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Henri LEBESQUE. — **La mesure des grandeurs.** — Un vol. broché, de 184 p. — Prix: FF 30.00. — Librairie scientifique et technique, Albert Blanchard, Paris, 1975. (Nouveau tirage).

*Comparaison des collections. Nombres entiers. — Longueurs. Nombres:* Passage du nombre entier au nombre le plus général. Opérations. Critique pédagogique. Les fractions. Distance et rapports de longueurs. — *Aires planes:* Premier exposé: Méthode du réseau de carrés. Conditions déterminant les aires considérées. Deuxième exposé pour les polygones. Troisième exposé pour les polygones (méthode des arpenteurs). Quatrième exposé: Equivalences finies. Le rôle du nombre. Remarques pédagogiques. Aires limitées par des arcs de cercles. Domaines plus généraux. — *Volumes:* Première méthode: Réseau de cubes. Quatre remarques simplificatrices. Deuxième et troisième méthodes pour les polyèdres: Premier exposé et théorème des projections pour les aires. Deuxième et troisième exposés. Remarques pédagogiques. Corps ronds. Le nombre et le calcul. Critique pédagogique d'un exposé de calcul intégral. Remarque sur les calculs de sommes de carrés et de cubes d'entiers. — *Longueur des courbes. Aires des surfaces gauches:* Préliminaires et historique. Réduction à l'algèbre (Cauchy). Limites de lignes polygonales et de figures polyédrales. Raccord entre les notions physiques et les définitions analytiques. Premier exposé: La longueur d'une courbe. L'aire d'une surface gauche. Critique. Deuxième exposé: Longueur des courbes planes. Longueur des courbes gauches. Aire d'une surface. Traduction analytique. Conclusions. — *Grandeurs mesurables:* Préliminaires. Définition d'une grandeur attachée à une famille de corps. Remarques. Grandeurs proportionnelles. Application au théorème d'A. Girard. Nombres proportionnels à plusieurs autres; critique des énoncés classiques. — *Intégration et dérivation:* Préliminaires. Grandeurs (fonctions de corps) et nombres dérivés (fonctions de point). Rappel d'éléments de géométrie à  $k$  dimensions. Définition des domaines quarrables d'ordre  $k$ . Fonctions des domaines quarrables. Dérivation. Intégration. Procédé de calcul: intégrales multiples. Changement de variables dans le calcul intégral. Orientation des domaines. Nouvelle définition de l'intégrale. Application: Formule de Green. Généralisation des notions de longueurs et d'aires. — *Conclusions:* Science et philosophie. Le rôle du professeur de mathématiques. L'esprit de critique logique et pédagogique.

GÖTZ UEBE. — **Produktionstheorie.** — Unter Mitwirkung von Joachim Fischer. — Lecture notes in economics and mathematical systems, vol. 114. — Un vol. broché,  $16,5 \times 24$ , de xvii, 301 p., avec figures. — Prix: DM 28.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Einige Beispiele zur Wichtigkeit der Produktionstheorie. — Die zentrale Programmierungsaufgabe der Produktionstheorie. — Definitionen. — Konturlinien. — Homogenität.

— Die CES-Familie von Produktionsfunktionen. — Das Produktionsproblem als ein Problem der Mathematischen Programmierung. — Die Mittelwertbildung als ein Produktionsproblem. — Die Konstruktion von Produktionsfunktionen aus elementaren Eigenschaften. — Die Parallelität zwischen Produktionstheorie und Konsumtheorie.

E. BLUM, W. OETTLI. — **Mathematische Optimierung.** — Grundlagen und Verfahren. — Ökonometrie und Unternehmensforschung *Econometrics and Operations Research*, vol. 20. — Un vol. relié, 17,5 × 25, de ix, 413 p., avec figures. — Prix: DM 148.00. — Springer Verlag, Berlin/Heidelberg/New York, 1975.

*Mathematische Programme*: Problemstellung und Definitionen. Sonderfälle. Konvexe Programme. Umformungen von Programmen. — *Lineare Programmierung*: Allgemeines. Die Dualitätstheorie der linearen Programmierung. Das Simplexverfahren. Die Tableaudarstellung des Simplexverfahrens. Die Bestimmung einer zulässigen Startbasis. Degenerierte Programme. Der primal-duale Algorithmus. Der Dekompositionsalgorithmus. Das „Max-Flow/Min-Cut“-Theorem. — *Optimalitätsbedingungen*: Allgemeines. Optimalitätsbedingungen ohne Verwendung der Lagrange-Funktion. Optimalitätsbedingungen, die die Lagrange-Funktion verwenden: Grundlegende Begriffe. Optimalitätsbedingungen ohne Differenzierbarkeitsvoraussetzungen (unter Verwendung der Lagrange-Funktion). Optimalitätsbedingungen für Programme mit differenzierbaren Funktionen (unter Verwendung der Lagrange-Funktion). Optimalitätsbedingungen für Programme mit unendlich vielen Restriktionen. Anwendungsbeispiele zu den Optimalitätsbedingungen. Optimalitätsbedingungen für Programme mit Linearen Restriktionen. — *Dualitätstheorie*: Einleitung. Die Theorie von Dantzig, Eisenberg und Cottle. Die Dualitätstheorie von Stoer. Dualitätstheorie für homogene Programme. Die Dualitätstheorie von Frenchel und Rockafellar. Semi-infinite Programme. — *Optimierung ohne Restriktionen*: Gradientenverfahren erster Ordnung. Die Verfahren der konjugierten Richtungen. Das Newton-Verfahren. Die Minimierung einer Funktion auf einem Intervall. — *Projektions- und Kontraktionsverfahren*: Einleitung. Das Verfahren von Uzawa. Fejér-Kontraktionen. — *Einzelschrittverfahren*: Das zyklische Einzelschrittverfahren. Einzelschrittverfahren mit beliebiger Ordnung. Anwendung auf duale Probleme. Der quadratische Fall. — *Schnittverfahren*: Das allgemeine Modell. Das Schnittverfahren bei streng konvexer Zielfunktion. Der Austauschalgorithmus für lineare Programme mit unendlich vielen Restriktionen. Minimierung einer konvexen Funktion auf einem konvexen Grundbereich. Anwendung auf duale Probleme. — *Dekompositionsverfahren*: Hilfsmittel. Das symmetrische Dekompositionsverfahren. Das primale Dekompositionsverfahren. Varianten des primalen Dekompositionsverfahrens. — *Strafkostenverfahren*: Einleitung. Der allgemeine Fall. Der konvexe Fall. Das Verfahren SUMT (Sequential Unconstrained Minimization Technique). — *Verfahren der zulässigen Richtungen*: Hilfsmittel. Das Verfahren I: Lineare Approximationen. Das Verfahren II: Konvexe Approximationen. — *Das Verfahren der projizierten Gradienten*: Hilfsmittel. Das Verfahren. — *Die Verfahren von Zangwill und Dantzig-Cottle*: Der konvexe Fall. Der quadratische Fall. — *Das Verfahren von Beale*: Beschreibung des Verfahrens. Die Konvergenz des Verfahrens. Tableaudarstellung des Verfahrens.

