 p. — Prix: DM 45.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

Problems relating to complete intersections have been stimulating research in various fields of mathematics for at least the past hundred years. This volume, which contains the notes of the four main lecture courses delivered at the summer school in Acireale, as well as original papers, illustrates this diversity by featuring recent contributions to the theory originating from the research results and techniques developed in various fields. Among the topics treated are: complete intersections in algebraic varieties and in Stein manifolds with special reference to affine spaces and ordinary and weighted projective spaces; set-theoretic complete intersections; relations of complete intersections with problems of positivity for vector bundles; subcanonical curves and complete intersections; and rings of invariants which are complete intersections.

Alexander PRESTEL. — **Lectures on formally real fields.** — Lecture notes in mathematics, vol. 1093. — Un vol. broché, 16,5 × 24, de xi, 125 p. — Prix: DM 21.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

These notes were originally published in 1975 by the IMPA (Instituto de matematica pura e aplicada, Rio de Janeiro). The reprint of these notes makes this standard introduction to the theory of real fields widely available. The topics treated include the Artin-Schreier theorem of real closed fields, Tarski's transfer principle, for real closed fields, Lang's theory of real places, Pfister's theory of the Witt rings of quadratic forms over real fields.

**Analyse complexe.** — Proceedings of the Journées Fermat — Journées SMF, held at Toulouse, May 24-27, 1983. — Lecture notes in mathematics, vol. 1094. — Un vol. broché, 16,5 × 24, de ix, 184 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

Complex analysis in several variables has developed quite a bit in the last 15 years. The Toulouse colloquium on complex analysis focussed on two main directions of study: complex potential theory and holomorphic functions. It also highlighted the fact that almost all naturally arising problems have been resolved for strictly pseudoconvex bounded domains in  $\mathbf{C}^n$ .

**Stochastic analysis and applications.** — Proceedings of the international conference held in Swansea, April 11-15, 1983. — Ed. by A. Truman and D. Williams. — Lecture notes in mathematics, vol. 1095. — Un vol. broché, 16,5 × 24, de v, 199 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This volume contains a selection of papers presented at the Swansea workshop on stochastic analysis and its applications. The applications are concerned with: Wiener-Hopf theory, potential theory, excursion theory, queues, quantum mechanics, stochastic differential equations and stochastic mechanics.

**Théorie du potentiel.** — Proceedings of the colloque Jacques Deny held at Orsay, June 20-23, 1983. — Ed. by G. Mokobodzki and D. Pinchon. — Lecture notes in mathematics, vol. 1096. — Un vol. broché, 16,5 × 24, de ix, 582 p. — Prix: DM 78.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This special colloquium held at the University of Orsay focussed particularly on the work of Jacques Deny and the role he has played in the development of potential theory in France and elsewhere. In the 1st part of these proceedings, 3 semi-historical articles discuss Deny's work and its influence and consequences. The 2d part comprises the papers contributed by the participants.

**R. M. DUDLEY, H. KUNITA, F. LEDRAPPIER. — Ecole d'été de probabilités de Saint-Flour XII — 1982.** — Ed. par P. L. Hennequin. — Lecture notes in mathematics, vol. 1097. — Un vol. broché, 16,5 × 24, de x, 396 p. — Prix: DM 57.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

The 12th Saint-Flour summer school on probability held in 1982 was attended by over 50 participants and centered on 3 main lecture courses given by R. M. Dudley, H. Kunita and F. Ledrappier. Since the meeting, the courses have been entirely rewritten to render comprehensive and detailed surveys which are being published together in this volume.

**Groups — Korea 1983.** — Proceedings of a conference on combinatorial group theory, held at Kyoungju, Korea, August 26-31, 1983. — Ed. by A. C. Kim and B. H. Neumann. — Lecture notes in mathematics, vol. 1098. — Un vol. broché, 16,5 × 24, de viii, 183 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

*Groups — Korea 1983* was the first international mathematical conference held in Korea. The main theme of the conference was combinatorial group theory, but related topics were also discussed. There were many invited lectures and specialist-contributed seminar talks, as well as a program of more general invited lectures aimed at the graduate students who attended the conference.

Victor IVRII. — **Precise spectral asymptotics for elliptic operators acting in fiberings over manifolds with boundary.** — Lecture notes in mathematics, vol. 1100. — Un vol. broché, 16,5 × 24, de v, 238 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This 4th volume of the USSR subseries of the “Lecture notes” describes a method for obtaining precise spectral asymptotics for elliptic operators and surveying the possibilities offered by this method. The author’s method is based on an implicit study of the solution of the wave equation and successive approximations. It enables him to construct a spectral function without constructing the fundamental solution of the wave equation. He thus obtains precise spectral asymptotics for self-adjoint elliptic operators acting in fiberings over manifolds with boundary and for related spectral problems.

Andrei VERONA. — **Stratified mappings — structure and triangulability.** — Lecture notes in mathematics vol. 1102. — Un vol. broché, 16,5 × 24 de ix, 160 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

The object of this research monograph is to study the structure of stratified sets and mappings and then to use it in order to prove their triangulability. As an application of the general theory one obtains a result which was conjectured by R. Thom: “Any proper topologically stable smooth map is triangulable”. Other applications include the triangulability of subanalytic sets, of orbit spaces of smooth actions of compact Lie groups and of proper light subanalytic maps.

**Models and sets.** — Proceedings of the logic colloquium held in Aachen, July 18-23, 1983, Part I. — Edited by G. H. Müller and M. M. Richter. — Lecture notes in mathematics, vol. 1103. — Un vol. broché, 16,5 × 24, de viii, 484 p. — Prix: DM 64.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

*From the contents:* A. J. Berner, I. Juhasz: Point-picking games and HFD’s. — G. L. Cherlin: Decidable theories of pseudo-algebraically closed fields. — J. M. Font: Monadicity in topological pseudo-boolean algebras. — E. Kranakis, I. Phillips: Partitions and homogeneous sets for admissible ordinals. — K. L. Manders: Interpretation and the model theory of the classical geometries. — R. Murawski: A contribution to nonstandard teratology.

**Computation and proof theory.** — Proceedings of the logic colloquium held in Aachen, July 18-23, 1983, Part II. Edited by M. M. Richter, E Börger, W. Oberschelp, B. Schinzel and W. Thomas. — Lecture notes in mathematics, vol. 1104. — Un vol. broché, 16,5 × 24, de viii, 475 p. — Prix: DM 64.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

*From the contents:* S. Feferman: Between constructive and classical mathematics. — Y. Gurevich: Toward logic tailored for computational complexity. — P. Hajek: On a new notion of partial conservativity. — P. G. Hinman: Finitely approximable sets. — Y. N. Moschovakis: Abstract recursion as a foundation for the theory of algorithms.

**Rational approximation and interpolation.** — Proceedings of the United Kingdom-United States conference held at Tampa, Florida, December 12-16, 1983. — Edited by P. R. Graves-Morris, E. B. Saff and R. S. Varga. — Lecture notes in mathematics, vol. 1105. — Un vol. broché, 16,5 × 24, de xii, 528 p. — Prix: DM 72.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

The contributions to this proceedings volume are mainly original research papers, but also include several survey papers. The main topics of the research articles are: approximation and

interpolation theory, circuit theory, convergence theory, critical phenomena, location of zeros and poles, numerical methods, and orthogonal polynomials. The survey articles are concerned with: the Faber operator, inverse problems of Padé approximation, polynomial, sinc and rational function methods for approximating, analytic functions.

C. T. CHONG. — **Techniques of admissible recursion theory.** — Lecture notes in mathematics, vol. 1106. — Un vol. broché, 16,5 × 24, de IX, 214 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This book surveys the major techniques that have been devised to study problems in recursion theory over admissible ordinals. Emphasis is placed on the interplay between recursion theory and the fine structure of the constructible universe. The applicability of set-theoretic and model-theoretic methods in recursion theory are highlighted.

**Nonlinear analysis and optimization.** — Proceedings of the international conference held in Bologna, Italy, May 3-7, 1982. — Edited by C. Vinti. — Lecture notes in mathematics, vol. 1107. — Un vol. broché, 16,5 × 24, de v, 214 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This conference had the motivating objective of providing a forum where problems of nonlinear analysis and optimization could be discussed and further connections between them highlighted.

**Global analysis-studies and applications I.** — Edited by Yu. G. Borisovich and Yu. E. Gliklikh. — Lecture notes in mathematics, vol. 1108. — Un vol. broché, 16,5 × 24, de v, 301 p. — Prix: DM 45.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

This volume introduces to English-speaking readers the Voronezh university press series on global analysis. The main purpose of the series is to publish survey papers or papers with detailed descriptions of important results in global analysis and its applications. This initial volume comprises articles from the first three issues of the series already published in Russian: Equations on manifolds (1982), topological and geometrical methods in mathematical physics (1983), and Geometry and topology in global nonlinear problems (1984).

Vincent COSSART, Jean GIRAUD, Ulrich ORBANZ. — **Resolution of surface singularities: three lectures with an appendix by H. Hironaka.** — Edited by U. Orbantz. — Lecture notes in mathematics, vol. 1101. — Un vol. broché, 16,5 × 24, de VII, 132 p. — Prix: DM 21.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

*U. Orbantz:* Embedded resolution of algebraic surfaces after Abhyankar (characteristic 0). — *J. Giraud:* Desingularization in low dimension. — *V. Cossart:* Desingularization in dimension two. — *H. Hironaka:* Desingularization of excellent surfaces.

G. G. LORENTZ, K. JETTER, S. D. RIEMENSCHNEIDER. — **Birkhoff interpolation.** — Encyclopedia of mathematics and its applications, vol. 19. — Un vol. relié, 17 × 24, de LV, 237 p. — Prix: £25.00. — Cambridge university press, Cambridge, England, 1984.

This book provides the main definitions, theorems, and techniques in the theory of Birkhoff interpolation by polynomials. Topics discussed include: applications of Birkhoff interpolation to approximation theory, quadrature formulas, and Chebyshev systems; lacunary interpolation

at special knots; and an introduction to the theory of Birkhoff interpolation by splines. The book is written on a research level but the material is easily accessible to graduate students and researchers in other disciplines with a strong background in undergraduate mathematics.

Rudolf LIDL, Harald NIEDERREITER. — **Finite fields.** — Foreword by P. M. Cohn. — Encyclopedia of mathematics and its applications, vol. 20. — Un vol. relié, 17 × 24, de xx, 755 p. — Prix: £45.00. — Cambridge university press, Cambridge, England, 1984.

The theory of finite fields is a branch of modern algebra that has come to the fore in the last fifty years because of its diverse applications in such areas as combinatorics, coding theory, and the mathematical study of switching circuits. This book, the first one devoted entirely to this theory, provides comprehensive coverage of the literature on finite fields and their applications. Extensive bibliographical notes at the end of each chapter, worked-out examples and lists of exercises found throughout the book make it useful as a text for advanced level courses.

W. T. TUTTE. — **Graph theory.** — Encyclopedia of mathematics and its applications, vol. 21. — Un vol. relié, 17 × 24, de xxi, 333 p. — Prix: £30.00. — Cambridge university press, Cambridge, England, 1984.

The central themes of graph theory, such as Menger's theorem, the theory (largely created by W. T. Tutte) of factors (or matchings) in graphs, chromatic polynomials, Brooks's theorem, Grinberg's theorem, planar graphs and Kuratowski's theorem, are covered in this reference book. Other topics include the theory of decomposition of graphs into 3-connected "3-blocks", electrical networks, and the classification theorem for closed surfaces. Exercises, notes and exhaustive references follow each chapter.

Julio R. BASTIDA. — **Field extensions and Galois theory.** — Foreword by Roger Lyndon. — Encyclopedia of mathematics and its applications, vol. 22. — Un vol. relié, 17 × 24, de li, 294 p. — Prix: £30.00. — Cambridge university press, Cambridge, England, 1984.

From the foreword: "In this book Professor Bastida has set forth this classical theory, of field extensions and their Galois groups, with meticulous care and clarity. The treatment is self-contained, at a level accessible to a sufficiently well-motivated beginning graduate student, starting with the most elementary facts about fields and polynomials and proceeding painstakingly, never omitting precise definitions and illustrative examples and problems."

John Rozier CANNON. — **The one-dimensional heat equation.** — Foreword by Felix E. Browder. — Encyclopedia of mathematics and its applications, vol. 23. — Un vol. relié, 17 × 24, de xxv, 483 p. — Prix: £37.50. — Cambridge university press, Cambridge, England, 1984.

From the foreword: "The one-dimensional heat equation... has become during the intervening century and a half the paradigm for the very extensive study of parabolic partial differential equations, linear and nonlinear. The present volume is a systematic development of a variety of aspects of this paradigm, of which many have not yet received an extension to the multidimensional space-variable case... In summary, the volume is a useful contribution to the effort to bring the material of the research literature in analysis into a form useful to applied mathematicians and mathematically oriented specialists in the sciences."

**Differential geometry and complex analysis: a volume dedicated to the memory of Harry Ernest Rauch.** — Edited by I. Chavel and H. M. Farkas. — Un vol. relié, 17 × 25, de xiii, 222 p. — Prix: DM 88.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

The volume is a collection of articles centered on the scientific career of the late H. E. Rauch. It features in particular a biographical sketch of Rauch, three extensive surveys of Rauch's own work in Riemannian geometry, Teichmüller spaces, and theta functions, direct developments of Rauch's original programs by later authors, and current research articles by authors of international renown in areas initiated by Rauch.

**Module des fibrés stables sur les courbes algébriques: notes de l'Ecole normale supérieure, Printemps 1983.** — Edited by Jean-Louis Verdier, Joseph Le Potier. — Progress in mathematics, vol. 54. — Un vol. relié, 15,5 × 23, de 129 p. — Prix: FS 38.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

*J. Le Potier*: Variété de modules de fibrés stables sur une surface de Riemann: résultats d'Atiyah et Bott. — *J. Oesterlé*: Construction de la variété de modules des fibrés vectoriels stables sur une courbe algébrique lisse. — *J. M. Drezet*: Cohomologie du groupe de jauge. — *A. Bruguières*: Filtration de Harder-Narasimhan et stratification de Shatz. — *O. Debarre*: Calcul de la cohomologie de  $N(r, d)$ .

Martin EICHLER, Don ZAGIER. — **The theory of Jacobi forms.** — Progress in mathematics, vol. 55. — Un vol. relié, 15,5 × 23. de v, 148 p. — Prix: FS 39.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

This monograph serves as a high level introduction to the modern theory of Jacobi forms. Jacobi forms are generalized modular forms first introduced in Jacobi's famous treatise "Fundamenta Nova Functionum Ellipticarum" in the form of theta series of weight 1/2. In this book, these functions are generalized and considered independently. Various connections with ordinary and Siegel modular forms and with modular forms of half-integral weight are studied. The theory has many interesting arithmetic aspects and has recently turned out to have connection with the theory of Heegner points on modular curves.

Bernard SHIFFMAN, Andrew John SOMMESE. — **Vanishing theorems on complex manifolds.** — Progress in mathematics, vol. 56. — Un vol. relié, 15,5 × 23, de xiii, 170 p. — Prix: FS 46.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

This book offers a comprehensive treatment of recent results in a clear and efficient exposition. The excellent introduction motivates the reader with geometric examples, and the text then leads the reader into more recent results such as vanishing theorems of Ramanujan, Kawamata and Vieweg.

Georg HEINIG and Karla ROST. — **Algebraic methods for Toeplitz-like matrices and operators.** — Operator theory: advances and applications, vol. 13. — Un vol. relié, 17 × 24, de 212 p. — Prix: FS 54.00. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1984.

*Toeplitz and Hankel matrices*: Inversion formulae. Bezoutians and resultant matrices. Recursion formulae and inversion algorithm for strongly regular T- and H-matrices. Transformations of T- and H-matrices and Bezoutians. Kernel structure. T- and H-matrices with non-regular principal sections. Generalized inverses of H-matrices. Canonical representation. — *Toeplitz-*

*like operators:* Fredholm operators. Inversion formulae and inversion algorithms for Toeplitz-like matrices. Inversion of integral operators with displacement kernel and their generalizations. Singular integral and Toeplitz operators. Kernel structure and partial indices of TLO.

Raghavan NARASIMHAN. — **Complex analysis in one variable.** — Un vol. relié, 17 × 24, de XVI, 266 p. — Prix: FS 84.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

This book presents complex analysis in one variable in the context of modern mathematics, with clear connections to several complex variables, de Rham theory, real analysis and other branches of mathematics. Thus, covering spaces are used explicitly in dealing with Cauchy's theorem, real variable methods are illustrated in the Loeman-Menchoff theorem and in the corona theorem, and the algebraic structure of the ring of holomorphic functions on a domain in  $C$  is studied. This book requires minimal background material. Cohomological methods are introduced. The proof of Picard's theorem, given here illustrates the strong restrictions on holomorphic mappings imposed by curvature conditions.

C. ALBERT, P. MOLINO. — **Pseudogroupes de Lie transitifs, vol. 1: structures principales:** — Collection «Travaux en cours». — Un vol. broché, 17 × 24, de 152 p. — Prix: FF 130.00. — Hermann, Paris, 1984.

La théorie des pseudogroupes de Lie remonte essentiellement à l'œuvre d'Elie Cartan. Elle joue un rôle essentiel dans l'étude des structures géométriques différentiables (structures homogènes, structures complexes, feuilletages, etc.) et dans l'analyse globale sur les variétés, en particulier la présentation intrinsèque des systèmes d'équations aux dérivées partielles. En utilisant les notions d'espaces fibrés et de jets, les auteurs donnent une présentation moderne de ces théories et font le point sur le problème d'équivalence; ils offrent ainsi un exposé général de la théorie des pseudogroupes transitifs. Les notions présentées, qui ont leur intérêt propre, s'avèrent être les outils de base de la géométrie différentielle contemporaine.

**Aspects of topology: in memory of Hugh Dowker, 1912-1982.** — Edited by I. M. James and E. H. Kronheimer. — London mathematical society lecture note series, vol. 93. — Un vol. broché, 15 × 22,5, de XVII, 335 p. — Prix: £17.50. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This is a memorial volume to the distinguished Canadian-born mathematician Hugh Dowker, one of the most highly-regarded topologists in the United Kingdom. The volume comprises specially-written articles on various topological topics by experts in many countries who worked with Dowker at one time or another. These include survey, expository and research articles on general topology, algebraic topology, and related subjects such as knot theory and graph theory.

Roger H. FARRELL. — **Multivariate calculation: use of the continuous groups.** — Springer series in statistics. — Un vol. relié, 16 × 24, de XVI, 376 p. — Prix: DM 138.00. — Springer-Verlag, New York/Berlin/Heidelberg/Tokyo, 1985.

This book centers on nonstandard methods of computing multivariate probability density functions and the mathematical techniques needed in multivariate inference. It is addressed to mathematically well trained students of probability theory or mathematical statistics. The author presents his arguments in a rigorous and complete fashion consolidating many basic mathematical results about matrices, inequalities, null sets, and factorization of measures. The presentation is accompanied by a historical discussion of the literature.

Frederick MOSTELLER, David L. WALLACE. — **Applied Bayesian and classical inference: the case of The Federalist Papers.** — 2nd edition of *Inference and disputed authorship: The Federalist*. — Springer series in statistics. — Un vol. relié, 16 × 24, de xxxviii, 303 p. — Prix: DM 92.00. — Springer-Verlag, New York/Berlin/Heidelberg/Tokyo, 1984.

This is a unique introduction to the use of Bayesian and other methods of inference in the solution of problems of statistical inference. It combines a sound and pedagogically attractive introduction with a major case study that includes data leading to the solution of the mystery of the authorship of the Federalist Papers. The book contains empirical data analysis, side studies of word distribution, the effect of time style, the discussion of approximations needed for practical Bayesian analyses, the effect of word distribution on the authorship odds, and the use of both parametric and nonparametric methods.

Lothar SACHS. — **Applied statistics: a handbook of techniques.** — 2nd edition. — Translated by Zenon Reynarowych. — Springer series in statistics. — Un vol. relié, 16 × 24, de xxviii, 707 p. — Prix: DM 154.00. — Springer-Verlag, New York/Berlin/Heidelberg/Tokyo, 1984.

This book is an up-dated translation of a highly successful German work which has gone through 5 editions. Slanted toward and containing many illustrative examples from medicine and biology, its coverage of basic statistics — including a wide variety of techniques, tables, and computational aids — is notably thorough and complete. A comprehensive cross-reference system, an extensive and up-to-date bibliography, and a very substantial index enhance the usefulness of the book.

Janos GALAMBOS. — **Introductory probability theory.** — Probability: pure and applied, vol. 1. — Un vol. relié, 16 × 23,5, de vii, 200 p. — Prix: FS 69.00. — Marcel Dekker, Inc., New York/Basel, 1984.

This self-contained volume, serves the needs of students in many disciplines by presenting probability theory with its many possibilities of direct scientific, technical, engineering, and business applications. Stressing the importance of model building, this textbook introduces basic terminology and definitions, contains over 195 end-of-chapter review problems and lengthier proofs in separate sections. It includes both discrete and continuous variables, the multivariate case, and such topics as waiting time paradoxes and the Borel-Cantelli lemma.

Lyle D. BROEMELING. — **Bayesian analysis of linear models.** — Statistics: textbooks and monographs, vol. 60. — Un vol. relié, 16 × 23,5, de xii, 454 p. — Prix: FS 179.00. — Marcel Dekker, Inc., New York/Basel, 1985.

The book introduces the Bayes theorem and its use in inference and prediction, including a study of the general linear model; offers a brief history of Bayesian inference and explains the subjective interpretation of probability and the implementation of prior knowledge; discusses the general linear model, including regression models and the models of designed experiments; examines the mixed linear model; develops the Bayesian way of estimating parameters; provides a complete study of the structural change in linear models; explores multivariate linear regression models, models for designed experiments, and multivariate autoregressive processes.

**Seminar on stochastic processes, 1983.** — Edited by E. Cinlar, K. L. Chung, R. K. Getoor. — Progress in probability and statistics, vol. 7. — Un vol. relié, 15,5 × 23, de vi, 290 p. — Prix: FS 68.00. — Birkhäuser, Boston/Basel/Stuttgart, 1984.

*B. W. Atkinson*: A general theory approach to the construction of Markov processes. — *K. L. Chung*: Conditional gauges. — *K. L. Chung, M. Liao, K. M. Rao*: Duality under a new setting. — *C. Dellacherie*: Théorie générale du balayage. — *E. B. Dynkin*: Local times and quantum fields. — *N. Falkner*: Approximation of debuts. — *R. K. Getoor*: Capacity theory and weak duality. — *T. Jeulin*: Ray-knight's theorem on Brownian local times and Tanaka's formula. — *Z. R. Pop-Stojanovic and M. Rao*: Further results on energy. — *L. C. G. Rogers*: A diffusion first passage problem. — *P. Salminen*: Brownian excursions revisited. — *C. T. Shih*: Construction of right processes from hitting distributions. — *J. B. Walsh*: Regularity properties of a stochastic partial differential equation.

Ramon E. MOORE. — **Computational functional analysis.** — Ellis Horwood series in mathematics and its applications. — Un vol. relié, 16 × 23,5, de 156 p. — Prix: £15.00 (broché: £7.95). — Ellis Horwood Limited, Chichester, distributed by John Wiley and Sons, Chichester/New York/Ontario/Brisbane, 1985.

This book makes a unique contribution to numerical analysis for operator equations. It introduces the new and powerful techniques of interval analysis incorporated into the mainstream of numerical functional analysis, and includes discussion of the elegant techniques available in reproducing kernel Hilbert spaces. No previous text covers all the material of relevant interest and the book fills a gap for students. There are more than 100 exercises designed to help the student discover the relevance of the theory for himself.

**Modular forms.** — Edited by Robert A. Rankin. — Ellis Horwood series in mathematics and its applications. — Un vol. relié, 16 × 23,5, de 272 p. — Prix: £25.00. — Ellis Horwood Limited, Chichester, distributed by John Wiley and Sons, New York/Chichester/Brisbane/Toronto, 1984.

Collated and expertly edited from the London mathematical society symposium held at the University of Durham, 30 June-10 July 1983, this book takes account of the ways in which modular form theory has developed in the last three years. Each chapter makes a vital contribution to this unique assembly of new results and information, obtained from the individual writer's most recent work.

Kiyosi ITO. — **Foundations of stochastic differential equations in infinite dimensional spaces.** — CBMS-NSF regional conference series in applied mathematics, vol. 47. — Un vol. broché, 17,5 × 25, de ix, 70 p. — Prix: £11.75. — Society for industrial and applied mathematics, Philadelphia, Pennsylvania, distributed by John Wiley & Sons, Chichester, 1984.

The infinite dimensional spaces where stochastic differential equations are formulated may be any function spaces. Here the author has chosen the Schwartz spaces of distributions, and hopes that the reader will appreciate that this choice makes it easier to connect general theory with concrete problems.

**Mathematical methods in energy research.** — Proceedings of the special year in the mathematics of energy at the University of Wyoming, July 1982-July 1983. — Edited by Kenneth I. Gross.

— Un vol. relié, 18 × 26, de ix, 242 p. — Prix: £25.90. — Society for industrial and applied mathematics, Philadelphia, Pennsylvania, distributed by John Wiley & Sons, Chichester, 1984.

From the preface: "The major areas discussed... can be loosely grouped under the following five headings: mathematical modelling related to hydrocarbon recovery, flow in porous media, combustion and chemical reactors; mathematical analysis of coupled systems of nonlinear partial differential equations; numerical analysis of transport-dominated flow in 2 and 3 dimensions; computational algorithm development for large, sparse, nonlinear, nonsymmetric systems of equations; inverse problems, especially related to reflective seismology and geophysical prospecting."

A. V. ARKHANGEL'SKII and V. I. PONOMAREV. — **Fundamentals of general topology: problems and exercises.** — Mathematics and its applications. — Un vol. relié, 16 × 23, de xvi, 415 p. — Prix: Dfl. 185.00. — D. Reidel publishing company, Dordrecht/Boston/Lancaster, 1984.

Set theory. — Topological spaces, metric spaces. Basic concepts in topological and metric spaces. — Compact spaces and their subspaces. Concepts related to compactness. — Compactifications. — Metrization and paracompactness. — Spaces and continuous mappings. — Many of the extremely significant results obtained in the theory of topology during the last decade and a half are directly attributable to the work of these authors. This is borne out by the fact that a completely new and fundamental chapter relating to the general theory of continuous mapping of topological spaces, included in the present work, is basically their creation.

Roger C. LYNDON. — **Groups and geometry.** — London mathematical society lecture note series, vol. 101. — Un vol. broché, 15,5 × 23, de x, 217 p. — Prix: £11.95. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

The author emphasises and exploits the well-known connections between group theory and geometry, and, whilst keeping the presentation at a level that assumes only a basic background in mathematics, leads the reader to the frontiers of current research. The treatment is concrete and combinatorial with a minimal use of analytic geometry. In the interest of the reader's intuition, most of the geometry considered is two-dimensional and there is an emphasis on examples, both in the text and in the problems at the end of each chapter.

P. G. HARPER, D. L. WEAIRE. — **Introduction to physical mathematics.** — Un vol. broché, 15 × 23, de xi, 260 p. — Prix: £6.95 (relié: £20.00). — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

The book contains all the usual topics covered in a first-year course, such as vectors, matrices, differential equations, basic mathematical functions and their analysis, and power series. There is also a strong emphasis on qualitative understanding (such as curve sketching) and practical methods of solution. The latter take due account of the impact of modern computers on the subject. The principles of mathematical expression are illustrated by copious examples taken from a wide range of physics and chemistry. Each of the short chapters concludes with a summary and a large number of problems.

Nicolas BOURBAKI. — **Éléments de mathématique, algèbre commutative, chapitres 1 à 4, et algèbre commutative, chapitres 5 à 7.** — Nouveau tirage. — 2 vol. brochés, 17,5 × 24, de

360 et 352 p., respectivement. — Prix: FF 250.000, chacun des deux volumes. — Masson, Paris/New York/Barcelone/Milan/Mexico/Sao Paulo, 1985.

Les deux tomes de cette réédition regroupent chacun, deux des volumes de l'édition initiale. Le chapitre 1 est consacré à l'étude de la platitude et de la fidèle platitude des modules et des algèbres, le chapitre 2 à celle des anneaux locaux et de la méthode de localisation. Le chapitre 3 traite de façon systématique des techniques de filtration, de graduation et de complétion; il se conclut par les propriétés spéciales du cas noethérien (théorème de Krull et d'Artin-Rees, platitude supérieure). La décomposition primaire des modules de type fini sur un anneau commutatif noethérien fait l'objet du chapitre 4. Il faut noter que contrairement au titre du livre, les chapitres 1 à 3 ne se limitent pas au cas des anneaux commutatifs, mais rassemblent aussi les bases algébriques communes à l'arithmétique et aux géométries algébriques et analytiques. Le 2<sup>e</sup> tome est consacré à des questions d'inspiration plus proprement arithmétique ou algébrique. La théorie des entiers fait l'objet du chapitre 5, qui se termine par le théorème des zéros et les propriétés des anneaux de Jacobson. Le chapitre 6 étudie les notions de valuations, de places, de valeurs absolues, leurs rapports et leurs applications. Le chapitre 7 traite de la notion de division (au sens d'Artin) et des catégories d'anneaux qui y sont liées (anneaux de Krull, de Dedekind, factoriels); il se termine par la structure «en codimension 0 et 1» des modules de type fini sur un anneau noethérien intégralement clos.

Nicolas BOURBAKI. — **Eléments d'histoire des mathématiques.** — Nouveau tirage. — Un vol. broché, 13,5 × 21, de 376 p. — Prix: FF 130.00. — Masson, Paris/New York/Barcelone/Milan/Mexico/Sao Paulo, 1984.

Ce volume rassemble les notes historiques parues dans les différents livres des «Eléments de mathématiques» de Nicolas Bourbaki. Elles concernent donc l'ensemble des matières abordées dans ce traité: théorie des ensembles, algèbre, topologie, fonctions de variable réelle, espaces vectoriels topologiques, intégration, algèbre commutative, groupes et algèbres de Lie. Pour la commodité du lecteur, les bibliographies (600 titres d'œuvres) et les index des différentes notices ont été fusionnés. Il ne s'agit pas d'un ouvrage d'historien, mais de la réflexion d'un mathématicien sur le développement historique de la discipline. A la lumière de sa vision propre de la structure des mathématiques, Bourbaki fait apparaître la genèse, la croissance et l'interaction des idées qui ont abouti aux concepts et aux résultats qu'il juge essentiels.

Jacqueline FOURASTIE, Bernard GRAIS. — **Les indices statistiques.** — Un vol. broché, 15,5 × 22, de 160 p. — Prix: FF 72.00. — Masson, Paris/New York/Barcelone/Milan/Mexico/Sao Paulo, 1984.

L'élaboration des indices (indices de prix, de production..., etc.) pose de nombreux problèmes théoriques et pratiques. Cet ouvrage rassemble quelques-uns des résultats connus sur la théorie des indices synthétiques, et aide le lecteur à connaître à la fois la valeur et les limites de ces indices. Les premiers chapitres présentent les définitions essentielles sur les indices simples et leurs propriétés. Ensuite les formules sont analysées, ainsi que les résultats et leurs divergences. L'ouvrage se termine par deux chapitres sur les principaux indices officiels publiés en France.

G. F. WEBB. — **Theory of nonlinear age-dependent population dynamics.** — Pure and applied mathematics, vol. 89. — Un vol. relié, 16 × 23,5, de vi, 294 p. — Prix: FS 195.00. — Marcel Dekker, Inc., New York/Basel, 1985.

Utilizing a general model, and developing its mathematical theory, for nonlinear birth, mortality, and immigration processes, this book details the basic theory of solutions such as exis-

tence, uniqueness, positivity, regularity, representation, and numerical approximation; stresses the study of ultimate population behavior as time evolves, including the determination and stability of time-independent equilibrium solutions; applies general theory to specific applications of age-dependent biological populations in genetics, species competition, predator-prey interaction, infectious disease epidemics, and logistic populations, and provides an extensive bibliography from both mathematical and biological sources.

E. ARBARELLO, M. CORNALBA, P. A. GRIFFITHS and J. HARRIS. — **Geometry of algebraic curves, volume 1.** — Grundlehren der mathematischen Wissenschaften, vol. 267. — Un vol. relié, 16,5 × 24,5, de xvi, 386 p. — Prix: DM 128.00. — Springer-Verlag, New York/Berlin/Heidelberg/Tokyo, 1985.

The theory of algebraic curves looks completely different now from how it appeared 15 years ago; in particular our current state of knowledge represents a significant advance beyond the legacy left by the classical geometers such as Noether, Castelnuovo, Enriques, and Severi. This book gives a presentation of one of the central areas of this recent activity, namely, the study of linear series on a fixed curve. An attempt is made in this book to give a comprehensive and self-contained account of the extrinsic geometry of algebraic curves, which in the authors' opinion, constitute the main geometric core of the recent advances in curve theory.

Antal E. FEKETE. — **Real linear algebra.** — Un vol. relié, 16 × 24, de xxi, 426 p. — Pure and applied mathematics, vol. 91. — Prix: FS 118.00. — Marcel Dekker, Inc., New York/Basel, 1985.

This volume, based on the archives of Norman E. Steenrod, redefines the teaching of linear algebra by emphasizing an intuitive geometric approach rather than the standard axiomatic algebraic method. — *Contents:* Introductory remarks concerning logic. — The sum and the scalar multiple of vectors. — The dot product of vectors. — The cross product and the box product of vectors. — The Lie algebra of vectors in three-dimensional space. — Lines and planes. — Linear operators. — The product of linear operators. — Invertible linear operators. — Kernel and image: the classification of linear maps. — Eigenvalues and eigenvectors: the classification of linear operators. — Symmetric, antisymmetric, and orthogonal operators. — Rotations and reflections: the classification of orthogonal operators. — The determinant and the trace of a linear operator. — The exponential functor. — Appendices: Numerical methods of linear algebra: determinants, Gaussian elimination. The field of real numbers.