Yudell L. LUKE. — **Mathematical functions and their approximations.** — Un vol. relié, 15,5 × 23,5, de xvii, 568 p. — Prix: \$14.50. — Academic Press, Inc., New York/San Francisco/London, 1975.

“An updated version of part of *Handbook of mathematical functions with formulas, graphs and mathematical tables* edited by M. Abramowitz and I. A. Stegun.”

The gamma function and related functions. — The binomial function — Elementary functions. — Incomplete gamma functions. — The generalized hypergeometric function  ${}_pF_q$  and the  $G$ -function. — The Gaussian hypergeometric function  ${}_2F_1$ . — The confluent hypergeometric function. — Identification of the  ${}_pF_q$  and  $G$ -functions with the special functions. — Bessel functions and their integrals. — Lommel functions, Struve functions, and associated Bessel functions. — Orthogonal polynomials. — Computation by use of recurrence formulas. — Some aspects of rational and polynomial approximations. — Miscellaneous topics.

**The theory of numbers.** — Edited by Shokichi Iyanaga, Tokyo. — Translated by K. Iyanaga. — North Holland mathematical library, vol. 8. — Un vol. relié, 15 × 22, de xi, 541 p. — Prix: Dfl 130.00. — North Holland/American Elsevier, Amsterdam/Oxford/New York, 1975.

*Cohomology of groups*: Tensor products and groups of homomorphisms. Homology and cohomology. Inhomogeneous complexes  $\mathcal{C}(g)$ . Subgroups and related cohomology groups. Tensor products and cup products. Cohomology theory of finite groups. Cohomology theory of cyclic groups. Tate's theorem and Galois cohomology. — *Valuation theory*: Valuations of fields. Complete fields. Archimedean valuations. Non-Archimedean valuations I. Non-Archimedean valuations II. Hilbert's theory. Discriminants and differentials (local cases). The differential of formal power series. — *Adele rings and idele groups*: Locally compact groups. Locally compact rings. Local fields. Adele and idele. Extensions of the base fields. The structure of adèle rings. The structure of idele groups. — *The main theorems of class field theory*: Cyclotomic fields. Kummer fields. Power residue symbols and Hilbert norm residue symbols. Quadratic number fields and the reciprocity laws for quadratic residues. Artin-Schreier fields. The theory of infinite Galois extensions. Main theorems of class field theory. — *Proofs of the main theorems*: Local cases. Proofs of the conductor theorems. The first inequality. The second inequality and the existence theorem. The reciprocity law. Weil groups. — *Ideal theory*: Ideals in a Dedekind domain. Discriminants and differentials (global cases). Artin-Whaples' theory. — *History of class field theory*: From Euclid to Hilbert. Takagi and Artin's class field theory. The development of the theory after Takagi and Artin.

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Contient 12 exposés par: G. Anger, und B.-W. Schulze. — A. V. Balakrishnan. — H. Beckert. — R. Klötzler. — J. Kolomý. — G. Lassner. — J. Leiterer. — J. Nečas. — D. Przeworska-Rolewicz. — S. Rolewicz. — 2 exposés en russe.

Waclaw SIERPINSKI. — **Œuvres choisies.** — Tome III, Théorie des ensembles et ses applications, travaux des années 1930-1966. — Publié par les soins de: Stanislaw Hartman, Kazimierz Kuratowski, Edward Marczewski, Andrzej Mostowski et Andrzej Schinzel. — Un vol. relié, 17 × 24,5, de 685 p. — PWN-Editions scientifiques de Pologne, Warszawa, 1976.

126 articles sur la théorie des ensembles et ses applications, publiés entre 1934 et 1966.

**$\lambda$ -Calculus and computer science theory.** — Proceedings of the symposium held in Rome, March 25-27, 1975. — Lecture notes in computer science, vol. 37. — Ed. by C. Böhm. — Un vol. broché, 16,5 × 24, de XII, 370 p. — Prix: DM 32.00. — Springer Verlag, Berlin/Heidelberg/New York, 1975.

Contient 21 exposés par: D. Scott. — J. W. de Bakker. — R. Nakajima. — J. M. E. Hyland. — C. Böhm, M. Dezani-Ciancaglini — P. H. Welch. — J.-J. Levy. — L. Nolin. — G. Ausiello. — G. Huet. — G. Jacopini. — H. Egli. — L. Aiello, M. Aiello. — R. de Vrijer. — H. Barandregt. — M. Venturini Zilli. — C. Batini, A. Pettorossi. — V. Yu. Sazonov. — A. Dubinsky. — J. W. Klop. — D. Scott.

**Proceedings of the ICMI (International Commission on Mathematical Instruction) — IDM (Institut für Didaktik der Mathematik) regional conference on the teaching of geometry, Bielefeld, 16-20 September, 1974.** — Bericht über die IMUK — IDM Regionaltagung zu Fragen des Geometrie-Unterrichts. — Herausgegeben von H. Bauersfeld, M. Otte, H. G. Steiner. — Schriftenreihe des IDM, vol. 3. — Un vol. broché, 16,5 × 24, de XIV, 307 p. — Universität Bielefeld, Institut für Didaktik der Mathematik, Bielefeld, 1974.

14 exposés par: H.-J. Vollrath. — W. Servais. — R. Stowasser. — G. Pickert. — H. Freudenthal. — A. J. Bishop. — S. Iyanaga. — G. Ewald. — T. J. Fletcher. — G. Glaeser. — J. Vysin. — H. G. Steiner und B. Winkelmann.

**Theory and application of special functions.** — Edited by Richard A. Askey. — Proceedings of an advanced seminar, sponsored by the Mathematics Research Center, the University of Wisconsin-Madison, March 31-April 2, 1975. — Publication No. 35, of the Mathematics Research Center, the University of Wisconsin. — Un vol. relié, 16 × 23,5, de XI, 560 p. — Prix: \$20.00. — Academic Press, New York/San Francisco/London, 1975.

Contient 13 exposés par: Walter Gautschi. — F. W. J. Olver. — Bruce C. Berndt. — George E. Andrews. — N. J. A. Sloane. — S. Karlin and J. McGregor. — K. M. Case. — Willard Miller, Jr. — L. Durand. — George Gasper. — Tom Koornwinder. — Alan T. James.

Frank CHORLTON. — **Vector and tensor methods.** — Mathematics and its applications. — Un vol. relié, 16 × 23, de 332 p. — Prix: \$17.60. — John Wiley & Sons Inc., New York/London/Sydney/Toronto, 1976.

Part I: *Basic vector analysis*: Elements of vector algebra and solid geometry I: Vector algebra and solid geometry II. Vector algebra III. Vector calculus I. Vector calculus II. Vector calculus III. Vector calculus IV. — Part II: *Vector and tensor applications*: Potential theory I. Potential theory II. Hydrodynamical applications. Electrical applications. Cartesian tensor analysis I. Cartesian tensor analysis II. Further applications of the tensor calculus.

Magnus R. HESTENES. — **Optimization theory: the finite dimensional case.** — Pure and applied mathematics. — Un vol. relié, 16 × 24, de XIII, 447 p. — Prix: £14.00. — John Wiley and Sons, New York/London/Sydney/Toronto, 1975.