Andrzej HANYGA. — **Mathematical theory of non-linear elasticity.** — Ellis Horwood series in mathematics and its applications. — Un vol. relié, 16 × 23,5, de 432 p. — Prix: £39.50. — Ellis Horwood Ltd, Chichester, distributed by John Wiley & Sons, 1985.

This systematic and up-to-date presentation of non-linear elasticity meets the requirements of both practical application and mathematical rigor, providing a unified theory of the physical fields which occur in the description of physical phenomena with singularities. It also provides a straightforward simple model of continuous medium which can be studied thoroughly before developing more refined models of continua. It will additionally introduce the reader to branches of modern mathematics relevant to continuum mechanics.

Roger HARTLEY. — **Linear and nonlinear programming: an introduction to linear methods in mathematical programming.** — Ellis Horwood series in mathematics and its applications,

statistics and operational research section. — Un vol. broché, 15 × 23, de 221 p. — Prix: £9.95 (relié: £22.50). — Ellis Horwood Ltd, Chichester, distributed by John Wiley & Sons, New York/Chichester/Ontario/Brisbane, 1985.

This book deals with linear programming and a selection of other topics which can be handled by extending linear programming methods. It arose out of a course given to undergraduate and postgraduate students from a wide range of numerate disciplines. The author has adopted an approach which is rigorous and complete but informal in presentation. The only mathematical prerequisites are an ability to handle equations and inequalities (knowledge of the theory of equations is not required) and familiarity with summation notation.

**K. DEKKER, J. G. VERWER.** — **Stability of Runge-Kutta methods for stiff nonlinear differential equations.** — CWI monograph, vol. 2. — Un vol. relié, 17,5 × 25, de x, 308 p. — Prix: Dfl 95.00. — North-Holland, Amsterdam/New York/Oxford, 1984.

The object of this monograph is to present a unified account of all developments concerning stability of Runge-Kutta methods for stiff nonlinear differential equations, which began in 1975 with Dahlquist's G-stability paper and Butcher's B-stability paper. Designed for the reader with a background in numerical analysis, the book contains numerous theoretical and practical results aimed at giving insight into the treatment of nonlinear problems.

**Geometry of geodesics and related topics.** — Proceedings of a symposium held at University of Tokyo from November 29 until December 3, 1982. — Edited by K. Shiohama. — Advanced studies in pure mathematics, vol. 3. — Un vol. relié, 16 × 24, de x, 486 p. — Prix: Dfl. 275.00. — North-Holland publishing company, Amsterdam/New York/Oxford, 1984.

This 3rd volume in the Japanese symposia series surveys recent advances in five areas of geometry, namely, closed geodesics, geodesic flows, finiteness and uniqueness theorems for compact Riemannian manifolds, Hadamard manifolds, and topology of complete noncompact manifolds. — 21 papers by: M. Tanaka, J.-i. Itoh, T. Sunada, N. Abe, K. Kiyohara, C. Tsukamoto, K. Ii and S.-i. Watanabe, T. Sakai, T. Yamaguchi, K. Sakamoto, H. Sato, K. Shiga, H. Morimoto, N. Inami, A. Kasue, T. Sasaki, K. Shiohama, M. Maeda, S. Yorozu, R. Ichida.

**Arthur T. WHITE.** — **Graphs, groups and surfaces.** — Completely revised and enlarged edition. — North-Holland mathematics studies, vol. 8. — Un vol. broché, 17 × 24, de xiv, 314 p. — Prix: Dfl. 95.00. — North-Holland, Amsterdam/New York/Oxford, 1984.

The field of topological graph theory has expanded greatly in the ten years since the first edition of this book appeared. The original nine chapters of this classic work have therefore been revised and updated. Six new chapters have been added, dealing with: voltage graphs, non-orientable imbeddings, block designs associated with graph imbeddings, hypergraph imbeddings, map automorphism groups and change ringing. 32 new problems have been added to this new edition, so that there are now 181 in all. 9 of these problems have been designated as "unsolved".

**Convexity and graph theory.** — Proceedings of the conference on convexity and graph theory, Israel, March 1981. — Edited by M. Rosenfeld, J. Zaks. — North-Holland mathematics studies,

vol. 87. — Annals of discrete mathematics, vol. 20. — Un vol. broché, 17 × 24, de XII, 340 p. — Prix: Dfl. 160.00. — North-Holland, Amsterdam/New York/Oxford, 1984.

Among the participants discussing recent trends in their respective fields and in areas of common interest in these proceedings are such world-famous geometers as H. S. M. Coxeter, L. Danzer, D. Larman and J. Wills, and equally famous graph-theorists C. Berge, B. Bollobas, P. Erdős and F. Harary. In addition to new results in both geometry and graph theory, this work includes articles involving both of these two fields, for instance "Convexity, graph theory and non-negative matrices", "Weakly saturated graphs are rigid", and many more. In all, 69 participants from 13 different countries took part in the conference.

**Singularities and dynamical systems.** — Proceedings of the international conference on singularities and dynamical systems, Heraklion, Greece, 30 August-6 September, 1983. — Edited by Spyros N. Pnevmatikos. — North-Holland mathematics studies, vol. 103. — Un vol. broché, 17 × 24, de VIII, 460 p. — Prix: Dfl. 150.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

The main purpose of the conference was to create conditions of scientific contact between mathematicians and physicists who have singularities and dynamical systems as common interests. The volume contains 31 articles, devoted to recent progress in the following topics: the global study of dynamics generated by diffeomorphisms of foliations, the local study of the singularities of differential equations of real and complex fields, the singularities of symplectic geometry, contact geometry, and Riemannian geometry, the singularities of functions and complex hypersurfaces, the bifurcations in dynamical systems and the appearance of chaos, the study of some specific dynamical systems, nonlinear differential equations, and solitons.

**José M. ISIDRO, Laszlo L. STACHO.** — **Holomorphic automorphism groups in Banach spaces: an elementary introduction.** — North-Holland mathematics studies, vol. 105. — Notas de matematica, vol. 97. — Un vol. broché, 17 × 24, de XII, 314 p. — Prix: Dfl. 120.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

Uniformly bounded families of holomorphic maps and locally uniform convergence. — Topological consequences of the group structure of the set of automorphisms. — The Caratheodory distance and completeness properties of the group of automorphisms. — The Lie algebra of complete vector fields. — The natural topology on the Lie algebra of complete vector fields. — The Banach Lie group structure of the set of automorphisms. — Bounded circular domains. — Automorphisms of the unit ball of some classical Banach spaces. — Bounded symmetric domains. — The Jordan theory of bounded symmetric domains.

**Jorge Alberto BARROSO.** — **Introduction to holomorphy.** — North-Holland mathematics studies, vol. 106. — Notas de matematica, vol. 98. — Un vol. broché, 17 × 24, de XIV, 302 p. — Prix: Dfl. 130.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

This book presents a set of basic properties of holomorphic mappings between complex normed spaces and between complex locally convex spaces. These properties have already achieved an almost definitive form and should be known to all those interested in the study of infinite dimensional holomorphy and its applications. The author also makes "incursions" into the study of the topological properties of the spaces of holomorphic mappings between spaces of infinite dimension. An attempt is then made to show some of the several topologies that can naturally be considered in these spaces.

Leon HENKIN, J. Donald MONK, Alfred TARSKI. — **Cylindric algebras, part I.** — With an introductory chapter: General theory of algebras. — Studies in logic and the foundations of mathematics, vol. 64. — 1st reprint of the 1971 edition. — Un vol. relié, 16 × 23, de vi, 508 p. — Prix: Dfl. 175.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

*Preliminaries:* Set-theoretical notions. Metalogical notions. — *General theory of algebras:* Algebras and their subalgebras. Homomorphisms, isomorphisms, congruence relations, and ideals. Direct products and related notions. Polynomials and free algebras. Reducts. — *Elementary properties of cylindric algebras:* Cylindric algebras. Cylindrifications. Diagonal elements. Duality. Substitutions. Dimension sets. Generalized cylindrifications. Generalized diagonal elements. Generalized co-diagonal elements. Atoms and rectangular elements. Locally finite-dimensional and dimension-complemented cylindric algebras. — *General algebraic notions applied to cylindric algebras:* Subalgebras. Relativization of cylindric algebras. Homomorphisms, isomorphisms, and ideals. Direct products and related notions. Free algebras. Reducts. Canonical embedding algebras and atom structures. — *Bibliography.*

Leon HENKIN, J. Donald MONK, Alfred TARSKI. — **Cylindric algebras, part II.** — Studies in logic and the foundations of mathematics, vol. 115. — Un vol. relié, 16 × 23, de viii, 302 p. — Prix: Dfl. 125.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

This book completes the description of the main aspects of the theory of cylindric algebras started in part I (but is largely independent of that part). Cylindric algebras are Boolean algebras with additional operations and form algebraic versions of first-order logic. — *Contents: Representable cylindric algebras.* Representation theory. — *Notions of logic related to cylindric algebras:* Model theory of cylindric algebras. Decision problems. Connections between logic and cylindric algebras. — *Other algebraic versions of logic:* Diagonal-free cylindric algebras. Projective algebras. Relation algebras. Polyadic algebras. Relativized cylindric algebras. Abstract algebraic logic and more algebraic logics. — *Bibliography.*

**Intensional mathematics.** — Edited by Stewart Shapiro. — Studies in logic and the foundations of mathematics, vol. 113. — Un vol. relié, 16 × 23, de vi, 230 p. — Prix: Dfl. 100.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

*Stewart Shapiro:* Introduction: intensional mathematics and constructive mathematics. — *Stewart Shapiro:* Epistemic and intuitionistic arithmetic. — *John Myhill:* Intensional set theory. — *Nicholas D. Goodman:* A genuinely intensional set theory. — *Andrej Scedrov:* Extending Gödel's modal interpretation to type theory and set theory. — *Robert C. Flagg:* Church's thesis is consistent with epistemic arithmetic. — *Vladimir Lifschitz:* Calculable natural numbers. — *Raymond M. Smullyan:* Modality and self-reference. — *Raymond M. Smullyan:* Some principles related to Löb's theorem.

Pierre SCHAPIRA. — **Microdifferential systems in the complex domain.** — Grundlehren der mathematischen Wissenschaften, vol. 269. — Un vol. relié, 16 × 24, de x, 214 p. — Prix: DM 98.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This volume gives a general survey, with complete proofs, of the theory of systems of micro-differential equations in the complex domain initiated by Sato-Kashiwara-Kawai. Starting with basic results of analysis such as the Weierstrass division theorem and the Cauchy-Kowalewski theorem in their microdifferential formulation, the author shows how elementary algebraic tools together with geometrical arguments can lead to deep results, including: existence of quantized

contact transformations, structure theorem for systems with simple characteristics, propagation in the “non micro-characteristic” directions, Kashiwara’s constructibility theorem for holonomic systems. The proofs are fully worked out and are supplemented by carefully selected exercises to deepen and extend the results.

Peter D. T. A. ELLIOTT. — **Arithmetic functions and integer products.** — Grundlehren der mathematischen Wissenschaften, vol. 272. — Un vol. relié, 16 × 24, de xv, 461 p. — Prix: DM 198.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book presents an algebraically oriented approach to the theory of additive and multiplicative arithmetic functions. This is a very active theory with applications in many other areas of mathematics, such as functional analysis, probability and the theory of group representations. Elliott’s volume gives a systematic account of the theory, embedding many interesting and far-reaching individual results in their proper context while introducing the reader a very active field. This book contains supplementary material (mostly updates) to the author’s earlier two volumes on probabilistic number theory.

Michael BARR, Charles WELLS. — **Toposes, triples and theories.** — Grundlehren der mathematischen Wissenschaften, vol. 278. — Un vol. relié, 16 × 24, de xiii, 345 p. — Prix: DM 138.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book provides an introduction to the three concepts of topos, triple, and theory, and describes the connections between them. These ideas, subsumed under the larger concept of category theory, have been the subject of a great deal of research in the past several years. The book can be read by a second year graduate student with a familiarity with elementary algebra. Category theory is studied by mathematicians for its own appeal, as well as for its applications to such areas as mathematical logic, cohomology theory, and algebraic geometry.

John B. CONWAY. — **A course in functional analysis.** — Graduate texts in mathematics, vol. 96. — Un vol. relié, 16 × 24, de xiv, 404 p. — Prix: DM 118.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book is intended as a one semester textbook on functional analysis for graduate students who have a firm foundation in measure and integration theory. In the last half of the book the reader will also need to know the rudiments of analytic function theory. Unlike most modern treatments, this book starts from the particular and works its way up to the more general.

N. Z. SHOR. — **Minimization methods for non-differentiable functions.** — Springer series in computational mathematics, vol. 3. — Translated from the Russian by K. C. Kiwiel, A. Ruszczynski. — Un vol. relié, 16 × 24, de viii, 162 p. — Prix: DM 84.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book reflects 20 years of the author’s research and summarizes results which up to now have been unavailable to Western readers. His original contributions include the subgradient algorithm and methods with space dilation, of which the famous ellipsoid algorithm is a special case. This volume presents for the first time a complete theoretical analysis and numerical validation of these methods, including computational results for real-life problems.

J. P. HOGENDIJK. — **Ibn Al-Haytham's "Completion of the conics".** — Sources in the history of mathematics and physical sciences, vol. 7. — Un vol. relié, 16 × 24, de x, 417 p. — Prix: DM 328.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book contains the Arabic text, an English translation, a critical apparatus, and extensive commentaries to Ibn al-Haytham's reconstruction of the eighth book of the Conics of Apollonius, the original of which was lost in late antiquity. The work is of great interest for historical, mathematical and linguistic reasons, shedding much light on the status of Arabic mathematics in the 8th century and its perception of its Greek sources. A particularly attractive feature of this edition of Ibn al-Haytham's work is the fact that the accompanying commentary by the editor is extensive and discusses many interesting and relevant questions surrounding Ibn al-Haytham's work, among them the possibility of reconstructing Ibn al-Haytham's sources.

Winfried SCHARLAU, Hans OPOLKA. — **From Fermat to Minkowski: lectures on the theory of numbers and its historical development.** — Translated from the German by W. K. Bühler, G. Cornell. — Undergraduate texts in mathematics. — Un vol. relié, 16 × 24, de xi, 184 p. — Prix: DM 72.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This is a genealogical introduction to number theory, tracing its growth from Fermat through the 18th and 19th century, and culminating with Minkowski's work on the geometry of numbers. By following the historical development the student acquires a familiarity with many of the classical questions of number theory, such as the representation of numbers by sums of squares, quadratic reciprocity, or class numbers, and is made aware of how one question through increasing knowledge of the subject and refinement of the techniques, leads to new questions and new answers.

Murray H. PROTTER, Charles B. MORREY, Jr. — **Intermediate calculus.** — 2nd edition. — Undergraduate texts in mathematics. — Un vol. relié, 16 × 24, de x, 650 p. — Prix: DM 128.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Analytic geometry in three dimensions. — Vectors. — Infinite series. — Partial derivatives. Applications. — Multiple integration. Fourier series. — Implicit function theorems. Jacobians. — Differentiation under the integral sign. Improper integrals. The gamma function. — Vector field theory. — Green's and Stokes' theorems. — Appendices: Matrices and determinants. Proofs of theorems. Introduction to the use of a table of integrals. — Answers to odd-numbered problems.

Serge LANG. — **Differential manifolds.** — 2nd edition. — Un vol. broché, 15,5 × 23,5, de ix, 230 p. — Prix: DM 68.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book lays the necessary foundation for the study of differential topology, differential geometry, and differential equations. It presents an extremely general, unified treatment of its subject matter. Perhaps the most striking feature is its use of Banach manifolds throughout; it is the only book to treat these manifolds and, as such, is of great value to many mathematicians as well as to many physicists for whom this subject has become quite important.

Ladislav BERAN. — **Orthomodular lattices: algebraic approach.** — Mathematics and its applications (East European series). — Un vol. relié, 16 × 23, de xix, 394 p. — Prix: Dfl. 180.00. — D. Reidel publishing company, Dordrecht/Boston/Lancaster, 1985.

The author has attempted to make the exposition as self-contained as possible without assuming any special knowledge of lattice theory. The book moves from an introduction to the theory of orthomodular lattices to Boolean skew lattices and their connection to orthomodularity. Hilbert spaces, the notion of amalgamation, and the structure of generalized orthomodular lattices are also dealt with. A development of the results of commutators and finitely generated orthomodular lattices is followed by an account of identities in orthomodular lattices and in Boolean skew lattices. The final chapter considers various important aspects of orthomodularity. Of fundamental importance in this chapter is dimension theory and the study of orthologies. The book is suitable for student use, containing numerous exercises.

**Nicolas Chuquet, Renaissance mathematician: a study with extensive translation of Chuquet's mathematical manuscript completed in 1484.** — Edited by Graham Flegg, Cynthia Hay, Barbara Moss. — Un vol. relié, 17 × 24,5, de viii, 388 p. — Prix: Dfl. 135.00. — D. Reidel publishing company, Dordrecht/Boston/Lancaster, 1985.