*Unconstrained and linearly constrained extrema*: Existence of extreme points. Unconstrained local minima and maxima. Positive symmetric matrices. Minima of convex functions. Linearly constrained local minima and maxima. Minima of quadratic functions. Inner product spaces and the Gram-Schmidt process. Eigenvalues and eigenvectors of a real symmetric matrix. — *Applications to matrices and quadratic forms*: Relative eigenvalues and eigenvectors. Eigenvalues on subspaces. A fundamental lemma. Quadratic forms of arcs. Further properties of quadratic forms. Rectangular matrices, norms, and principal values. Pseudoinverses and \*-reciprocals of matrices. — *The Lagrange multiplier rule for equality constraints*: Constrained minima. Sufficient conditions for a local constrained minimum. Classification of critical points. Tangent vectors and normality. Gradient of a function relative to constraints. Implicit function theorems. — *General constrained minimum problems*: The Lagrange multiplier rule. Convex cones and their duals. Tangent cones and normal cones. Remarks on differentiation. Minimum of a function on an arbitrary set  $S$ . Minima subject to nonlinear constraints. Concave and linear constraints. Linear programming. Criteria for regularity. Infinitely many inequality constraints. A simple integral problem. — *Augmentability and Lagrange multipliers*: Penalty functions. Removal of constraints. Augmentability and the Lagrange multiplier rule. Minima subject to simple inequality constraints. Augmentability in the case of inequality constraints. An extended Lagrange multiplier rule. Quasinormality. Extensions of earlier results. A method of multipliers. — *Images and Lagrange multipliers*: Illustrative examples. Convex programming. Convex programming with linear constraints. Further examples. Minima relative to general inequality constraints. Applications to quadratic forms. Implicit function theorems. Derived cones and derived sets. Minima relative to equality and inequality constraints. Further theorems on tangent spaces and derived sets. Auxiliary theorems. — *Appendix*: Euclidean  $n$ -space. Basic concepts. Extreme points of functions. Local minima and maxima. — the one-variable case. Functions of class  $C^{(k)}$

A. HENRY-LABORDERE; M. GROJNOWSKI. — **Recherche opérationnelle (programmation linéaire et combinatoire): exercices et problèmes avancés.** — Collection « Comprendre et appliquer », n° 8. — Un vol. broché, 18 × 24, de VIII, 58 p. — Masson, Paris/New York/Barcelone/Milan, 1976.

Linéarité et convexité. — Relations entre un programme linéaire et son programme dual. — Algorithme du simplexe. Algorithme dual du simplexe. Application à la programmation en nombres entiers. — Procédure S.E.P. (séparation et évaluation progressive).

**Spline functions: proceedings of an international symposium held at Karlsruhe, Germany, May 20-23, 1975.** — Ed. by K. Böhmer, G. Meinardus and W. Schempp. — Lecture note in mathematics, vol. 501. — Un vol. broché, 16,5 × 24,5, de VI, 421 p. — Prix: DM 35.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

17 exposés par: C. de Boor et I. J. Schoenberg; F. J. Delvos et W. Schempp; G. Hämmerlin; G. Jentzsch, G. Lange et O. Rosenbach; H. Johnen et K. Scherer; H.-W. Kösters; T. Lyche; G. Meinardus; G. Micula; H. ter Morsche; A. Sard; W. Schäfer et W. Schempp; K.-H. Schlosser; L. L. Schumaker; F. Schurer et F. W. Steutel; M. Sommer; H. Strauss

**ISILC proof theory symposium:** dedicated to Kurt Schütte on the occasion of his 65th birthday. — **Proceedings of the International Summer Institute and Logic Colo-**

**quium, Kiel 1974.** — Edited by J. Diller and G. H. Müller. — Lecture notes in mathematics, vol. 500. — Un vol. broché,  $16,5 \times 24,5$ , de viii, 383 p. — Prix: DM 32.00. — Springer Verlag, Berlin/Heidelberg/New York, 1975.

20 exposés par: W. Buchholz, J. N. Crossley, H. B. Curry, J. Diller et H. Vogel<sup>?</sup> S. Feferman, W. Felscher, Y. Hanatani, G. Kreisel, D. Leivant, E. G. K. Lopez-Escobar et W. Veldman, H. Luckhardt, W. Maass, H. Osswald, H. Pfeiffer, W. Pohlers, D. Prawitz, B. Scarpellini, H. Schwichtenberg et S. S. Wainer, G. Takeuti, A. S. Troelstra.

**Janos GALAMBOS.** — **Representations of real numbers by infinite series.** — Lecture notes in mathematics, vol. 502. — Un vol. broché,  $16,5 \times 24,5$ , de vi, 146 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Introduction. — The algorithms. — Questions of rationality and irrationality. — Some concepts and tools from probability theory. — Metric theory of representations with stochastically independent digits. — A survey on the applications of ergodic theory to series representations. — Metric theory in the general case. — The Hausdorff dimension of certain sets related to series expansions. — Miscellaneous topics.

**Serge LANG; Hale TROTTER.** — **Frobenius distributions in  $GL_2$ -extensions: distribution of Frobenius automorphisms in  $GL_2$ -extensions of the rational numbers.** — Lecture notes in mathematics, vol. 504. — Un vol. broché,  $16,5 \times 24,5$ , de iii, 274 p. — Prix: DM 25.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Part I:* Supersingular and fixed trace distribution: Preliminaries. The distribution for fixed trace. Examples. — *Part II:* Imaginary quadratic distribution: The fixed trace case. The model for the mixed case. Computations of Harish transforms. — *Part III:* Special computations: General lemmas. — *Part IV:* Numerical results: Supersingular and fixed trace distribution. Imaginary quadratic distribution. Extended results for  $X_0(11)$ .

**Advances in complex function theory: proceedings of seminars held at Maryland University, 1973/74.** — Edited by W. E. Kirwan and L. Zalcman. — Lecture notes in mathematics, vol. 505. — Un vol. broché,  $16,5 \times 24,5$ , de viii, 203 p. — Prix: DM 23.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*C. A. Berenstein:* An estimate for the number of zeros of analytic functions in  $n_t$ -dimensional cones. — *Peter L. Duren:* Asymptotic behavior of coefficients of univalent functions. — *W. K. Hayman:* On the domains where a harmonic or subharmonic function is positive. — *Albert Marden:* Isomorphisms between Fuchsian groups. — *Albert Pfluger:* On a coefficient problem for Schlicht functions. — *Ch. Pommerenke:* On inclusion relations for spaces of automorphic forms. — *Edgar Reich:* Quasiconformal mappings of the disk with given boundary values. — *M. Schiffer and G. Schober:* A distortion theorem for quasiconformal mappings. — *Uri Srebro:* Quasiregular mappings. — *T. J. Suffridge:* Starlike functions as limits of polynomials.