Nicolas Chuquet is widely regarded as the most significant French mathematician of the 15th century. This book makes available, for the first time in English, the whole manuscript, including the "Geometry" and the "Commercial arithmetic". This manuscript is critically assessed in the context of Renaissance mathematics. Chuquet can now be seen in overall perspective, as the book explores his remarkable innovations as well as his limitations.

**Categorical topology.** — Proceedings of the International conference held at the University of Toledo, Toledo, Ohio, USA., August 1-5, 1983. — Edited by H. L. Bentley, H. Herrlich, M. Rajagopalan, H. Wolff. — Sigma series in pure mathematics, vol. 5. — Un vol. broché, 17 × 24, de xvi, 635 p. — Prix: DM 88.00. — Heldermann Verlag, Berlin, 1984.

Categorical topology can be described as a subject which embodies the investigation of topological categories and their relationships to each other. However, categorical topology is not monolithic in nature. The variety of perspectives is amply demonstrated by the collection of papers appearing in this volume. They can be roughly grouped into general theory of topological categories, particular topological categories, functors from topological categories to algebraic ones, topological algebra, algebraic topology, continuous lattices or locales, factorizations, connectedness theories, Cartesian closedness, functional analysis, symbolic logic methods, and category theory generally.

**M. JUENGER.** — **Polyhedral combinatorics and the acyclic subdigraph problem.** — Research and exposition in mathematics, vol. 7. — Un vol. broché, 17 × 24, de x, 128 p. — Prix: DM 36.00. — Heldermann Verlag, Berlin, 1985.

Polyhedral combinatorics is a modern branch of mathematics which has already considerably influenced algorithmic approaches to combinatorial optimization problems. This monograph gives a concise introduction into the concepts of polyhedral combinatorics and surveys the main results. Applying these concepts, the acyclic subdigraph problem is studied, a prominent member of the class of NP-hard optimization problems with many practical applications. The theoretical investigations presented in this book lay the foundations for the development of algorithms for solving the acyclic subdigraph problem within a linear programming framework.

**A. B. ROMANOWSKA, J. D. H. SMITH.** — **Modal theory: an algebraic approach to order, geometry, and convexity.** — Research and exposition in mathematics, vol. 9. — Un vol. broché, 17 × 24, de xii, 158 p. — Prix: DM 38.00. — Heldermann Verlag, Berlin, 1985.

Modal theory is a new algebraic discipline. The topics of modal theory, belonging mostly to universal algebra, have broad connections to the theory of semigroups, semilattices, lattices, convex sets and geometry; also included are interesting applications to computer science. The work summarizes various recent results in a new, unifying manner.

Diane D. WOLFF, Michael L. PARSONS. — **Pattern recognition approach to data interpretation.** — Un vol. relié, 17 × 25,5, de XIII, 223 p. — Prix: \$29.50. — Plenum press, New York/London, 1983.

From the preface: "An attempt is made in this book to give scientists a detailed working knowledge of the powerful mathematical tools available to aid in data interpretation, especially when confronted with large data sets incorporating many parameters". — *Contents: Philosophical considerations and computer packages:* Philosophical considerations. Biomedical computer program (BMDP). Statistical package for the social sciences (SPSS). ARTHUR. CLUSTAN. SAS. — *Pattern recognition approach to data analysis:* Preliminary data examination. Data stratification. Intervariable relationships. Unsupervised learning techniques. Supervised learning techniques. Variable reduction. Data manipulations. — *Implementation:* Typical SPSS runs. Typical ARTHUR runs. Typical BMDP runs. SPSS implementation. ARTHUR implementations. BMDP programs. — *Natural science applications:* Biological, medical, geological, environmental, physics, chemical applications. — *Appendices.*

Jean-Paul GAUTHIER. — **Structure des systèmes non linéaires.** — Un vol. broché, 16 × 24, de 307 p. — Prix: FF 150.00. — Editions du Centre national de la recherche scientifique, Paris, 1984.

Cet ouvrage présente les résultats fondamentaux et les techniques principales de la théorie du contrôle des systèmes non linéaires, d'un point de vue géométrique. Quatre questions sont abordées: gouvernabilité, observabilité et observateurs, stabilisation, découplage. Après une introduction sommaire des outils mathématiques nécessaires, la gouvernabilité est abordée, à travers les «techniques d'extension», et appliquée aux systèmes classiques. L'«ouverture» de la propriété de gouvernabilité est examinée. Les résultats de base concernant l'observabilité et la théorie de la réalisation sont exposés, le problème de la réalisation d'observateurs est abordé. De façon très brève, on présente ensuite deux méthodes non triviales pour la stabilisation des systèmes non linéaires. Le problème du découplage et de la réjection des perturbations est ensuite traité et relié aux questions d'observabilité. Une application «pratique» est traitée sommairement.

Jean VAILLANT. — **Propagation des singularités et opérateurs différentiels.** — Travaux en cours. — Un vol. broché, 17 × 24, de 168 p. — Prix: FF 160.00. — Hermann, Paris, 1985.

L'ouvrage, issu du séminaire Jean Vaillant de 1984, tenu à l'Université de Paris VI, regroupe les contributions de mathématiciens français, italiens et japonais. — *Table:* Le domaine d'existence et le prolongement analytique de la solution du problème de Cauchy à données singulières. — Perturbations singulières et formules de localisation. — Micro-support et variété caractéristique. — Problème de Cauchy pour des opérateurs fuchsiens. — Continuation de régularité et surjectivité d'opérateurs différentiels dans les espaces de Gevrey. — Une classe d'équations aux dérivées partielles non linéaires à singularité régulière. — Problème de Cauchy pour les équations linéaires et non linéaires hyperboliques dans les classes de Gevrey; un opérateur partiellement strictement hyperbolique. — On analytic regularities. — Sur l'indice de Gevrey. — Etude du

problème de Cauchy faiblement hyperbolique  $C^\infty$  pour des systèmes à caractéristiques de multiplicité variable quelconque. — Propagation of singularities for Hamilton-Jacobi equation.

Roger W. CARTER. — **Finite groups of Lie type: conjugacy classes and complex characters.** — Pure and applied mathematics. — Un vol. relié.  $17 \times 24$ , de XII, 544 p. — Prix: £42.50. — John Wiley and Sons, Chichester/New York/Brisbane/Toronto/Singapore, 1985.

The finite groups of Lie type are of basic importance in the theory of groups. The author's intention here is to make theories of finite groups of Lie type, particularly the complex representation theory which has been developed since the fundamental breakthrough made by Deligne and Lusztig in 1976, accessible to a wider circle of mathematicians. He introduces the subject clearly, especially with regard to the main concepts of the theory and the techniques of proof used, and gives a detailed exposition of the complex representation theory. There is a considerable amount of preparatory material on conjugacy classes, and much detailed specific information about the groups of Lie type relating to conjugacy classes and degrees of irreducible representations; also included are a detailed introduction to algebraic groups, and an account of Harish-Chandra's theory of cuspidal representations and the Howlett-Lehrer theory for decomposing induced cuspidal representations.

Mark CROSS, A. O. MOSCARDINI. — **Learning the art of mathematical modelling.** — Ellis Horwood series in mathematics and its applications. — Un vol. broché,  $15 \times 23$ , de 155 p. — Prix: £7.50 (relié: £15.00). — Ellis Horwood Limited, Chichester, distributed by John Wiley and Sons, New York/Chichester/Brisbane/Toronto, 1985.

After a carefully structured overview of mathematical modelling, a chapter is devoted to illustrating the activities and problems to overcome when developing a model to analyse a real industrial process. The process of mathematical modelling is considered in some detail and a set of modelling scenarios are provided through which students may acquire their skills. A chapter on student-user oriented simulation software is included.

Andy R. MAGID. — **Applied matrix models: a second course in linear algebra with computer applications.** — Un vol. relié,  $16 \times 23,5$ , de x, 240 p. — Prix: £41.75. — John Wiley and Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1985.

*Introduction:* The book and how to use it. Review of vector and matrix algebra. Why most matrices are good. Reading FORTRAN. — *Static and steady-state models: Systems with a unique solution:* Linear equations and the L-U decomposition. Gaussian elimination with row interchanges. Some examples of nonsingular systems. Solving nonsingular systems with LINPACK. Systems solvable by iteration. *Systems with many solutions:* Linear equations, rank, and row reduction. Some examples of underdetermined systems. Row reducing matrices with LINPACK. *Overdetermined systems:* Vector geometry and overdetermined systems of equations. Fitting equations to data by least squares. Least-squares approximate solutions using LINPACK. More fitting equations to data. — *Dynamic models: Discrete time system evolution:* Iterative inhomogeneous linear models. Eigenvectors and eigenvalues. Computation of eigenvectors and eigenvalues. Some homogeneous matrix power models. Markov processes. *Continuous time system evolution:* Systems of differential equations and their solutions by eigenvectors and eigenvalues. Examples of systems of differential equations.

**Parametric optimization and approximation.** — Conference held at the Mathematisches Forschungsinstitut, Oberwolfach, October 16-22, 1983. — Ed. by B. Brosowski, F. Deutsch. —

International series of numerical mathematics, Bd. 72. — Un vol. relié, 17 × 24, de 263 p. — Prix: FS 62.00. — Birkhäuser-Verlag, Basel/Boston/Stuttgart, 1985.

The articles in this volume are based on papers presented to the International symposium on "Parametric optimization and approximation", held on October 16-22, 1983 at Oberwolfach. It is concerned with the stability and sensitivity of optimization and approximation problems. Special emphasis lies on semi-infinite optimization problems and on certain problems of best approximation. Some numerical methods and applications in operations research and engineering are also presented as well as an article on the historic development of parametric programming.

**Constructive methods for the practical treatment of integral equations.** — Proceedings of the conference at the Mathematisches Forschungsinstitut, Oberwolfach, june 24-30, 1984. — Ed. by G. Hämerlin and K.-H. Hoffmann. — International series of numerical mathematics, Bd. 73. — Un vol. relié, 17 × 24, de 284 p. — Prix: SFr. 62.00. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1985.

This volume reflects the wide spectrum of questions arising in connection with the practical aspect of integral equations. Twenty-three papers read at the Oberwolfach conference in June 1984 are collected here. Focal points include the numerical treatment of integral equations of the Volterra type, with emphasis on weakly singular kernels and stability questions. Weakly singular Fredholm integral equations are treated as well. Collocation and Galerkin methods, in particular those using splines to find approximate solutions, are of special interest. Further, nonlinear equations and their applications and boundary integral methods should be mentioned. Integral equations of the first kind and regularisation methods bridge to improperly posed problems.

**Hans RIESEL.** — **Prime numbers and computer methods for factorization.** — Progress in mathematics, vol. 57. — Un vol. relié, 15,5 × 23, de xvi, 463 p. — Prix: FS 118.00. — Birkhäuser, Boston/Basel/Stuttgart.

Applications of number theory have become of vital importance in communications, coding theory, cryptology and other areas of science and engineering. This book is an introduction to applied number theory but is distinguished by the fact that its methods and results are more recent than those found in other source books and by its emphasis on practical computer programs, including actual program listings. Because computers are becoming ubiquitous, the reader will be able to carry out number theoretical experimentation on a scale that was formerly not feasible without access to large computers.

**G. A. F. SEBER.** — **Multivariate observations.** — Wiley series in probability and mathematical statistics. — Un vol. relié, 17 × 24, de xx, 686 p. — Prix: £56.70. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1984.

This work comprises a practical reference and handbook covering all current and applied data-oriented techniques and contains both modern, computer-related procedures and classical methods in multivariate analysis. Major aspects of multivariate analysis are presented: the nature of multivariate data and problems of simultaneous inference; multivariate distribution theory (with special attention to Hotelling's  $T^2$  distribution together with the multivariate beta distribution); graphical and data-oriented techniques; practical methods for expressing multivariate data in fewer dimensions; discriminant analysis; cluster analysis; general linear models, multivariate analysis of variance and covariance; computational techniques, etc. Techniques are illustrated

with practical numerical examples, graphs, tables, and exercises. A set of appendices summarizes useful results in matrix algebra, reviews order statistics and probability plotting, and presents a collection of statistical tables.

**T. P. HETTMANSPERGER.** — **Statistical inference based on ranks.** — Wiley series in probability and mathematical statistics. — Un vol. relié, 16 × 23,5, de xvii, 323 p. — Prix: £43.40. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1984.

In this work, a set of statistical methods for analyzing data resulting from various experimental designs is developed. Estimates, tests, and multiple comparisons are developed simultaneously, beginning with the simple one-sample location model and progressing through the two-sample location model, the one- and two-way layouts, and the general linear model. Basic tools and results from mathematical statistics are discussed: those useful in assessing the statistical properties of the procedures and those useful in assessing the stability properties. Most of the available nonparametric methods are discussed including: Sign test, Wilcoxon signed rank test, Mann-Whitney-Wilcoxon rank test, Mood's median test, Kruskal-Wallis test, Kendall's tau, Spearman's rho, etc.

**Vijay K. ROHATGI.** — **Statistical inference.** — Wiley series in probability and mathematical statistics. — Un vol. relié, 17 × 24, de xiv, 940 p. — Prix: £52.00. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1984.

This work departs from the traditional separation of statistics from probability by integrating coverage of both areas, along with parametric and nonparametric techniques, into a single, unified treatment. Probability is treated from a modeling point of view with an emphasis on usefulness, interrelationship, and continuity. Thus, while the topics themselves remain traditional, the sequence, coverage and discussions of them are not. The book introduces the formal language of statistical inference early, just as soon as the concept of probability distributions has been explained. Inferential questions are constantly considered along with probabilistic models. In short, the relationship between probability and statistics is continually explained and analyzed for the reader.

**John Fox.** — **Linear statistical models and related methods:** with applications to social research. — Wiley series in probability and mathematical statistics. — Un vol. relié, 17 × 24, de xx, 449 p. — Prix: £46.20. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1984.

Linear models, their variants and extensions, are widely used tools in social research. This text offers an in-depth, modern explanation of linear models and related methods. Statistical theory is combined with applied data analysis, and the important methodological principles that underlie statistical methods for the social sciences are studied. Treatment of the following topics are presented: regression analysis, dummy-variable regression, analysis of variance, the general linear model, linear-model diagnostics.

**W. R. DILLON & M. GOLDSTEIN.** — **Multivariate analysis: methods and applications.** — Wiley series in probability and mathematical statistics. — Un vol. relié, 17 × 24, de xii, 587 p. — Prix: £43.90. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1984.

In recent years, a growing number of social, behavioral and biological professionals have come to rely upon multivariate analysis techniques for their research needs. In this book, which covers multivariate methods, special coverage of important topics includes: multidimensional scaling, cross-classified categorical data, latent structure analysis and linear structural relations (LISREL). A technical appendix reviews linear algebra and matrices and contains some distributional results dealing with the multivariate normal, multinomial and Wishart distributions.

Alan AGRESTI. — **Analysis of ordinal categorical data.** — Wiley series in probability and mathematical statistics. — Un vol. relié, 16 × 23,5, de IX, 287 p. — Prix: £41.60. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1984.

Methods for analyzing ordered categorical data are being frequently applied in such diverse fields as sociology, public health, ecology, marketing and pharmacy. Researchers are finding that ordinal methods make possible simpler description of data, and also permit more powerful inferences about crucial questions of association linkages. This book discusses such applications and covers specialized models that, unlike standard methods for nominal categorical data, efficiently use the information on ordering.

Fritz JOHN. — **Collected papers**, vol. 1 & 2. — Ed. by Jürgen Moser. — Contemporary mathematicians. — 2 volumes reliés, 18,5 × 26, de 648 p. et 758 p. — Prix: SFr. 418.00. — Birkhäuser Verlag, Boston/Basel/Stuttgart, 1985.

The mathematical works of Fritz John, whose deep and original ideas have had great influence on the development of various fields in mathematical analysis, are made available with these volumes. With the publication of this collection, a wider circle of mathematicians will become familiar with, and appreciate, the fertile ideas of Fritz John, whose works are certainly well known to the experts, but perhaps not to such an extent to others. His fundamental papers on convexity, uniqueness, illposed problems, numerical analysis, quasi-isometry and blow-up all started new developments. Fritz John's originality stems from his ability to ask and answer penetrating questions about difficult matters that few others thought about seriously before him. His style of writing bears the mark of his personality: clear, thoughtful and measured.

A. H. SCHOFIELD. — **Representation of rings over skew fields.** — London mathematical society lecture note series, vol. 92. — Un vol. broché, 15 × 22,5, de XII, 223 p. — Prix: £12.95. — Cambridge university press, Cambridge/London/New York/New Rochelle, Melbourne, Sydney, 1985.

The first half of the book is a general study of homomorphisms to simple artinian rings; the techniques developed should be of interest to algebraists. The second half is a more detailed study of special types of skew fields which have arisen from the work of P. M. Cohn and the author. A number of previously open questions are settled; a version of the Jacobian conjecture for free algebras is proved and there are examples of skew field extensions of different but finite left and right dimension.

Lewis H. RYDER. — **Quantum field theory.** — Un vol. relié, 16 × 23,5, de XII, 443 p. — Prix: £40.00. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This book describes the ideas and techniques of quantum field theory, on which is based our current understanding of subnuclear physics. In recent years this has advanced considerably

with the discovery of charmed particles and the weak intermediate vector bosons predicted by gauge theories. After a brief survey of particle physics, the quantum theory of scalar and spinor fields, and then of gauge fields, is developed. The emphasis throughout is on functional methods, which have played a large part in modern field theory. The book concludes with a brief survey of “topological” objects in field theory.

Alexander OSTROWSKI. — **Collected mathematical papers, vol. 6.** — Un vol. relié, 17 × 24, de 718 p. — Prix: SFr. 104. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1985.

This is the 6th and last volume compiling the collected mathematical papers of Alexander Ostrowski. It contains papers on conformal mapping edited between 1929 and 1955, on numerical analysis (1936-1975) and miscellaneous articles (1932-1980). Thus ends the compilation of papers which constitute the work of one of the most significant mathematicians of our time. Alexander Ostrowski is one of the last great mathematicians to command a comprehensive knowledge of mathematical science while also having worked and published in virtually all of its branches.

H. BAUMGÄRTEL. — **Analytic perturbation theory for matrices and operators.** — Operator theory: advances and applications, vol. 15. — Un vol. relié, 17 × 24, de 427 p. — Prix: SFr. 96.00. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1985.

This book treats the problem of how the Jordan structure of a matrix is changed by small analytic perturbation of this matrix. The book also contains the perturbation theory of isolated eigenvalues of linear operators in infinite dimensional spaces. The selfadjoint and normal cases are discussed separately. Attention is also given to the numerical aspects and perturbation problems for operator bundles.

M. R. BREMNER, R. V. MOODY, J. PATERA. — **Tables of dominant weight multiplicities for representations of simple Lie algebras.** — Monographs and textbooks in pure and applied mathematics, vol. 90. — Un vol. relié, 18 × 26, de v, 340 p. — Prix: SFr. 195.00. — Marcel Dekker, New York/Basel, 1985.

This work provides extensive tables of weight multiplicities in representations of simple Lie algebras. Computed by a version of Freudenthal's algorithm, these tables supply the multiplicities for representations previously beyond the feasible range of electronic computation. This reference provides: multiplicities for the first 104 representations (ordered by increasing level of the highest weight) for algebras of types  $E_6$ ,  $E_7$ ,  $E_8$ ,  $F_4$  and  $G_2$  and the first 52 representations in each congruence class of the other simple Lie algebras of rank  $\leq 12$  ... auxiliary data such as root systems, dimensions, weight levels and lengths, sizes of the Weyl group and other “biographical aspects” of each Lie algebra.

Marc ZAMANSKY. — **Analyse harmonique et approximation.** — Travaux en cours. — Un vol. broché, 16,5 × 24, de 123 p. — Prix: FF 160.00. — Hermann, Paris, 1985.

Utilisant les moyens tout à fait élémentaires comme le théorème de la moyenne et la «somma-tion partielle» d'Abel, et sans pratiquement faire intervenir les théorèmes profonds de la théorie des espaces de Banach, l'auteur met en évidence quelques principes généraux applicables à la plupart des résultats antérieurs des théories modernes de l'approximation des fonctions. Cette

étude met en relief les relations entre les propriétés différentielles d'une fonction et l'ordre de grandeur que l'on peut obtenir pour l'écart entre cette fonction et ses approximations.

B. BEAUZAMY, J.-T. LAPRESTE. — **Modèles étalés des espaces de Banach.** — Travaux en cours. — Un vol. broché, 16,5 × 24, de 210 p. — Prix: FF 160.00. — Hermann, Paris, 1984.

Ce livre, consacré à une branche de l'analyse fonctionnelle actuellement en plein développement, s'adresse aux chercheurs désireux d'en acquérir les techniques les plus modernes. Celles-ci sont indiquées en grand détail et présentent de façon exhaustive un outil dont l'importance s'avère croissante. Partant des définitions de base, les auteurs étudient les différentes applications des modèles étalés, y compris les plus récentes, qui sont les propriétés de Banach-Saks et les espaces stables. La notion de modèle étalé apparaît comme l'un des outils fondamentaux de la géométrie des espaces de Banach, particulièrement adapté aux propriétés de sommabilité.

J.-N. BERNSTEIN, P. DELIGNE, D. KAZHDAN, M.-F. VIGNERAS. — **Représentations des groupes réductifs sur un corps local.** — Travaux en cours. — Un vol. broché, 16,5 × 24, de 157 p. — Prix: FF 160.00. — Hermann, Paris, 1984.

Ce livre présente des résultats de la théorie des représentations des groupes réductifs p-adiques. Les auteurs étudient d'abord l'algèbre de convolution des fonctions localement constantes à support compact sur  $G$ , à partir d'une analyse de la catégorie des représentations algébriques de  $G$ . Ils obtiennent une décomposition de cette catégorie paramétrée par les représentations cuspidales de sous-groupes de Lévi, le calcul d'une algèbre de multiplicateurs et divers résultats de finitude. On utilise ensuite ces résultats pour construire une bijection entre les séries discrètes de représentations de  $GL(n, F)$  et du groupe multiplicatif d'une algèbre simple de rang  $n^2$  sur son centre  $F$ . On précise enfin des résultats anciens de M. Krasner, reliant les extensions galoisiennes d'un corps local  $F$  de caractéristique  $p$  à celles des extensions de corps locaux de caractéristique 0, de même corps résiduel et d'indice de ramification absolu tendant vers l'infini. La philosophie de Langlands laisse espérer que ces résultats aient une contrepartie en théorie des représentations de  $GL(n, F)$ .

L. CHAMBADAL. — **Formulaire de mathématiques.** — Classes préparatoires nouveaux programmes 1<sup>er</sup> cycle universitaire. — Troisième édition. — Un vol. broché, 13 × 18, de 188 p. — Prix: FF 55.00. — Dunod, Paris, 1985.

Ce formulaire présente la totalité des définitions, résultats et formules correspondant aux nouveaux programmes de mathématiques de classes préparatoires aux Grandes Ecoles Scientifiques. Une présentation améliorée fait de cet ouvrage un instrument de travail commode et sûr pour l'étudiant dès la 1<sup>re</sup> année universitaire, comme pour les enseignants et les ingénieurs.

Lars HÖRMANDER. — **The analysis of linear partial differential operators III: pseudo-differential operators.** — Grundlehren der mathematischen Wissenschaften, vol. 274. — Un vol. relié, 16 × 24, de VIII, 525 p. — Prix: DM 138.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book first presents some of the earlier methods in the theory of linear partial differential operators with variable coefficients. Pseudodifferential operators are then introduced with applications to elliptic operators in particular index theory, and to the Cauchy and mixed problems, after a discussion of symplectic geometry. *Contents:* Second order elliptic operators. — Pseudodifferential operators. — Elliptic operators on a compact manifold without boundary. — Boun-

dary problems for elliptic differential operators. — Symplectic geometry. — Some classes of (micro)-hypoelliptic operators. — The strictly hyperbolic Cauchy problem. — The mixed Dirichlet-Cauchy problem for second order operators. — *Appendices*: Some spaces of distributions. Some tools from differential geometry.

Lars HÖRMANDER. — **The analysis of linear partial differential operators IV: Fourier integral operators.** — Grundlehren der mathematischen Wissenschaften, vol. 275. — Un vol. relié,  $16 \times 24$ , de vii, 352 p. — Prix: DM 128.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This volume presents Fourier integral operators which emerge between geometrical and wave optics on the one hand and classical mechanics and quantum mechanics on the other. One of its first applications was for the study of asymptotic properties of eigenvalues (eigenfunctions) of higher order elliptic operators. The completeness of the results obtained motivated the inclusion of a chapter on subelliptic operators. In addition to Fourier integral operators one needs a fair amount of symplectic geometry. The subjects have deep roots in classical mechanics but are now equally indispensable in the theory of linear differential operators. — *Contents*: Lagrangian distributions and Fourier integral operators. — Pseudo differential operators of principal type. — Subelliptic operators. — Uniqueness for the Cauchy problem. — Spectral asymptotics. — Long range scattering theory.

Thomas M. LIGGETT. — **Interacting particle systems.** — Grundlehren der mathematischen Wissenschaften, vol. 276. — Un vol. relié,  $16 \times 24$ , de xv, 488 p. — Prix: DM 196.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Interacting particle systems are certain Markov processes that serve as models for the temporal evolution of infinite systems of “particles” which interact with one another in prescribed ways. Situations which can be modeled using these systems occur in a large number of areas including statistical mechanics, neural networks, tumor growth, and the spread of infection. This book is intended as a reference for practitioners in the field, as well as for researchers in related areas such as mathematical physics and mathematical biology. — *Contents*: The construction, and other general results. — Some basic tools. — Spin systems. — Stochastic Ising models. — The voter model. — The contact process. — Nearest particle systems. — The exclusion process. — Linear systems with values in  $[0, \infty)$ .

Theodor BRÖCKER, Tammo tom Dieck. — **Representations of compact Lie groups.** — Graduate texts in mathematics, vol. 98. — Un vol. relié,  $16 \times 24$ , de x, 313 p. — Prix: DM 128.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book is an introduction to the representation theory of compact Lie groups, based on the original concept of Hermann Weyl. Although all aspects of finite dimensional Lie theory are treated, the emphasis throughout is on the groups themselves. The presentation is accordingly more geometric and analytic than algebraic. The central results, culminating with the Weyl character formula, are reached quickly and directly. They appear in forms suitable for applications in both physics and geometry. The classical groups, including the spinor groups, are presented explicitly and in detail. Each section contains a large number of exercises.

L. C. GROVE, C. T. BENSON. — **Finite reflection groups.** — Graduate texts in mathematics, vol. 99. — 2nd edition. — Un vol. relié,  $16 \times 24$ , de x, 133 p. — Prix: DM 78.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

The present book presents an account of the theory of finite reflection groups acting on euclidean space. This subject is of great interest to mathematicians as well as to scientists in several fields, notably physics, chemistry, and crystallography. The approach taken by this book is algebraic in nature, although the subject has a highly geometric flavor. In this second edition, a new section on the invariant theory of reflection groups has been added.

Michael J. BEESON. — **Foundations of constructive mathematics: metamathematical studies.** — Ergebnisse der Mathematik und ihrer Grenzgebiete. 3. Folge, vol. 6. — Un vol. relié, 17 × 25, de xxiii, 466 p. — Prix: DM 168.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

The background and results of a decade of research by logicians, mathematicians, computer scientists and philosophers are presented in this book. The subject is constructive mathematics — mathematics in which existence proofs are explicit — showing how to construct the object whose existence is proved. In the late sixties, it was discovered that far more mathematics can be made constructive than had been realized. At the same time, the computer's increasing influence intensified interest in algorithms in mathematics. In the seventies, logicians struggled to create formal axiomatic systems to account for constructive mathematics in a natural and elegant way. Several different approaches were found to be viable: constructive set theories, theories of rules and classifications, and constructive type theories. All of these theories are carefully analyzed and backed up with a good deal of historical background material.

Bruce C. BERNDT. — **Ramanujan's notebooks, Part I.** — Un vol. relié, 16 × 24, de x, 357 p. — Prix: DM 188.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Srinivasa Ramanujan is, arguably, the greatest mathematician that India has produced. He died very young at the age of 32, leaving behind three notebooks containing almost 3000 theorems virtually all without proof. This volume deals with chapters 1-9 of book II; each theorem is either proved, or a reference to a proof is given. — *Contents:* Magic squares. — Sums related to the harmonic series or the inverse tangent function. — Combinatorial analysis and series inversions. — Iterates of the exponential function and an ingenious formal technique. — Eulerian polynomials and numbers, Bernoulli numbers, and the Riemann zeta-function. — Ramanujan's theory of divergent series. — Sums of powers, Bernoulli numbers, and the gamma function. — Analogues of the gamma function. — Infinite series identities, transformations, and evaluations. — Ramanujan's quarterly reports.

A. N. TIKHONOV, A. B. VASIL'eva, A. G. SVESHNIKOV. — **Differential equations.** — Translated from the Russian by A. B. Sossinskij. — Springer series in Soviet mathematics. — Un vol. broché, 15,5 × 23,5, de viii, 238 p. — Prix: DM 98.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book acquaints the reader with various methods for numerically solving initial value as well as boundary value problems. It also introduces fundamental notions in the theory of numerical methods, such as the convergence of difference schemes, approximation, and stability. Practice-oriented problems are supplied, and singular disturbances are included in the chapter on asymptotic methods. This book is designed especially for students of applied mathematics, physics and engineering.

Klaus DEIMLING. — **Nonlinear functional analysis.** — Un vol. relié, 17 × 25, de xiv, 450 p. — Prix: DM 98.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Topological degree in finite dimensions. — Topological degree in infinite dimensions. — Monotone and accretive operators. — Implicit functions and problems at resonance. — Fixed point theory. — Solutions in cones. — Approximate solutions. — Multis. — Extremal problems. — Bifurcation. — Epilogue. — The theoretical parts are illustrated by many examples and models for problems in natural science involving various kinds of differential and integral equations. A large number of exercises are also included.

Jerrold MARSDEN, Alan WEINSTEIN. — **Calculus I.** — 2nd edition. — Undergraduate texts in mathematics. — Un vol. broché, 19 × 27, de xv, 385 p. — Prix: DM 69.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This is the second, substantially revised edition of a popular calculus text. This second edition will be published in three volumes. — *Contents of vol. I:* Orientation quizzes. — Review of fundamentals. — Derivatives and limits. — Rates of change and the chain rule. — Graphing and maximum-minimum problems. — The integral. — The trigonometric functions. — Exponentials and logarithms.

M. H. A. DAVIS. — **Lectures on stochastic control and nonlinear filtering.** — Tata institute of fundamental research lectures on mathematics, vol. 75. — Un vol. broché, 18 × 24, de iv, 109 p. — Prix: DM 20.00. — Bombay, Tata institute of fundamental research, Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

*Stochastic jump processes and applications:* *Stochastic jump processes:* Introduction. Martingale theory for jump processes. Some discontinuous Markov processes. *Optimal control of PD processes.* — *Filtering theory:* Introduction. Linear and nonlinear filtering equations. Pathwise solutions of differential equations. Pathwise solutions of the filtering equations.

John R. RICE, Ronald F. BOISVERT. — **Solving elliptic problems using ELLPACK.** — Springer series in computational mathematics, vol. 2. — Un vol. relié, 16 × 24, de x, 497 p. — Prix: DM 138.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book is a complete guide to the ELLPACK software system for solving elliptic partial differential equations. ELLPACK consists of a very-high-level user interface to over 50 problem-solving modules. These modules are state of the art software for two- and three dimensional problems, and include finite difference, finite element, FFT, multigrid, and many other methods. The book gives the practicing scientists the tools to solve a wide range of elliptic problems with minimum effort. The book also provides the system programmer with the information he needs to install and modify ELLPACK, and explains how the expert can add his own methods to the ELLPACK system.

**Vertex operators in mathematics and physics.** — Proceedings of a conference, November 10-17, 1983. — Edited by J. Lepowsky, S. Mandelstam, I. M. Singer. — Mathematical sciences research institute publications, vol. 3. — Un vol. relié, 16 × 24, de xiv, 482 p. — Prix: DM 98.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

From the preface: "In the last few years, interesting connections have been discovered between the affine Kac-Moody Lie algebras and the dual-string theory, through the use of vertex

operators. ... The present time is especially appropriate for such a conference, since the great current interest in Kac-Moody algebras coincides with a renewed interest in string models and their relation with supergravity... Some recently discovered symmetries of certain supergravity models appear to bear a striking resemblance to the affine Kac-Moody algebra related to the vertex function of the associated string model...”.

SRIVASTAVA, H. M. & KARLSSON, Per W. — **Multiple Gaussian hypergeometric series.** — Ellis Horwood series in mathematics and its applications. — 16 × 23,5, de 425 p. — Prix: £37.50. — Ellis Horwood Ltd., Chichester and Halsted Press, a div. of John Wiley and Sons, New York/Chichester/Brisbane/Toronto, 1985.

Two interesting problems in the theory of multiple Gaussian hypergeometric series consist in constructing all distinct series and in establishing their regions of convergence. Both problems are rather straightforward for single series and have been completely solved for double series. This book is the first to present a systematic discussion of the complexity of the problems when the dimension exceeds two. It also presents a discussion of several applications of many of the multiple hypergeometric series considered in the text.

Samuel KOTZ, Norman L. JOHNSON, editors-in-chief. — **Encyclopedia of statistical sciences, vol. 5:** Lindeberg condition to multitrait-multimethod matrices. — Un vol. relié, 18,5 × 26, de ix, 741 p. — Prix: £99.95. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1985.

Planned as a 9-volume set of some three million words, the “Encyclopedia of statistical sciences” aims to provide sound information and practical guidance for readers who may not be specialists in a particular topic. Its scope embraces agriculture, censuses, computers, demography, statistical mechanics, crystallography, zoology ... and scores of other disciplines that utilize statistics as a matter of course. No other source available provides such exhaustive coverage of the philosophical foundations, theoretical bases, and computational techniques of statistical methods in such a wide variety of contexts.