**Numerical analysis: proceedings of the Dundee Conference on numerical analysis, 1975.** — Edited by G. A. Watson. — Lecture notes in mathematics, vol. 506. — Un vol. broché,  $16,5 \times 24,5$ , de x, 201 p. — Prix: DM 23.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

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Michael REED. — **Abstract non linear wave equations.** — Lecture notes in mathematics, vol. 507. — Un vol. broché, 16,5 × 24,5, de vi, 128 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Existence and properties of solutions:* Local and global existence. Applications. Smoothness of solutions. Finite propagation speed and continuous dependence on the data. Weak solutions. Discussion. — *Scattering theory:* Formulation of scattering problems. Scattering for small data. Global existence for small data. Existence of the wave operators. Applications. Asymptotic completeness. Discussion.

Eugene SENETA. — **Regularly varying functions.** — Lecture notes in mathematics, vol. 508. — Un vol. broché, 16,5 × 24,5, de v, 112 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Functions of regular variation:* Fundamental theorems. Refinement of definition of regular variation. The structure of slowly varying functions and alternative proofs. Further properties of regularly varying functions. Conjugate and complementary regularly varying functions. The definition of a regularly varying function. Monotone regular variation. — *Some secondary theory of regularly varying functions:* Necessary and sufficient integral conditions for regular variation. Tauberian theorems involving regular variation. A class of integrals involving regularly varying functions. A class of functions related to regularly varying functions. — *Generalizations of regular variation:* *R-O* varying functions. *S-O* varying functions. Monotonicity: dominated variation.

G. I. MARCHUK. — **Methods of numerical mathematics.** — Translated by Jiri Ruzicka. — Applications of mathematics, vol. 2. — Un vol. relié, 16 × 24,5, de xii, 316 p. — Prix: DM 72.80. — Springer Verlag, New York/Heidelberg/Berlin, 1975.

*Fundamentals of the theory of difference schemes:* Basic equations and their adjoints. Approximation. Countable stability. The convergence theorem. — *Methods of constructing difference schemes for differential equations:* Method of constructing difference equations for problems with discontinuous coefficients on the basis of an integral identity. Variational methods in mathematical physics. Difference schemes for equations with discontinuous coefficients based on variational principles. General approach to variational-difference schemes for one-dimensional equations and construction of subspaces. Variational-difference schemes for two-dimensional equations of elliptic type. Variational methods for multi-dimensional problems. Interpolation of solutions of difference equations by means of splines. — *Methods for solving stationary problems of mathematical physics:* Some iterative methods and their optimization. Gradient iterative methods. The splitting-up method. The splitting-up method with variational optimization. Equations with singular operators. Iterative methods for inaccurate input data. The fast Fourier transform. Factorization of difference equations. — *Methods for solving non-stationary problems:* Second-order-approximation difference schemes with time-varying operators. Nonhomogeneous equations of evolution type. Splitting-up methods for nonstationary

problems. Multicomponent splitting. General approach to component-by-component splitting. Methods of solving equations of hyperbolic type. — *Numerical methods for some inverse problems*: Fourier series method for inverse evolution problems. Inverse evolution problems with time-varying operators. Methods of perturbation theory for inverse problems. — *The simplest problems of mathematical physics*: The Poisson equation. The heat equation. The wave equation. The equation of "motion". On increasing the order of approximation of difference schemes. — *Numerical methods in the theory of radiative transfer*: Problem statement. The transport equation in various geometries. Numerical solution of the transport equation in the parallel-plane geometry. The stationary transport problem. Nonisotropic particle scattering. — *A review of the methods of numerical mathematics*: The theory of approximation, stability, and convergence of difference schemes. Numerical methods for problems of mathematical physics. Conditionally well-posed problems. Numerical methods in linear algebra. Optimization problems in numerical mathematics. Some trends in numerical mathematics.

Georges DUVAUT; Jacques Louis LIONS. — **Inequalities in mechanics and physics.** — Translated from the French by C. W. John. — Grundlehren der mathematischen Wissenschaften, Band 219. — Un vol. relié, 17,5 × 25, de xvi, 397 p. — Prix: DM 98.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Problems of semi-permeable media and of temperature control. — Problems of heat control. — Classical problems and problems with friction in elasticity and viscoelasticity. — Unilateral phenomena in the theory of flat plates. — Introduction to plasticity. — Rigid visco-plastic Bingham fluid. — Maxwell's equations. Antenna problems. — Bibliography.

Jonathan S. GOLAN. — **Localization of non-commutative rings.** — Monographs and textbooks in pure and applied mathematics, vol. 30. — Un vol. relié, 16 × 24, de 346 p. — Prix: FS. 80.00. — Marcel Dekker, New York, 1975.

*Torsion theories*: Torsion and torsion-free modules. The torsion functor. Dense and pure submodules. Relative injectivity and neatness. Absolute purity. Localization. — *The space  $R$ -tors*: Order among torsion theories. Lattice structure on  $R$ -tors. Change of rings. — *Special torsion theories*: Faithful torsion theories. Stable torsion theories. Semisimple torsion theories. Saturated torsion theories. Torsion theories satisfying chain conditions. Torsion theories satisfying finiteness conditions. Exact torsion theories. Perfect torsion theories. — *The left spectrum*: Cocritical modules. Prime torsion theories. Semiprime torsion theories. Primary decomposition. — *Decomposition of torsion theories*: Jansian torsion theories. Direct decompositions. — *Representation theory*: Topologies on subsets of  $R$ -prop. Representation of rings over  $R$ -sp. — Examples. — Index of notation. — Index of terminology.

Michael J. FIELD. — **Differential calculus and its applications.** — The new university mathematics series. — Un vol. relié, 16 × 24, de viii, 315 p. — Prix: £12.00. — Van Nostrand Reinhold Co. Ltd., New York/Cincinnati/Toronto/London/Melbourne, 1976.

*Preliminaries*: Vector spaces and linear maps. Topological and metric spaces. — *Linear algebra and normed vector spaces*: Normed vector spaces. Inner-product spaces. Topology on normed vector spaces. Products of normed vector spaces. Linear and multi-

linear maps. Normed spaces of continuous linear and multilinear maps. Some special spaces of linear and multilinear maps. Equivalence of norms. Complete normed spaces. Equivalence of norms on finite-dimensional vector spaces. Completion of a normed vector space. Hilbert spaces. Bases. Transpose and adjoint of linear maps. Eigenvalues. Self-adjoint maps and quadratic forms. Isometries. The Hahn-Banach theorem. Proof of the Hahn-Banach theorem. — *Differentiation and calculus on vector spaces*:  $o$ -notation. Differentiation of functions on normed vector spaces. The composite-mapping formula. Differentiable maps into products of normed vector spaces. Differentiable maps from products and partial derivatives. The mean-value theorem. Differentiation and partial differentiation. Higher derivatives. Leibniz' theorem and the general composite-mapping formula. Taylor's theorem. Extrema. Curves in  $R^n$ . — *The inverse- and implicit-function theorems*: Topological linear isomorphisms. The inverse-function theorem. The implicit-function theorem. Change of variables. — *Differential manifolds*: Charts and atlases. Equivalent atlases. Products of differential manifolds. Quotients of differential manifolds. Submanifolds. Submanifolds of  $R^m$ . Differentiable maps: critical points. Tangent spaces. The tangent bundle of a submanifold. Differential equations on manifolds.