Walter LEDERMANN and Steven VAJDA, editors. — **Handbook of applicable mathematics, vol. 5, parts A and B: Combinatorics and geometry.** — 2 vol. reliés, 17,5 × 25, de XXXIII, 327 p. et XXXIII, p. 329-732. — Prix: £88.00 (6 volumes set: £220.00). — John Wiley and Sons, Chichester/Brisbane/New York/Toronto/Singapore, 1985.

*Part A: S. Wylie:* Elementary geometry and trigonometry. Solid geometry and spherical trigonometry. — *D. A. Quadling:* Curve sketching. — *G. H. Lawden:* Convexity. — *P. Hilton:* Topology. — *N. Christofides:* Graphs and networks. — *J. Foster and J. A. Lawrie:* Tensors. — *T. Poston:* Catastrophe theory. — *S. Vajda:* Finite spaces and combinatorial designs. — *D. Longothetti:* Projective geometry.

*Part B: G. Jones:* Symmetry. — *C. C. Hsiung & J. Foster:* Differential geometry. — *W. Ledermann:* Vectors. — *P. Hilton:* Analytic manifolds and Lie groups. — *E. K. Lloyd:* Enumeration. — *J. L. Massey:* Coding theory. — *B. Grünbaum:* Patterns.

Jack Carl KIEFER. — **Collected papers, vol. 1 and 2: “Statistical inference and probability”, vol. 3: “Design of experiments”.** — Published with the co-operation of the Institute of mathematical statistics, and edited by Lawrence D. Brown, Ingram Olkin, Jerome Sacks, Henry P. Wynn.

— Vol. 1 et 2: deux volumes reliés non disponibles séparément de XLVI, 1092 p. — Vol. 3: un vol. relié de XXV, 718 p. — Prix: vol. 1 et 2 ensemble: DM 278.00, pour le vol. 3: DM 128.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

These collected papers cover sequential analysis, nonparametric analysis, decision theory, multivariate analysis, inventory theory, stochastic processes, and design of experiments. They contain all of Jack Kiefer's scientific papers, with introductory essays by former students and colleagues and annotated commentaries of certain papers, tracing their historical impact and explaining their relation to subsequent work. The work reflects Kiefer's breadth of interest, but also the emphasis of his work on the design of experiments (vol. 3); otherwise, the edition is arranged chronologically.

Victor BRYANT. — **Metric spaces: iteration and application.** — Un vol. broché, 14 × 21,5, de VI, 104 p. — Prix: £4.95 (relié: £15.00). — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This introductory text on metric spaces is the first to be written for students who are as interested in the applications as in the theory. Knowledge of metric spaces is fundamental to understanding numerical methods as well as analysis, yet most books at this level emphasise just the abstraction and theory. The author uses applications to provide motivation and to sustain the development and discusses numerical procedures where appropriate.

Wilfrid HODGES. — **Building models by games.** — London mathematical society student texts, vol. 2. — Un vol. broché, 15,5 × 22,5, de VIII, 311 p. — Prix: £7.95 (relié: £25.00). — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This book introduces a general method for building infinite mathematical structures, and surveys its applications in algebra and model theory. The basic idea behind the method is to build a structure by a procedure with infinitely many steps, similar to a game between two players that goes on indefinitely. The approach is new and helps to simplify, motivate and unify a wide range of constructions that were previously carried out separately and ad hoc. There are over 160 exercises which range from elementary drill to research and which contain further information and examples.

Jean DIEUDONNE. — **History of algebraic geometry: an outline of the history and development of algebraic geometry.** — The Wadsworth mathematics series. — Un vol. relié, 16,5 × 24, de XII, 186 p. — Prix: \$32.95. — Wadsworth advanced books & software, a Division of Wadsworth, Inc., Monterey, California, 1985.

“History of algebraic geometry” consists of a translation of chapters I through VIII of volume 1 of the 1974 edition of “Cours de géométrie algébrique” and a revised chapter IX by Jean Dieudonné, which covers recent results and open problems. To facilitate the exposition, the history of algebraic geometry has been divided into seven epochs: ca. 400 B. C.-1630 A. D.: prehistory. — 1630-1795: exploration. — 1795-1850: the golden age of projective geometry. — 1850-1866: Riemann and birational geometry. — 1866-1920: development and chaos. — 1920-1950: New structures in algebraic geometry. — After 1950: sheaves and schemes.

**Numerical boundary value ODEs.** — Proceedings of an international workshop, Vancouver, Canada, July 10-13, 1984. — Edited by U. M. Ascher, R. D. Russell. — Progress in scientific computing, vol. 5. — Un vol. relié, 15,5 × 23, de XII, 317 p. — Prix: FS 78.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

This collection of refereed papers covers the significant recent advances in the study of numerical methods for two-point boundary value problems. The volume includes survey articles on singular perturbation problems. Some papers deal with fundamental issues such as conditioning of problems, while others are concerned with specific applications in fields such as combustion or semiconductor theory. They are treatments of particular classes of problems like functional differential equations, bifurcations, and singular perturbations.

**Richard DEDEKIND.** — **Vorlesung über Differential- und Integralrechnung, 1861/62.** — In einer Mitschrift von Heinrich Bechtold. — Im Auftrag der Deutschen Mathematiker-Vereinigung, herausgegeben von Winfried Scharlau. — Bearbeitet von Max-Albert Knus und Winfried Scharlau. — Dokumente zur Geschichte der Mathematik, Bd. 1. — Un vol. relié, 16,2 × 22,9, de XIV, 349 p. — Prix: DM 58.00. — Fried. Vieweg & Sohn, Braunschweig/Wiesbaden, 1985.

Die in diesem Band abgedruckte Vorlesung über Differential- und Integralrechnung wurde im 1861/62 von R. Dedekind an der damaligen eidgenössischen polytechnischen Schule in Zürich gehalten. Sie wandte sich an Ingenieure im ersten Studienjahr und unterschied sich in ihrem Aufbau kaum von den bis heute üblichen Vorlesungen. Insbesondere können die zahlreichen von Dedekind diskutierten Beispiele noch heute mit Gewinn studiert werden. Bekanntlich hat Dedekind kurz zuvor seine exakte arithmetische Begründung der reellen Zahlen gefunden und damit als erster die Analysis auf eine sichere Grundlage gestellt. Es ist historisch besonders interessant zu verfolgen, wie diese theoretischen Überlegungen in Aufbau und Gestaltung der Vorlesung einfließen.

**SAINT-MARTIN.** — **Problèmes résolus de mathématiques: examens de mathématiques générales A du CNAM.** — Un vol. broché, 15,5 × 24, de 250 p. — Dunod, Paris, 1985.

Recueil de problèmes donnés aux examens du Conservatoire national des arts et métiers, à Paris et en province, ainsi que dans les territoires et départements d'outre-mer, en 1983. Ces 55 problèmes résolus encourageront l'étudiant à s'entraîner.

**Jean-Pierre NOUGIER.** — **Méthodes de calcul numérique.** — 2<sup>e</sup> édition révisée et complétée. — Un vol. broché, 16 × 24, de 328 p. — Prix: FF 144.00. — Masson, Paris/New York/Barcelone/Milan/Mexico/Sao Paulo, 1985.

Ce livre n'est pas un ouvrage de mathématiques, ni même d'analyse numérique. C'est un outil à la disposition de tous les étudiants confrontés à des problèmes conduisant à des formulations mathématiques n'ayant pas de solution analytique, mais qui peuvent être résolus par voie numérique, soit à l'aide d'un ordinateur ou même d'une simple calculette. Les compléments portés à cette édition couvrent le conditionnement d'un système, les systèmes d'équations non linéaires, les méthodes de descente et les méthodes des résidus pondérés.

**Marie-Paule MALLIAVIN.** — **Algèbre commutative: applications en géométrie et théorie des nombres.** — Collection «Maîtrise de mathématiques pures». — Un vol. broché, 16 × 24, de

248 p. — Prix: FF 145.00. — Masson, Paris/New York/Barcelone/Milan/Mexico/Sao Paulo, 1985.

Anneaux de polynômes. — Idéaux premiers et localisation. — Anneaux factoriels-résultant. — Entiers algébriques. — Extensions de corps. — Théorème de l'élément primitif. Séparabilité. Norme et trace. — Correspondance de Galois et applications. — Corps ordonnés. — Anneaux noethériens. — Anneaux et modules gradués. Filtrations et complétions I-adiques. Anneaux de séries formelles. — Algèbres de type fini sur un corps algébriquement clos. — Valeurs absolues. — Complétion. — Prolongements de valeurs absolues. — Unités et classes dans les corps de nombres.

Ashot V. KAKOSYAN, Leo B. KLEBANOV and Joseph A. MELAMED. — **Characterization of distributions by the method of intensively monotone operators.** — Lecture notes in mathematics, vol. 1088. — Un vol. broché, 16,5 × 24,5, de x, 175 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

Intensively monotone operators and their properties. — Characterization problems associated with properties of linear statistics. — Characterization problems associated with nonlinear statistics and problems of reconstruction of distributions. — On some problems of characterization of distributions associated with mathematical theory of reliability. — Characterizations of multivariate distributions.

Claus Michael RINGEL. — **Tame algebras and integral quadratic forms.** — Lecture notes in mathematics, vol. 1099. — Un vol. broché, 16,5 × 24,5, de XIII, 376 p. — Prix: DM 51.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1984.

From the introduction: The aim of these notes is twofold. On the one hand, we want to give an introduction to some parts of the new representation theory of finite dimensional algebras as it has been developed by the joint effort of several mathematicians through the last 15 years. We will present several of the basic methods in a unified way. We try to give a full account for those results which are available not too easily, and we will review rather carefully also the remaining results which are needed. On the other hand, we also want to exhibit the structure of the module categories of an exceptional class of algebras which we call tubular.

**Stochastic aspects of classical and quantum systems.** — Proceedings of the 2nd French-German encounter in mathematics and physics, held in Marseille, France, March 28-April 1, 1983. — Edited by S. Albeverio, Ph. Combe and M. Sirugue-Colin. — Lecture notes in mathematics, vol. 1109. — Un vol. broché, 16,5 × 24,5, de IX, 227 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

14 exposés par: R. Azencott, H. Doss. — A. Badrikian. — F. Bentosela. — J. Bertrand, G. Rideau. — D. Dürr. — W. Kirsch. — Y. Levy. — R. Lima. — P. Moussa, D. Bessis. — P. Picco. — W. von Waldenfels. — V. Wihstutz. — S. Albeverio, Ph. Blanchard. — R. Hoegh-Krohn. — S. Albeverio, Ph. Blanchard, F. Gesztesy, L. Streit.

Ryszard JAJTE. — **Strong limit theorems in non-commutative probability.** — Lecture notes in mathematics, vol. 1110. — Un vol. broché, 16,5 × 24,5, de vi, 152 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Recently, fundamental pointwise convergence theorems in probability and ergodic theory have been extended to the operator context. The motivation for this is to be found in the mathe-

mathematical foundations of quantum statistical mechanics. The main objective of this book is to provide a self-contained exposition of the ideas and results in this area.

**Products of conjugacy classes in groups.** — Edited by Z. Arad and M. Herzog. — Lecture notes in mathematics, vol. 1112. — Un vol. broché, 16,5 × 24,5, de v, 244 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

*Z. Arad, M. Herzog and J. Stavi*: Powers and products of conjugacy classes in groups. — *S. Karni (under the supervision of Z. Arad)*: Covering numbers of groups of small order and sporadic groups. — *Y. Dvir (under the supervision of Z. Arad)*: Covering properties of permutation groups. — *Z. Arad, D. Chillag and G. Moran*: Groups with a small covering number.

Piotr ANTOSIK, Charles SWARTZ. — **Matrix methods in analysis.** — Lecture notes in mathematics, vol. 1113. — Un vol. broché, 16,5 × 24,5, de IV, 114 p. — Prix: DM 21.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Introduction. — Basic matrix results. —  $K$ -convergence. — The uniform boundedness principle. — Convergence of operators. — Bilinear maps and hypocontinuity. — Orlicz-Pettis theorems. — The Schnur and Phillips lemmas. — The Schnur lemma for bounded multiplier convergent series. — Imbedding  $c_0$  and  $l^\infty$ .

**Zahlentheoretische Analysis.** — Wiener Seminarberichte 1980-82. — Herausgegeben von Edmund Hlawka. — Lecture notes in mathematics, vol. 1114. — Un vol. broché, 16,5 × 24,5, de v, 157 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Under the direction of E. Hlawka a seminar on number-theoretical analysis was held at the University of Vienna (1980-81), and at the Technical University of Vienna (1981-82). Number-theoretical analysis includes the application of methods from analytic number theory to different fields of analysis and applied mathematics.

Stephan STOLZ. — **Hochzusammenhängende Mannigfaltigkeiten und ihre Ränder.** — Lecture notes in mathematics, vol. 1116. — Un vol. broché, 16,5 × 24,5, de XXIII, 134 p. — Prix: DM 26.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Gegenstand dieser Forschungsmonographie sind neue Resultate über hochzusammenhängende Mannigfaltigkeiten, die Ergebnisse von C. T. C. Wall aus den 60er Jahren verallgemeinern. In dieser Monographie werden die Probleme jedoch mit Hilfe homotopie-theoretischer Methoden behandelt, und zwar der Adams-Spektralsequenz und eines «Verschwindungs»-Satzes von M. Mahowald. Das Buch richtet sich an Leser, die an Problemen der Diffeomorphieklassifikation oder an interessanten Anwendungen der stabilen Homotopietheorie auf die Differentialtopologie interessiert sind.

**Recent mathematical methods in dynamic programming.** — Proceedings of the conference held in Rome, Italy, March 26-28, 1984. — Edited by I. Capuzzo Dolcetta, W. H. Fleming and T. Zolezzi. — Lecture notes in mathematics, vol. 1119. — Un vol. broché, 16,5 × 24,5, de VI, 202 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

*V. Barbu*: The time optimal control of variational inequalities. Dynamic programming and the maximum principle. — *A. Bensoussan*: Some singular perturbation problems arising in stochastic control. — *G. da Prato*: Some results on stationary Bellman equation in Hilbert spaces.

— *W. H. Fleming*: A stochastic control approach to some large deviations problems. — *C. Gomez, J. P. Quadrat, A. Sulem*: Towards an expert system in stochastic control. — *P. L. Lions*: Optimal control and viscosity solutions. — *J. L. Menaldi, M. Robin*: Some control problems of degenerate diffusions with unbounded cost. — *U. Mosco*: On some stochastic optimal impulse control problems. — *E. Rofman*: Approximation of Hamilton-Jacobi-Bellman equation in deterministic control theory. An application to energy production systems. — *R. Vinter*: Dynamic programming for optimal control problems with terminal constraints.

**Alois KUFNER.** — **Weighted Sobolev spaces.** — Un vol. relié, 16 × 23,5, de 115 p. — Prix: £15.00. — John Wiley & Sons, Chichester/New York/Brisbane/Toronto/Singapore, 1985.

Introduction. Motivation. Weight. Domain. Hardy inequality. — *Power-type weights*: Some elementary assertions. Density of smooth functions. Imbedding theorems. Miscellaneous. — *General weights*: Several elementary results. Density of smooth functions. Imbedding theorems. — *Applications*: Formulation of the problem. Power-type weights. General weights.

**Edgar M. PALMER.** — **Graphical evolution.** — Un vol. relié, 17 × 24, de xvii, 177 p. — Prix: £40.40. — John Wiley & Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1985.

*Introduction*: A little history. — *Probability models for graphs*: Models. Expectation. Properties of almost all graphs. — *Threshold functions*: A threshold for isolated vertices. A sharper threshold. Thresholds for existence. — *The evolution of random graphs*: The emerging forests. The double jump. Connectivity and beyond. — *Selected highlights*: The degree distribution. The chromatic number. The clique number. Strength of a theorem. Random functional digraphs and model *C*. — *Recent related results*: Generation. Random regular graphs. Random trees. — *Appendices*: Notation. Stirling's formula. Binomial coefficients. Binomial distribution. Probability theory. Relation between models *A* and *B*. Inclusion and exclusion. Graph theory.

**Stan WAGON.** — **The Banach-Tarski paradox.** — Encyclopedia of mathematics and its applications, vol. 24. — Un vol. relié, 17 × 24, de xvi, 251 p. — Prix: £25.00. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

The Banach-Tarski paradox is a striking mathematical construction: it asserts that a solid ball may be taken apart into finitely many pieces that can be rearranged using rigid motions to form a ball twice as large as the original. This book begins with an elementary exposition of the Banach-Tarski paradox that only requires familiarity with undergraduate mathematics. It goes on to explore the consequences of the paradox for measure theory and its connections with group theory, geometry and logic. It unifies the results of contemporary research on the paradox and presents several new results including some unusual paradoxes in hyperbolic space.

**Proceedings of the Rutgers group theory year, 1983-84.** — Edited by Michael Aschbacher, Daniel Gorenstein, Richard Lyons, Michael O'Nan, Charles Sims, Walter Feit. — Un vol. relié, 16 × 23,5, de viii, 415 p. — Prix: £25.00. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1984.