KONRAD JÖRGENS; FRANZ RELICH. — **Eigenwerttheorie gewöhnlicher Differentialgleichungen.** — Bearbeitet von J. Weidmann. — Hochschultext. — Un vol. broché,  $16,5 \times 24,5$ , de IX, 227 p. — Prix: DM 28.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Lineare Operatoren in Hilbertschen Räumen*: Linearer Operator, Hilbertscher Raum. Grundtatsachen in der Theorie des Hilbertschen Raumes. Symmetrische Operatoren. Fehlerabschätzung. Zusätze und Aufgaben. — *Spektralzerlegung symmetrischer Operatoren*: Eigenpakete. Die Orthogonalität der Eigenpakete eines symmetrischen Operators. Das Spektrum eines symmetrischen Operators. Zerlegbare Operatoren. Das reguläre Sturm-Liouvillesche Eigenwertproblem. Wesentlich selbstadjungierte Operatoren. Fortsetzung von Operatoren, selbstadjungierte Operatoren. Zusätze und Aufgaben. — *Die Weylsche Theorie der singulären Differentialgleichungen zweiter Ordnung*: Das singuläre Sturm-Liouvillesche Eigenwertproblem. Grenzpunktfall und Grenzkreisfall. Keine zusätzlichen Randbedingungen im Grenzpunktfall. Zusätzliche Randbedingungen im Grenzkreisfall. Anfangszahlen. Lösungsscharen mit festen Anfangszahlen. Konstruktion eines Fundamentalsystems an einer Stelle der Bestimmtheit. Der Grenzkreisfall an einer Stelle der Bestimmtheit. Die Randbedingungen bei der Wellengleichung des Keplerproblems. Die Normierung der Lösungen. Operatoren mit diskretem Spektrum. Darstellung der Eigenpakete und Eigenscharen durch Lösungen. Orthogonale normierte Funktionenscharen. Der Spektralsatz für Sturm-Liouville-Operatoren. Einfache Anwendungen des Spektralsatzes. Das Streckenspektrum bei der Wellengleichung des Keplerproblems.

G. POLYA; G. SZEGÖ. — **Problems and theorems in analysis, volume 2.** — Theory of functions, zeros, polynomials, determinants, number theory, geometry. — Translation by C. E. Billigheimer. — Die Grundlehren der mathematischen Wissenschaften, Band 216. — Un vol. relié,  $17 \times 25$ , de XI, 392 p. — Prix: DM 110.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Part IV: Functions of one complex variable*: Maximum term and central index, maximum modulus and number of zeros: Analogy between  $\mu(r)$  and  $M(r)$ ,  $\nu(r)$  and  $N(r)$ . Further results on  $\mu(r)$  and  $\nu(r)$ . Connection between  $\mu(r)$ ,  $\nu(r)$ ,  $M(r)$  and  $N(r)$ .

$\mu(r)$  and  $M(r)$  under special regularity assumptions. — Schlicht mappings: Introductory material. Uniqueness theorems. Existence of the mapping function. The inner and outer radius. The normed mapping function. Relations between the mappings of different domains. The Koebe distortion theorem and related topics. — Miscellaneous problems: Various propositions. A method of E. Landau. Rectilinear approach to an essential singularity. Asymptotic values of entire functions. Further applications of the Phragmén-Lindelöf method. Supplementary problems. — *Part V: The location of zeros*: Rolle's theorem and Descartes' rule of signs: Zeros of functions, changes of sign of sequences. Reversals of sign of a function. First proof of Descartes' rule of signs. Applications of Descartes' rule of signs. Applications of Rolle's theorem. Laguerre's proof of Descartes' rule of signs. What is the basis of Descartes' rule of signs? Generalizations of Rolle's theorem. — The geometry of the complex plane and the zeros of polynomials: Center of gravity of a system of points with respect to a point. Center of gravity of a polynomial with respect to a point. A theorem of Laguerre. Derivative of a polynomial with respect to a point. A theorem of Grace. — Miscellaneous problems: Approximation of the zeros of transcendental functions by the zeros of rational functions. Precise determination of the number of zeros by Descartes' rule of signs. Additional problems on the zeros of polynomials. — *Part VI: Polynomials and trigonometric polynomials*: Tchebychev polynomials. General problems on trigonometric polynomials. Some special trigonometric polynomials. Some problems on Fourier series. Real non-negative trigonometric polynomials. Real non-negative polynomials. Maximum-minimum problems on trigonometric polynomials. Maximum-minimum problems on polynomials. The Lagrange interpolation formula. The theorems of S. Bernstein and A. Markov. Legendre polynomials and related topics. Further maximum-minimum problems on polynomials. — *Part VII: Determinants and quadratic forms*: Evaluation of determinants. Solution of linear equations. Power series expansion of rational functions. Generation of positive quadratic forms. Miscellaneous problems. Determinants of systems of functions. — *Part VIII: Number theory*: Arithmetical functions: Problems on the integral parts of numbers. Counting lattice points. The principle of inclusion and exclusion. Parts and divisors. Arithmetical functions, power series, Dirichlet series. Multiplicative arithmetical functions. Lambert series and related topics. Further problems on counting lattice points. — Polynomials with integral coefficients and integral-valued functions: Integral coefficients and integral-valued polynomials. Integral-valued functions and their prime divisors. Irreducibility of polynomials. — Arithmetical aspects of power series: Preparatory problems on binomial coefficients. On Eisenstein's theorem. On the proof of Eisenstein's theorem. Power series with integral coefficients associated with rational functions. Function-theoretic aspects of power series with integral coefficients. Power series with integral coefficients in the sense of Hurwitz. The values at the integers of power series that converge about  $z = \infty$ . — Some problems on algebraic integers: Algebraic integers. Fields Greatest common divisor. Congruences. Arithmetical aspects of power series. — Miscellaneous problems: Lattice points in two and three dimensions. — *Part IX: Geometric problems*.

André WEIL. — **Elliptic functions according to Eisenstein and Kronecker**. — *Ergebnisse der Mathematik und ihrer Grenzgebiete*, Band 88. — Un vol. relié, 17 × 25, de XII, 92 p. — Prix: DM 36.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Eisenstein*: Introduction. Trigonometric functions. The basic elliptic functions. Basic relations and infinite products. Variation I. Variation II. — *Kronecker*: Prelude to Kronecker, Kronecker's double series. Finale: Allegro con brio (Pell's equation and the Chowla-Selberg formula).

Zhe-Xian WAN. — **Lie algebras.** — Translated by C.-Y. Lee. — International series of monographs in pure and applied mathematics, vol. 104. — Un vol. relié, 18 × 28, de VII, 231 p. — Prix: £9.90. — Pergamon Press, Oxford/New York/Toronto/Sydney/Braunschweig, 1975.

*Basic concepts:* Lie algebras. Subalgebras, ideals and quotient algebras. Simple algebras. Direct sum. Derived series and descending central series. Killing form. — *Nilpotent and solvable Lie algebras:* Preliminaries. Engel's theorem. Lie's theorem. Nilpotent linear Lie algebras. — *Cartan subalgebras:* Cartan subalgebras. Existence of Cartan subalgebras. Preliminaries. Conjugacy of Cartan subalgebras. — *Cartan's criterion:* Cartan's criterion for solvable Lie algebras. Cartan's criterion for semisimple Lie algebras. — *Cartan decompositions and root systems of semisimple Lie algebras:* Cartan decompositions of semisimple Lie algebras. Root systems of semisimple Lie algebras. Dependence of structure of semisimple Lie algebras on root systems. Root systems of the classical Lie algebras. — *Fundamental systems of roots of semisimple Lie algebras and Weyl groups:* Fundamental systems of roots and prime roots. Fundamental systems of roots of the classical Lie algebras. Weyl groups. Properties of Weyl groups. — *Classification of simple Lie algebras:* Diagrams of  $\pi$  systems. Classification of simple  $\pi$  systems. The Lie algebras  $G_2$ . Classification of simple Lie algebras. — *Automorphisms of semisimple Lie algebras:* The group of automorphisms and the derivation algebra of a Lie algebra. The group of outer automorphisms of a semisimple Lie algebra. — *Representations of Lie algebras:* Fundamental concepts. Schur's lemma. Representations of the three-dimensional simple Lie algebras. — *Representations of semisimple Lie algebras:* Irreducible representations of semisimple Lie algebras. Theorem of complete reducibility. Fundamental representations of semisimple Lie algebras. Tensor representations. Elementary representations of simple Lie algebras. — *Representations of the classical Lie algebras:* Representations of  $A_n$ . Representations of  $C_n$ . Representations of  $B_n$ . Representations of  $D_n$ . — *Spin representations and the exceptional Lie algebras:* Associative algebras. Clifford algebra. Spin representations. The exceptional Lie algebras  $F_4$  and  $E_8$ . — *Poincaré-Birkhoff-Witt theorem and its applications to representation theory of semisimple Lie algebras:* Enveloping algebras of Lie algebras. Poincaré-Birkhoff-Witt theorem. Applications to representations of semisimple Lie algebras. — *Characters of irreducible representations of semisimple Lie algebras:* A recursion formula for the multiplicity of a weight of an irreducible representation. Half of the sum of all the positive roots. Alternating functions. Formula of the character of an irreducible representation. — *Real forms of complex semisimple Lie algebras:* Complex extension of real Lie algebras and real forms of complex Lie algebras. Compact Lie algebras. Compact real forms of complex semisimple Lie algebras. Roots and weights of compact semisimple Lie algebras. Real forms of complex semisimple Lie algebras.

Valentin POENARU. — **Singularités  $C^\infty$  en présence de symétrie.** — Lecture notes in mathematics, 510. — Un vol. broché, 16 × 24, de 174 p. — Prix: DM 20.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Théorie des invariants  $C^\infty$ :* Introduction. Le théorème de finitude de Hilbert. Invariants  $C^\infty$ . Produits tensoriels topologiques; rappels d'analyse différentielle. Démonstration du théorème fondamental. — *Déploiement (uni)-versel des fonctions  $G$ -invariantes:* Introduction. Le théorème de préparation équivariant. Démonstration du théorème de déploiement versel. L'idéal  $\mathcal{I}\mathcal{G}$ ; le théorème d'unicité. — *Stabilité structurelle équivariante (première partie):* Introduction. Topologie et analyse différentielles équivariantes. Le théorème de préparation équivariant. Démonstration du théorème de stabilité

équivariante. — *Stabilité structurelle équivariante (seconde partie)* : Introduction. Actions orthogonales et polynômes invariants. Le théorème d'ouverture.

David E. BLAIR. — **Contact manifolds in Riemannian geometry.** — Lecture notes in mathematics, 509. — Un vol. broché,  $16 \times 24$ , de 146 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Contact manifolds*: Contact manifolds. Examples. — *Almost contact manifolds*: Structural group of a contact manifold. Almost contact structures. Contact metric structures. Examples. — *Geometric interpretation of the contact condition*: Integral submanifolds of the contact distribution. Examples of integral submanifolds.

Ichiro SATAKE. — **Linear algebra.** — Pure and applied mathematics. — Translation by Sebastian Koh, Tadatoshi Akiba, Shin-ichiro Ihara. — Un vol. relié,  $16 \times 23$ , de XII, 375 p. — Prix: FS 50.00. — Marcel Dekker, Inc. New York, 1975.

*Vector and matrix operations*: Vector operations. Matrix operations. Matrix operations (the case of square matrices). Linear mappings. Real and complex numbers. Inner product. Appendix: On the exponential function of matrices. — *Determinants*: Permutations. Definition and fundamental properties of determinants. Expansion of determinants. System of linear equations (Cramer's rule). Product of determinants. Some Applications. Appendix 1: Determinants of special forms. Appendix 2: Characterizing determinants by their multiplication formulas. Appendix 3: Differentiation of determinants. — *Vectors spaces*: Linear independence of vectors. Subspaces. Orthogonal systems and orthogonal complements. The rank of a linear mapping (matrix). Systems of linear equations (general case). The axiomatization of vector spaces. Change of basis, orthogonal transformations. Appendix 1: Idempotent matrices and projections. Appendix 2: Systems of linear differential equations. — *Normalization of matrices*: Eigenvalues and eigenvectors. Decomposition into eigenspaces. Normalization of symmetric matrices. Quadratic forms (hermitian forms). Normal matrices. The orthogonal groups. Appendix 1: Quadratic forms in general. Appendix 2: Lie algebras of orthogonal groups. — *Tensor algebra*: Dual spaces. Tensor products. Symmetric tensors and alternating tensors. Tensor algebras and Grassmann algebras. Extensions and restrictions of the coefficient field. Appendix: Group representations. — *Geometric interpretation*: Vectors in a 3-dimensional space. Vector expressions for lines and planes. Areas, volumes. Axioms of Euclidean geometry. Principal axes of quadrics. Appendix: The concept of a projective space.

J. T. ODEN, J. N. REDDY. — **Variational methods in theoretical mechanics.** — Universitext. — Un vol. broché,  $16,5 \times 24$ , de 200 p. — Prix: DM 29,80. — Springer Verlag, Berlin/Heidelberg/ New York, 1976.