*From the preface*: «... The focus during the year was primarily on the following topics: Revision of the classification of the finite simple groups. — Development of the properties of the known simple groups, including properties needed for the classification, the structure of maximal subgroups, and representations. — Applications of the classification to finite group theory, number theory, and geometry. — Chamber systems and amalgams. — Computational algorithms for groups... The participants were asked to include in their articles... open questions and suggested problem areas...».

Harley FLANDERS. — **Calculus.** — Un vol. relié, 21 × 26, de XII, 1050 p. — Prix: £21.95.  
— W. H. Freeman and company Limited, Oxford/New York, 1985.

Functions and graphs. — The derivative. — Applications of differentiation. — Special functions. — Integration. — Techniques of integration. — Applications of integration. — Analytic geometry. — Numerical calculus. — Sequences and series. Power series. — Space geometry. — Vector functions. — Functions of several variables. — Surfaces and optimization. — Higher partial derivatives. — The double integral. — Multiple integrals. — Differential equations. — Answers to odd-numbered exercises.

Wieslaw SZLENK. — **An introduction to the theory of smooth dynamical systems.** — Un vol. relié, 16 × 23,5, de x, 369 p. — Prix: £29.50. — John Wiley & Sons, Chichester/New York/Brisbane/Toronto/Singapore, 1984.

This book is aimed at readers who are familiar with a standard undergraduate course of mathematics. It forms a short account of main ideas and results in the theory of smooth dynamical systems. The following topics are covered: dynamical systems on manifolds of one or two dimensions, generic properties, stability theory, invariant measures for differentiable dynamical systems and topological entropy. At the end of the book the reader will find a list of notes containing the definitions which are omitted in the text, together with brief explanatory remarks.

Abdul J. JERRI. — **Introduction to integral equations with applications.** — Pure and applied mathematics, vol. 93. — Un vol. relié, 15,5 × 23,5, de x, 254 p. — Prix: \$39.75 (U.S. and Canada) and \$47.50 (all other countries). — Marcel Dekker, Inc., New York/Basel, 1985.

This book offers detailed theoretical understanding of integral equations as well as a broad range of applications in such diverse areas as population dynamics, mechanics, and initial and boundary value problems. This text incorporates a full range of well-illustrated analytical and numerical examples, relevant exercises of varying difficulty, including answers as well as hints, and a final chapter containing proofs of the main results on linear and nonlinear integral equations.

**Rings of continuous functions.** — Edited by Charles E. Aull. — Lecture notes in pure and applied mathematics, vol. 95. — Un vol. broché, 18 × 25, de x, 318 p. — Prix: \$65.00 (U.S. and Canada) and \$78.00 (all other countries). — Marcel Dekker, Inc., New York/Basel, 1985.

This work is the first book in several years to review and update important developments in the study of rings of continuous functions. Integrating the recent efforts of leading mathematicians, this book presents chapters with varying emphasis on algebra, analysis, and general topology with particular focus on category theory, cardinality axioms, and set theory. Additionally historical perspectives and a review of early contributions by leading Soviet mathematicians such as P. S. Aleksandrov and A. N. Tychonov help provide a full, up-to-date understanding of current knowledge. Also, research problems raised in each chapter and in a special final chapter offer a way for further research, facilitated by more than 300 literature citations.

Laszlo FUCHS, Luigi SALCE. — **Modules over valuation domains.** — Lecture notes in pure and applied mathematics series, vol. 97. — Un vol. broché, 18 × 25, de XI, 317 p. — Prix: \$55.00 (U.S. and Canada), \$66.00 (all other countries). — Marcel Dekker, Inc. New York/Basel, 1985.

This book initiates a systematic, in depth study of modules over valuation domains. It introduces the theory of modules over commutative domains without finiteness conditions and examines frontiers of current research in modules over valuation domains. It represents an effort to combine ideas from abelian group theory, in a large scale with powerful techniques developed in module theory. This volume surveys the background material on valuation rings, modules and homological algebra... features new results for important classes of modules such as finitely generated, divisible, pure-injective, and projective dimension one... contains exercises and research problems, and provides historical notes, comments, and an extensive bibliography.

**E. RAMIS, C. DESCHAMPS, J. ODOUX.** — **Analyse: exercices avec solutions, vol. 2.** — Un vol. broché, 16 × 24 de 214 p. — Prix: FF 85.00. — Masson, Paris/New York/Barcelone/Milan/Mexico/Sao Paulo, 1985.

Le présent volume est le second d'une série d'exercices avec solutions développées qui s'adresse aux étudiants des classes préparatoires aux Grandes Ecoles Scientifiques et du premier cycle universitaire. Les objectifs d'un recueil de ce type sont: aider le lecteur à évaluer ses connaissances et à les mettre en œuvre: ceci implique aussi bien une réflexion sur la nature des concepts et une prise de conscience des limites de l'outil constitué par le cours, que la recherche d'une maîtrise des techniques de calcul. Sauf rares exceptions, les auteurs n'ont donné de chaque question qu'une solution, celle qui leur a paru s'exposer le plus brièvement ou offrir les plus larges prolongements; il ne s'agit pas d'une solution exhaustive et le lecteur aura toujours intérêt à poursuivre le plus loin possible sa propre démarche.

**Soo Bong CHAE.** — **Holomorphy and calculus in normed spaces.** — Monographs and textbooks in pure and applied mathematics, vol. 92. — Un vol. relié, 15,5 × 23,5, de XII, 421 p. — Prix: \$65.00 (U.S. and Canada), \$78.00 (all other countries). — Marcel Dekker, Inc., New York/Basel, 1985.

Taking recent achievements into account, this new volume provides a rudimentary knowledge of complex variables to the threshold of infinite dimensional holomorphy. It presents a systematic introduction to the theory of holomorphic mappings in normed spaces, using differential calculus in a modern setting to give coherence to this material. Numerous end-of-chapter exercises help reinforce the book's material and make it highly suitable for classroom use. Level: Advanced undergraduate and graduate mathematics students (prerequisites: introductory metric spaces or real analysis and complex analysis).

**Mathematical logic and formal systems: a collection of papers in honor of Professor Newton C. A. da Costa.** — Edited by Luiz Paulo de Alcantara. — Lecture notes in pure and applied mathematics, vol. 94. — Un vol. broché, 17,5 × 25, de XIV, 297 p. — Prix: \$59.75 (U.S. and Canada), \$71.50 (all other countries). — Marcel Dekker, Inc., New York/Basel, 1985.

This single-source reference explores practical applications as well as problems for further investigation into the field of mathematical logic and formal systems. This book discusses various interpretations of probability and its relationship to statistical methods; illustrates the problem of set theoretical foundations and category theory; treats various aspects of the theory of large cardinals including combinatorial properties of some sets naturally related to them; characterizes interpretations of elementary theories as functors between categories whose objects are structures; resolves an open problem in the theory of relations.

**Analysis, geometry, and probability.** — Proceedings of the first Chilean symposium on mathematics. — Edited by Rolando Chuaqui. — Lecture notes in pure and applied mathematics, vol. 96. — Un vol. broché, 17,5 × 25, de VIII, 274 p. — Prix: \$65.00 (U.S. and Canada), \$78.00 (all other countries). — Marcel Dekker, Inc., New York/Basel, 1985.

Featuring information published for the first time, this title reveals the results of the most recent mathematical advances in areas such as differential synthetic geometry, numerical solutions of differential equations, stochastic analysis, and group representations. This work contains foundational papers on infinitesimal calculus in differential synthetic geometry and probability, for quick reference on material previously scattered in many sources.

**Peter LINZ.** — **Analytical and numerical methods for Volterra equations.** — SIAM studies in applied mathematics, vol. 7. — Un vol. relié, 16 × 23,5, de XIII, 227 p. — Society for industrial and applied mathematics, Philadelphia, 1985.

*Theory:* Introduction. Some applications of Volterra equations. Linear Volterra equations of the second kind. Nonlinear equations of the second kind. Equations of the first kind. Convolution equations. — *Numerical methods:* The numerical solution of equations of the second kind. Product integration methods for equations of the second kind. Equations of the first kind with differentiable kernels. Equations of the Abel type. Integrodifferential equations. Some computer programs. Case studies.

**François S. CHAGHAGHI.** — **Time series package (TSPACK).** — Lecture notes in computer science, vol. 187. — Un vol. broché, 16,5 × 24, de III, 305 p. — Prix: DM 41.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

The Time Series Package is a library of 69 procedures, most of them independent of each other, some with several entries, mainly dealing with the treatment of data observed from the distribution of one or several variables in a given laps of time. Accessorily, it provides some useful tools for a few applications of numerical analysis, such as matrix manipulation, spline interpolation, data extraction and sorting. The main scope of TSPACK is to provide ready-made time series procedures to a large amount of researchers of various horizons. All TSPACK's procedures are written in standard FORTRAN 77.

**Arbeitstagung Bonn 1984.** — Proceedings of the meeting held by the Max-Planck-Institut für Mathematik, Bonn, June 15-22, 1984. — Edited by F. Hirzebruch, J. Schwermer and S. Suter. — Lecture notes in mathematics, vol. 1111. — Un vol. broché, 16,5 × 24, de v, 481 p. — Prix: DM 64.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

21 exposés par: A. Connes. — G. Harder, N. Schappacher. — J. Harris. — Y. Manin. — M. Atiyah. — H. O. Peitgen, P. H. Richter. — W. Schmid. — G. B. Segal. — Y.-T. Siu. — J. Tits. — D. Zagier. — M. Atiyah. — W. Ballmann. — R. Bryant. — S. S. Chern, R. S. Hamilton. — S. K. Donaldson. — G. Faltings. — G. van der Geer. — S. Lang. — H. C. Wente. — S. A. Wolpert. — *Aus dem Vorwort:* «... Die Arbeitstagung ist nicht ausschliesslich einem speziellen mathematischen Thema gewidmet, sondern es finden sich von der Zahlentheorie über die Topologie und Geometrie bis hin zur Analysis über die Jahre hinweg Beiträge aus fast allen Gebieten der Mathematik...».

D. J. ALDOUS, I. A. IBRAGIMOV, J. JACOD. — **Ecole d'été de probabilités de Saint-Flour XIII, 1983.** — Edité par P. L. Hennequin. — Lecture notes in mathematics, vol. 1117. — Un vol. broché, 16,5 × 24, de IX, 409 p. — Prix: DM 57.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

*D. J. Aldous:* Exchangeability and related topics. — *I. A. Ibragimov:* Théorèmes limites pour les marches aléatoires. — *J. Jacod:* Théorèmes limite pour les processus.

Krzysztof JAROSZ. — **Perturbations of Banach algebras.** — Lecture notes in mathematics, vol. 1120. — Un vol. broché, 16,5 × 24, de v, 118 p. — Prix: DM 21.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This research monograph is intended as an introduction to a theory that is still in its early stages of development. It is concerned with small deformations of the algebraic structure and “almost” isometric invariants in the theory of Banach algebras. The author considers function algebras, semisimple, commutative Banach algebras and operator algebras. Many of the results are valid for any Banach algebra.

**Singularities and constructive methods for their treatment.** — Proceedings of the conference held in Oberwolfach, West Germany, November 20-26, 1983. — Edited by P. Grisvard, W. Wendland and J. R. Whiteman. — Lecture notes in mathematics, vol. 1121. — Un vol. broché, 16,5 × 24, de IX, 346 p. — Prix: DM 51.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This Oberwolfach conference was attended by engineers and mathematicians whose common interest lay in the analysis and numerical solution of problems involving singularities. Many of the mathematical problems currently belong to the class of boundary value problems for elliptic partial differential equations with solutions having singularities due to geometric boundary irregularities or discontinuities of the differential or boundary operators.

**Number theory.** — Proceedings of the 4th Matscience conference held at Ootacamund, India, January 5-10, 1984. — Edited by K. Alladi. — Lecture notes in mathematics, vol. 1122. — Un vol. broché, 16,5 × 24, de VII, 217 p. — Prix: DM 31.50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

Paul Erdős was the principal guest of this 4th number theory conference conducted by Matscience, Madras. About 30 number theorists both from India and from abroad participated. Papers were presented in analytic number theory, probabilistic number theory, sieve methods, partitions and hypergeometric series, modular forms and L-series, and on arithmetical functions. Almost all papers included in the proceedings are research papers, few include surveys.

**Mathematical people: profiles and interviews.** — Edited by Donald J. Albers and G. L. Alexanderson. — Introduction by Philip J. Davis. — Un vol. relié, 21,5 × 28, de XVI, 372 p. — Prix: FS 68.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

The candid interviews and profiles of eminent mathematicians, teachers, and friends of mathematics collected in this volume provide an insight into the motives, philosophies, and talents that drive the creative process of the art and science of mathematics, which is so much a foundation and an expression of our culture. — *Contents:* Profiles and interviews of Garrett Birkhoff, David Blackwell, Shiing-shen Chern, John Horton Conway, H. S. M. Coxeter, Persi

Diaconis, Paul Erdős, Martin Gardner, Ronald L. Graham, Paul R. Halmos, Peter J. Hilton, John Kemeny, Morris Kline, Donald Knuth, Benoit Mandelbrot, Henry O. Pollak, George Polya, Mina Rees, Constance Reid, Herbert Robbins, Raymond Smullyan, Olga Taussky-Todd, Albert W. Tucker, Solomon Lefschetz, Stanislaw M. Ulam.

Ulrich KRENGEL. — **Ergodic theorems.** — With a supplement by Antoine Brunel. — De Gruyter studies in mathematics, vol. 6. — Un vol. relié, 17 × 24, de viii, 357 p. — Prix: DM 128.00. — Walter de Gruyter, Berlin/New York, 1985.

Ergodic theorems are convergence theorems for averages formed from stationary processes, Markov processes or general semigroups of operators. They play an important role in probability, functional analysis, theoretical physics, and the theory of dynamical systems. This monograph presents the first systematic study of the now rather broad spectrum of ergodic theorems. The book is written in such a way as to make it readily accessible to non specialists. It assumes only a few basic results from measure theory and functional analysis. Extensive notes at the end of each section provide a guide to a bibliography containing more than 1000 references.

Bernard HELFFER, Jean NOURIGAT. — **Hypoellipticité maximale pour des opérateurs polynomes de champs de vecteurs.** — Progress in mathematics, vol. 58. — Un vol. relié, 15 × 23, de ix, 278 p. — Prix: FS 72.00. — Birkhäuser, Basel/Boston/Stuttgart, 1985.

This volume provides comprehensive coverage of the field of maximal estimates for operators constructed from vector fields. Combining well-written exposition, carefully chosen notation, and an extensive bibliography with numerous new results which have not been previously published, this book is the sole source of material of interest to those working in linear partial differential equations and harmonic analysis of groups. Other applications extend to complex analysis of several variables. With one of the main conjectures on the field, formulated by the authors, the book is also a point of departure for major research.

**Delay equations, approximation and application.** — International symposium at the University of Mannheim, October 8-11, 1984. — Edited by G. Meinardus, G. Nürnberger. — International series of numerical mathematics, vol. 74. — Un vol. relié, 17 × 24, de 351 p. — Prix: FS 64.00. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1985.

This was the 1st meeting to explore the connection between delay equations and approximation theory. Special emphasis was placed on approximation problems arising in the numerical treatment of delay equations. Delay equations have their origin in domains of applications, such as physics, engineering, biology, medicine and economics. They appear in connection with the fundamental problem to analyse a retarded process from the real world, to develop a corresponding mathematical model and to determine the future behavior.

Walter GANDER. — **Computermathematik.** — Programm Praxis, Bd. 3. — Un vol. broché, 15 × 21, de 257 p. — Prix: FS 42.00. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1985.

Vorausgesetzt wird, dass der Leser bereits eine Programmiersprache kennt. Algorithmen werden entwickelt für nichtlineare Gleichungen, Polynome, Splinefunktionen, lineare Gleichungssysteme, Matrixoperationen, numerische Integration und mehrfachgenaues Rechnen. Mathematische Algorithmen sind komplizierte Formeln, welche hier in PASCAL dargestellt sind.

Ernst KUNZ. — **Introduction to commutative algebra and algebraic geometry.** — Translated by Michael Ackerman, with a preface by David Mumford. — Un vol. relié, 16 × 24, de ix, 238 p. — Prix: FS 86.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

This book is developed around the vital theme that certain areas of both subjects, commutative algebra and algebraic geometry, are best understood together. This link between the two subjects, forged in the 19th century, built further by Krull and Zariski, remains as active as ever. In this book the reader will find at the same time a leisurely and clear exposition of the basic definitions and results in both algebra and geometry, as well as an exposition of the important recent progress due to Quillen-Suslin, Evans-Eisenbud, Szpiro, Mohan Kumar and others. The ample exercises are another excellent feature.

Philip J. DAVIS, William G. CHINN. — **3.1416 and all that.** — Un vol. broché, 14 × 21,5, de ix, 188 p. — Prix: FS 34.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

Like it or not, our lives have become increasingly concerned with the manipulation of symbols. Mathematics is the natural language of symbols and this book is a captivating primer in that language. Basically an entertainment, this book also serves to show why mathematical thought is one of the great human achievements, and why the mathematicians' dream of an order that does not exist is an unending one.