*Introduction*: The role of variational theory in mechanics. — Some historical comments. Plan of study. — *Mathematical foundations of classical variational theory*: Introduction. Nonlinear operators. Differentiation of operators. Mean value theorems. Taylor formulas. Gradients of functionals. Minimization of functionals. Convex functionals. Potential operators and the inverse problem. Sobolev spaces. — *Mechanics of continua, a brief review*: Introduction. Kinematics. Stress and the mechanical laws of balance: the principle of conservation of mass; the principle of balance of linear momentum; the

principle of balance of angular momentum. Thermodynamic principles: the principle of conservation of energy; the Clausius-Duhem inequality. Constitutive theory: rules of constitutive theory; special forms of constitutive equations. Jump conditions for discontinuous fields. — *Complementary and dual variational principles in mechanics*: Introduction. Boundary conditions and Green's formulas. Examples from mechanics and physics. The fourteen fundamental complementary-dual principles. Some complementary-dual variational principles of mechanics and physics. Legendre transformations. Generalized Hamiltonian theory. Upper and lower bounds and existence theory. Lagrange multipliers. — *Variational principles in continuum mechanics*: Introduction. Some preliminary properties and lemmas. General variational principles for linear theory of dynamic viscoelasticity. Gurtin's variational principles for the linear theory of dynamic viscoelasticity. Variational principles for linear coupled dynamic thermoviscoelasticity: linear (coupled) thermoelasticity. Variational principles in linear elastodynamics. Variational principles for linear piezoelectric elastodynamic problems. Variational principles for hyperelastic materials: finite elasticity; quasistatic problems. Variational principles in the flow theory of plasticity. Variational principles for a large displacement theory of elastoplasticity. Variational principles in heat conduction. Biot's quasi-variational principle in heat transfer. Some variational principles in fluid mechanics and magnetohydrodynamics: non-Newtonian fluids; perfect fluids; an alternate principle for invicid flow; magnetohydrodynamics. Variational principles for discontinuous fields: hybrid variational principles. — *Variational boundary-value problems, monotone operators, and variational inequalities*: Direct variational methods. Linear elliptic variational boundary-value problems: regularity. The Lax-Milgram-Babuska theorem. Existence theory in linear incompressible elasticity. Monotone operators. Existence theory in nonlinear elasticity. Variational inequalities. Applications in mechanics. — *Variational methods of approximation*: Introduction. Several variational methods of approximation: Galerkin's method; the Rayleigh-Ritz method; semidiscrete Galerkin methods; methods of weighted residuals; least square methods; collocation methods; functional imbeddings. Finite-element approximations. Finite-element interpolation theory. Existence and uniqueness of Galerkin approximations. Convergence and accuracy of finite-element Galerkin approximations.

T. S. BLYTH; M. F. JANOWWITZ. — **Residuation theory**. — International series of monographs in pure and applied mathematics, volume 102. — Un vol. relié 15 × 22, de IX, 380 p. — Prix: \$32,50. — Pergamon Press, Oxford/New York/Toronto/Sydney/Braunschweig, 1972.

*Foundations*: Ordered sets. Mapping between ordered sets; residuated mappings. Directed sets; semilattices. Lattices; complete lattices. Morphisms. Regular equivalences on an ordered set. Complementation in lattices. Modularity in lattices. Distributive lattices. Congruence relations. — *Coordinatizing Baer semigroups*: Baer rings. Baer semigroups. Range-closed residuated mappings. Strongly regular Baer semigroups. Decreasing Baer semigroups. Annihilator-preserving homomorphisms. The notion of involution. Orthomodular lattices. Foulis semigroups. Idempotent residuated mappings. Boolean algebras. — *Residuated algebraic structures*: Residuated groupoids and semigroups; Molinaro equivalences. The zigzag equivalence. Group homomorphic images of ordered semigroups; Querré semigroups. Dubreil-Jacotin semigroups;  $A$ -normal semigroups. Particular types of  $A$ -normal semigroups.  $F$ -nomality.  $B$ -nomality. Isotone homomorphic Boolean images of ordered semigroups. Glivenko semigroups. Loipomorphisms. Brouwer semilattices.

Georges LERESCHE. — **Introduction mathématique à la logique.** — Un vol. broché, 15 × 21, de 91 p. — Spes Dunod, Lausanne, 1976.

*L'algèbre  $\mathcal{P}(E)$*  : Généralités sur la notion d'ensemble. L'ensemble  $\mathcal{P}(E)$ . « Ensemble produit » de deux ensembles. Application d'un ensemble dans un ensemble. Opération sur un ensemble. Opérations ensemblistes : Structure de  $\mathcal{P}(E)$ . Foncteur  $\mathcal{P}$ . L'algèbre  $Z_2$ . — *Propositions et opérations logiques* : Les propositions. Fonction valeur. Opérations logiques élémentaires. Un peu d'algèbre. Implication et équivalence logiques. Propriétés des opérations logiques. Retour à l'implication logique. Raisonnement par l'absurde. — *Algèbre de Boole de propositions* : Algèbre de Boole de propositions. Relations sur une algèbre de propositions. Théorème de Stone. Propositions élémentaires. — *Fonctions propositionnelles* : Exemple liminaire et définition. Ensemble de vérité d'une fonction propositionnelle. Opérations sur les fonctions propositionnelles. Quantificateurs. Démonstration par récurrence. — *Appendices* : Démonstration du théorème de Stone. Groupe de transformations des opérations logiques.

Peter KALL. — **Stochastic linear programming.** — Econometrics and operations research, 21. — Un vol. relié, 17 × 25, de 95 p. — Prix : DM 38.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Prerequisites* : Linear programming. Nonlinear programming. Measure theory and probability theory. — *Introduction.* — *Distribution problems* : The general case. Special problems. — *Two stage problems* : The general case. The fixed recourse case. Complete fixed recourse. Simple recourse. Computational remarks. Another approach to two stage programming. — *Chance constrained programming* : Convexity statements. Relationship between chance constrained programs and two stage problems.

Robert B. ASH; Melvin F. GARDNER. — **Topics in stochastic processes.** — Probability and mathematical statistics, volume 27. — Un vol. relié, 16 × 24, de vii, 321 p. — Prix : \$34,50. — Academic Press, New York/San Francisco/London, 1975.

*L<sup>2</sup> stochastic processes* : Introduction. Covariance functions. Second order calculus. Karhunen-Loève expansion. Estimation problems. — *Spectral theory and prediction* : Introduction:  $L^2$  stochastic integrals. Decomposition of stationary processes. Examples of discrete parameter processes. Discrete parameter prediction: special cases. Discrete parameter prediction: general solution. Examples of continuous parameter processes. Continuous parameter prediction in special cases; Yaglom's method. Some stochastic differential equations. Continuous parameter prediction: remarks on the general solution. — *Ergodic theory* : Introduction. Ergodicity and mixing. The pointwise ergodic theorem. Application to real analysis. Application to Markov Chains. The Shannon-McMillan theorem. — *Sample function analysis of continuous parameter stochastic processes* : Separability. Measurability. One-dimensional Brownian motion. Law of the iterated logarithm. Markov processes. Processes with independent increments. Continuous parameter martingales. The strong Markov property. — *The Itô integral and stochastic differential equations* : Definition of the Itô integral. Existence and uniqueness theorems for stochastic differential equations. Stochastic differentials: a chain rule. — *Some results from complex analysis. Fourier transforms on the real line. Solution to problems.*

Gian-Carlo ROTA. — **Finite operator calculus.** — With the collab. of P. Doubilet, C. Greene, D. Kahaner, O. Odlyzko, R. Stanley. — Un vol. relié, de x, 159 p. — Prix: \$9.75. — Academic Press, New York/San Francisco/London, 1975.