Alan GIBBONS. — **Algorithmic graph theory.** — Un vol. broché, 15 × 23, de xii, 259 p. — Prix: £8.95 (relié: £27.50). — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

Although this textbook introduces most of the classical concepts of pure and applied graph theory (spanning trees, connectivity, genus, colourability, flows in networks, matchings and traversals) and covers many of the major classical theorems, the emphasis is on algorithms and their complexity: which graph problems have known efficient solutions and which are intractable. For the intractable problems a number of efficient approximation algorithms are included with known performance bounds. Informal use is made of a PASCAL-like programming language to describe the algorithms.

D. R. HUGHES and F. C. PIPER. — **Design theory.** — Un vol. relié, 16 × 23,5, de viii, 240 p. — Prix: £25.00. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This textbook is intended to be an accessible introduction for advanced undergraduates and beginning graduate students and to prepare them for research in design theory and its applications. — *Contents:* Basic concepts. — Symmetric designs. — Some families of symmetric designs. — 3-designs and related topics. — Resolutions. — Other 2-designs. — Some 1-designs. — The large Mathieu designs.

Nathan JACOBSON. — **Basic algebra I.** — 2nd edition. — Un vol. relié, 17,5 × 24, de xviii, 499 p. — Prix: £19.95. — W. H. Freeman and company, New York, 1985.

Introduction: concepts from set theory. The integers. — Monoids and groups. — Rings. — Modules over a principal ideal domain. — Galois theory of equations. — Real polynomial equations and inequalities. — Metric vector spaces and the classical groups. — Algebras over a field. — Lattices and Boolean algebras.

Gregory KARPILOVSKY. — **Projective representations of finite groups.** — Pure and applied mathematics, vol. 94. — Un vol. relié, 16 × 23,5, de XIII, 644 p. — Prix: \$107.50, (\$89.75: USA and Canada). — Marcel Dekker, Inc., New York/Basel, 1985.

This book presents the first systematic account of this topic, leading from the classical foundations to the most current advances and developments in the field. For the reader's convenience, this volume includes a discussion of algebraic preliminaries and other topics necessary for understanding the ideas and theories presented later in the book. An extensive bibliography leads readers to books and articles for further study.

Robert E. ODEH, D. B. OWEN. — **Attribute sampling plans, tables of tests and confidence limits for proportions.** — Statistics: textbooks and monographs series, vol. 49. — Un vol. relié, 18,5 × 26, de XI, 368 p. — Prix: FS 189.00. — Marcel Dekker, Inc., New York/Basel, 1983.

This book gives the competitive edge to industrial statisticians—especially those working with acceptance sampling; quality control, reliability, and nondestructive testing chemists, engineers and managers; operations researchers; biometrists; and all researchers concerned with comparing or setting confidence limits on proportions. Moreover, the volume serves as an excellent supplement to graduate-level statistics courses emphasizing quality control and analytical chemistry courses dealing with statistical treatment of data.

R. GITTINS. — **Canonical analysis: a review with applications in ecology.** — Biomathematics, vol. 12. — Un vol. relié, 17 × 25, de XVI, 351 p. — Prix: DM 128.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

The aims of the book are to raise issues encountered in investigating relationships between variables of different kinds so as to encourage interaction between statisticians and ecologists, and to clarify the extent to which canonical analysis can contribute towards the solution of research questions in ecology and other fields.

**Cohort analysis in social research: beyond the identification problem.** — Edited by William M. Mason, Stephen E. Fienberg. — Un vol. relié, 16 × 24, de VIII, 400 p. — Prix: DM 138.00. — Springer-Verlag, New York/Berlin/Heidelberg/Tokyo, 1985.

From the preface: "The existence of the present volume can be traced to methodological concerns about cohort analysis, all of which were evident throughout most of the social sciences by the late 1970s... an interdisciplinary conference on cohort analysis was held in the summer of 1979, in Snowmass, Colorado. Much of the work presented here stems from that conference, the purpose of which was to promote the development of general methodological tools for the study of social change".

**Low dimensional topology.** — Edited by Roger Fenn. — London mathematical society lecture note series, vol. 95. — Un vol. broché, 15 × 22,5, de XII, 258 p. — Prix: £13.95. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This volume contains papers based on talks given at the Isle of Thorns conference on low dimensional topology held in 1982. *M. Boileau*: Noeuds rigidement inversables. — *F. Bonahon* and *L. Siebenmann*: The classification of Seifert fibred 3-orbifolds. — *H. Morton*: Exchangeable braids. — *K. Murasugi*: Nilpotent coverings of links and Milnor's invariant. — *J. P. Otal*: Présentations en ponts des noeuds rationnels. — *D. Rolfsen*: Piecewise linear I-

equivalence of links. — *H. Short*: Some closed incompressible surfaces in knot complements which survive surgery. — *B. Wicha-Krause*: Simple elements of  $\pi_1(M^3, x_0)$ . — *H. Zieschang*: A note on the mapping class group of surfaces and planar discontinuous groups. — *B. Zimmermann*: Zur Klassifikation höherdimensionaler Seifertscher Faserräume.

**Surveys in combinatorics 1985.** — Invited papers for the tenth British combinatorial conference. — Edited by Ian Anderson. — London mathematical society lecture note series, vol. 103. — Un vol. broché, 15 × 22,5, de vi, 173 p. — Prix: £11.95. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

*G. E. Andrews*: Combinatorics and Ramanujan's "lost" notebook. — *J. Beck*: Irregularities of distribution and combinatorics. — *H. J. Beker*: Adaptive algorithms for communications. — *G. R. Grimmett*: Random flows: network flows and electrical flows through random media. — *A. J. Hoffman*: On greedy algorithms that succeed. — *J. H. Van Lint*: {0, 1\*} distance problems in combinatorics. — *C. St. J. A. Nash-Williams*: Detachments of graphs and generalised Euler trails. — *N. Robertson and P. D. Seymour*: Graph minors: a survey.

**Ivan ERDELYI.** — **A local spectral theory for closed operators.** — London mathematical society lecture note series, vol. 105. — Un vol. broché, 15 × 22,5, de viii, 178 p. — Prix: £12.50. — Cambridge university press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This book, which is almost entirely devoted to unbounded operators, gives a unified treatment of the contemporary local spectral theory for unbounded closed operators on a complex Banach space. While the main part of the book is original, necessary background material is provided. There are some completely new topics treated, such as the complete spectral duality theory with the first comprehensive proof of the predual theorem, in two different versions.

**H. O. FATTORINI.** — **Second order linear differential equations in Banach spaces.** — North-Holland mathematics studies, vol. 108. — Notas de matematica, vol. 99. — Un vol. broché, 16,5 × 24, de xiii, 314 p. — Prix: Dfl. 110.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

Second order differential equations in Banach spaces can be used for modelling such second order equations of mathematical physics as the wave equation, the Klein-Gordon equation, *et al.* In this way, a unified treatment can be given of subjects such as growth of solutions, singular perturbations of parabolic, hyperbolic and Schrödinger type initial value problems, and the like. This book covers in detail these subjects, as well as the applications to each specific problem.

**Aleksandar IVIC.** — **The Riemann zeta-function:** the theory of the Riemann zeta-function with applications. — Un vol. relié, 16,5 × 24, de xvi, 517 p. — Prix: £57.80. — John Wiley and Sons, New York/Chichester/Brisbane/Toronto/Singapore, 1985.

Elementary theory. — Exponential integrals and exponential sums. — The Voronoi summation formula. — The approximate functional equations. — The fourth power moment. — The zero-free region. — Mean value estimates over short intervals. — Higher power moments. — Omega results. — Zeros on the critical line. — Zero-density estimates. — The distribution of primes. — The Dirichlet divisor problem. — Various other divisor problems. — Atkinson's formula for the mean square.

**Time series analysis: theory and practice 6:** hydrological, geophysical and spatial applications. — Proceedings of the international conference held at Toronto, Canada, 10-14 August 1983. — Edited by O. D. Anderson, J. K. Ord and E. A. Robinson. — Un vol. relié, 15,5 × 23, de VIII, 308 p. — Prix: Dfl. 160.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

The book is divided into three interrelated sections, each of five contributions. First, the Hydrological papers, which cover a variety of topics of current interest. Then, in the Geophysical papers section, the analytical methods of geophysics are linked with statistical ideas of time series analysis in order to explain how one processes data associated with geophysical surveys. The final section is devoted to modelling spatial and spatio-temporal processes. A general overview is provided for processes that are stationary in both time and space.

**Time series analysis: theory and practice 7.** — Proceedings of the (general interest) international conference held at Toronto, Canada, 18-21 August 1983. — Edited by O. D. Anderson. — Un vol. relié, 16 × 23,5, de x, 312 p. — Prix: Dfl. 160.00. — North-Holland, Amsterdam/New York/Oxford, 1985.

This refereed collection of 26 papers has a bias towards application, especially in economics, and to advanced time domain modelling. The topics covered include: accountancy and finance, causality, computer packages, developments in univariate analysis, econometric case studies, forecasting examples and methodology, missing observations, multivariate modelling, nonlinear models, nonstationarity, psychophysical applications, seasonality, telecommunications, and wind engineering.

**Limit theorems in probability and statistics, vol. 1 et 2.** — Edited by P. Révész. — Colloquia mathematica Societatis Janos Bolyai, vol. 36. — 2 vol. relié, 18 × 24,5, de 1168 p. (en 2 vol.). — Prix: Dfl. 375.00 (les 2 vol.). — North-Holland, Amsterdam/Oxford/New York, 1984.

The Colloquium on limit theorems in probability and statistics in Veszprem, 1982, the second of this kind in Hungary, was an occasion for exchanging ideas on the subject. This volume is the proceedings of this colloquium and reflects the developments on a wide range of current research in the topic. Major subjects discussed are: invariance principle (both independent and dependent case), curve estimation, Edgeworth expansions, limit theorems for order statistics, rank statistics and quantiles, limit theorems for stochastic processes, extreme values, local times, and statistical physics.

**Finite and infinite sets, vol. 1 and 2.** — Ed. by A. Hajnal, L. Lovasz and V. T. Sos. — Colloquia mathematica societatis Janos Bolyai, 37. — 2 vol. reliés, 18 × 24,5, de 902 p. en 2 vol. — Prix: Dfl. 350.00. — North-Holland, Amsterdam/Oxford/New York, 1984.

The 6th Hungarian combinatorial colloquium was held at Eger, in July 1981. The colloquium was attended by 170 mathematicians. These proceedings volumes contain the detailed version of most of the papers presented and some others which were presented later. The 62 referred papers cover various branches of graph theory, matroid theory, combinatorial set theory, designs, and various applications of combinatorics.

**Group representations and systems of differential equations.** — Proceedings of a symposium held at University of Tokyo, Dec. 20-27, 1982. — Ed. by K. Okamoto. — Advanced studies in pure mathematics, vol. 4. — Un vol. relié, 15,5 × 24, de 497 p. — Prix: Dfl. 360.00. — North-Holland publ. co., Amsterdam/New York/Oxford, 1985.

This collection of invited papers was presented at the University of Tokyo. The results of research into various topics in group representations and systems of differential equations are presented.

**Algebraic groups and related topics.** — Proceedings of a symposia held in Kyoto, Sept. 5-7, 1983 and Nagoya, Oct. 11-14, 1983. — Ed. by R. Hotta. — Advanced studies in pure mathematics, vol. 6. — Un vol. relié, 15,5 × 24, de 543 p. — Prix: Dfl. 390.00. — North-Holland publ. co., Amsterdam/New York/Oxford, 1985.

The papers contributed to this volume are related to the following two symposia: "Algebraic groups and related topics" held at the Research institute for mathematical science, Kyoto university and "Invariants and geometry" held at Nagoya university. Most of the contributors were speakers of one of the above symposia. The editors, however, found it desirable to invite some non-speakers who contributed additional papers on the above-mentioned subjects.

William L. BURKE. — **Applied differential geometry.** — Un vol. broché, 15 × 23, de xvii, 414 p. — Prix: £15.00. — Cambridge univ. press, Cambridge/London/New York/New Rochelle/Melbourne/Sydney, 1985.

This is a self-contained introductory textbook on the calculus of differential forms and modern differential geometry. Because the intended audience is physicists, the author emphasizes applications and geometrical reasoning in order to give the results and concepts a precise but intuitive meaning without getting bogged down in analysis. Mathematical topics covered include differentiable manifolds, differential forms and twisted forms, the Hodge star operator, exterior differential systems, and symplectic geometry.

**Progress and supercomputing in computational fluid dynamics.** — Proceedings of US-Israel workshop, 1984. — Ed. by A. M. Murman and S. S. Abarbanel. — Progress in scientific computing, vol. 6. — Un vol. relié, 15,5 × 23, de ix, 403 p. — Prix: SFr. 90.00. — Birkhäuser, Boston/Basel/Stuttgart, 1985.

This volume consists of papers presented at a US-Israel binational workshop held in Jerusalem, Israel in December 1984. Leading CFD researchers gathered to consider the "impact of supercomputers on the next decade of CFD". Contributions cover the capabilities of coming supercomputers, experiences with present generation supercomputers, algorithms and computations for the Euler and Navier-Stokes equations, issues regarding computation of turbulent flows, and applied mathematics topics.

Alain ROBERT. — **Analyse non standard.** — Un vol. broché, 16 × 24, de xvii, 118 p. — Prix: SFr. 42.00. — Presses polytechniques romandes, Lausanne, 1985.

Ce livre expose de façon didactique l'approche de Nelson de la théorie de l'analyse non standard. Des exercices sont proposés, puis des indications et finalement des solutions complètes permettant de vérifier l'assimilation de ces notions nouvelles. La première partie introduit les concepts à leur départ en essayant de donner un support intuitif au qualificatif "standard". La deuxième partie sélectionne quelques applications qui montrent l'originalité et la puissance de cette théorie.

**Chaos, fractals and dynamics.** — Ed. by P. Fischer, and W. R. Smith. — Un vol. broché, 17,5 × 25, de viii, 261 p. — Prix: US\$71.50. — Marcel Dekker, New York/Basel, 1985.

Integrating the work of leading mathematicians, physicists, chemists and engineers, this monograph discusses different aspects of the concepts of chaos and fractals from both experimental and theoretical points of view.

H. RUBIN and J. E. RUBIN. — **Equivalents of the axiom of choice, II.** — Studies in logic and the foundations of mathematics, vol. 116. — Un vol. relié, 15,5 × 23, de xxviii, 322 p. — Prix: Dfl. 140.00. — North-Holland publ. co., Amsterdam/New York/Oxford, 1985.

This is a new edition of the authors' work published in 1963. Many new equivalents have been discovered since then, a new section was added to include forms in logic, analysis and topology. Another new section was added for those forms which are equivalent to the axiom of choice only under the axioms of extensionability and foundation. In addition, new forms were added to the other sections.

V. A. DUBOVITSKIJ. — **The Ulam problem of optimal motion of line segments.** — Translation series in mathematics and engineering. — Un vol. relié, 17 × 24, de xiii, 113 p. — Prix: DM 108.00. — Optimization software, Inc. publications division, New York, distributed by Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

In this book, V. A. Dubovitskij has succeeded in solving in closed form, using the Dubovitsky-Milyutin theory, a generalization of a problem of Stanislaw Ulam, which stated succinctly is: among all continuous motions of an oriented line segment  $S$  in  $E^n$  from one position to another, which preserves its length and for which the endpoints of  $S$  lie on prescribed surfaces, find one for which the sum of the lengths of the paths swept by its endpoints is minimal.

Jean MOULIN OLLAGNIER. — **Ergodic theory and statistical mechanics.** — Lecture notes in mathematics, vol. 1115. — Un vol. broché, 16,5 × 24, de vi, 147 p. — Prix: DM 26,50. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book deals with topological and measure theoretic dynamical systems in particular with the symbolic systems of statistical mechanics. *Contents:* Dynamical systems and amenable groups. — Ergodic theorems. — Entropy of abstract dynamical systems. — Entropy as a function and the variational principle. — Statistical mechanics on a lattice. — Dynamical systems in statistical mechanics. — Equivalence of countable amenable groups.

**Grossissements de filtrations: exemples et applications.** — Séminaire de calcul stochastique 1982/83, Université Paris VI. — Edité par Th. Jeulin et M. Yor. — Lecture notes in mathematics, vol. 1118. — Un vol. broché, 16,5 × 24, de v, 315 p. — Prix: DM 45.00. — Springer-Verlag, Berlin/Heidelberg/New York/Tokyo, 1985.

This book contains further developments of the theory of enlargement of filtrations and its applications as developed between 1978 and 1980 by T. Jeulin. The main topics are: the existence of a new absolute continuity criterion under which enlargement techniques are applicable; a complete study of the enlargement of the Brownian filtrations with an arbitrary Gaussian subspace; a proof of the Ray-Knight—Perkins theorem on Brownian local times, using various enlargements of the filtrations of Brownian excursions; an extension of Burkholder-Gundy inequalities for Brownian motion stopped at an arbitrary random time; a study of the relationship, in some particular cases, between the enlargement of a filtration and the notions of entropy and information.