*The number of partitions of a set.* — *Finite operator calculus*: Introduction. Basic polynomials. The first expansion theorem. The Pincherle derivative. Sheffer polynomials. Recurrence formulas. Umbral composition. Cross-sequences. Eigenfunction expansions. Hermite polynomials. Laguerre polynomials. Vandermonde convolution. Examples and applications. Problems and history. Acknowledgments. References. — *The idea of generating function*: Introduction. Notation and terminology. Structure of the incidence algebra. Reduced incidence algebra. The large incidence algebra. Residual isomorphism. Algebras of Dirichlet type. Algebras of full binomial type. Algebras of triangular type. References. — *The valuation ring*: Introduction. Notation. The valuation ring. The characteristic. Applications. Open problems. References. — *Valuation ring and Möbius algebra*: The Möbius algebra of a lattice. Partially ordered sets. Identities in the Möbius algebra. References.

A. A. BOROVKOV. — **Stochastic processes in queueing theory.** — Translated by Kenneth Wickwire. — Applications of mathematics, vol. 4. — Un vol. relié, 16 × 24, de vii, de 280 p. — Prix: DM 72,80. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

*Introduction*: Classifications. Some notation. — *Systems with queues and service of type one*: Cases in which the systems  $\langle G \rangle$  can be described by means of recursion equations. Equivalence to the system  $\langle G, G, G, 1 \rangle$ . The basic equation. Properties of the solution as a process. Ergodic theorems. Interrupted governing sequences. On systems governed by sequences of independent random variables. The virtual waiting time. A continuous analogue of the system equation. Properties of the solution. Further properties of the process  $w(t)$ . Beneš' equation. The stationary solution of Beneš' equation. Approximation formulae for heavy and light traffic. The processes  $X(t)$  and  $Y(t)$  with stationary increments corresponding to governing sequences with independent terms. The connection between the distributions of  $w^c(t)$  and  $w^k$ . Estimates of the rate of convergence of the distributions of  $w_n$  and  $w(t)$  to stationarity. Connection with the queue length. Theorems on the stability of the stationary waiting time under a change of the governing sequences. — *Some boundary problems for processes continuous from below with independent increments. Their connection with the distribution of  $w(t)$* . Boundary problems for processes continuous from below with independent increments. Properties of the distribution of  $w(t)$ . The busy period. Discrete time. — *Boundary problems for sequences with independent increments and factorization identities*: Preliminary remarks. The first factorization identity and its consequences. The second factorization identity and its consequences. — *Properties of the supremum of sums of independent random variables and related problems of queueing theory*: Uniqueness theorems. Methods of finding the distribution of  $\bar{Y}$ . Explicit formulae for the distribution of  $\bar{Y}$  under the conditions of queueing theory. Stability theorems. The rate of convergence. Asymptotic properties of the distributions of  $\bar{Y}$  and  $\theta$ . Inequalities for the distributions of  $\bar{Y}_n$  and  $\bar{Y}$ . The rate of approach of the distributions of  $w_n$  and  $w^1$ . Comparison theorems. Conditions for heavy traffic. Transitional phenomena. The relation between the waiting time and queue length distributions. — *Multi-channel queueing systems*: Classes of systems which can be described by recursion equations. Existence theorems for a stationary solution in the systems  $\langle G, G, G/m, 1 \rangle$ . The relation between the waiting time and the queue

length. The systems  $\langle G_I, G_I, G_I/m, 1 \rangle$ . Stability theorems. Connection between the waiting time and queue length. Estimates of rates of convergence. The system  $\langle G_I, 1, E/m, 1 \rangle$  and  $\langle E, G_I, G_I/m, 1 \rangle$ . — *The systems  $\langle G, G, G/\infty, 1 \rangle$  with an infinite number of service channels*: Theorems on convergence to stationary processes. Stability theorems. The systems  $\langle G_I, G_I, G_I/\infty, 1 \rangle$ . The systems  $\langle E, 1, G_I/\infty, 1 \rangle$ . The systems  $\langle G_I, 1, E/\infty, 1 \rangle$ . — *Systems with refusals*: The systems  $\langle G, G, G/m, 1 \rangle_R$ . General theorems. Stability theorems. The systems  $\langle G_I, 1, G_I/m, 1 \rangle_R$ . The systems  $\langle G_I, G, E/m, G_I \rangle_R$ . The systems  $\langle G_R \rangle$ . Asymptotic analysis of multi-channel systems. — *Systems with autonomous service*: General properties. Methods of calculating the stationary distributions. Appendix 1: Some theorems from renewal theory. Appendix 2: Factorization in the ring  $\mathfrak{B}$  and some theorems associated with it. Appendix 3: The Wiener-Lévy theorems and the asymptotic behavior of the coefficients of absolutely convergent series. Appendix 4: Estimates for the distributions of sums of independent random variables.

Frank SPITZER. — **Principles of random walk**. — 2nd edition. — Graduate texts in mathematics, 34. — Un vol. relié, 16 × 24, de ix, 408 p. — Prix: DM 48,40. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

*The classification of random walk*: Introduction. Periodicity and recurrence behavior. Some measure theory. The range of a random walk. The strong ratio theorem. Problems. — *Harmonic analysis*: Characteristic functions and moments. Periodicity. Recurrence criteria and examples. The renewal theorem. Problems. — *Two-dimensional recurrent random walk*: Generalities. The hitting probabilities of a finite set. The potential kernel  $A(x, y)$ . Some potential theory. The Green function of a finite set. Simple random walk in the plane. The time dependent behavior. Problems. — *Random walk on a half-line*: The hitting probability of the right half-line. Random walk with finite mean. The Green function and the gambler's ruin problem. Fluctuations and the arc-sine law. Problems. — *Random walk on an interval*: Simple random walk. The absorption problem with mean zero, finite variance. The green function for the absorption problem. Problems. — *Transient random walk*: The Green function  $G(x, y)$ . Hitting probabilities. Random walk in three space with mean zero and finite second moments. Applications to analysis. Problems. — *Recurrent random walk*: The existence of the one-dimensional potential kernel. The asymptotic behavior of the potential kernel. Hitting probabilities and the Green function. The uniqueness of the recurrent potential kernel. The hitting time of a single point. Problems.

P. JAFFARD. — **Probabilités**. — Collection « Comprendre et appliquer »: Mathématiques pratiques élémentaires, 9. — Un vol. broché, 18 × 24, de vi, 60 p. — Prix: FF 34.00. — Masson, Paris/New York/Barcelone/Milan, 1976.

*Espaces de probabilité*: Evénements. Lois de probabilité. Loi uniforme sur un ensemble fini. Analyse combinatoire. Loi hypergéométrique. Autres lois uniformes. Problèmes. — *Probabilités conditionnelles. Evénements indépendants*: Probabilités conditionnelles. Formule de Bayes. Evénements indépendants. Probabilités des causes. Epreuves répétées. Problèmes. — *Variables aléatoires*: Lois images. Variables aléatoires. Lois à plusieurs variables, variables aléatoires indépendantes. Variables aléatoires discrètes. Variables aléatoires continues. Loi de Laplace. Processus de Poisson. Lois multinomiales. Problèmes. — *Espérance mathématique et variance*: Espérance mathématique. Variance.

Covariance. Variance d'une somme. Problèmes. — *Lois des grands nombres*: Loi forte des grands nombres. Théorème de la limite centrale. Lois approchées. Problèmes. — *Tables statistiques*.

**The teaching of algebra at the pre-college level.** — Proceedings of the third CSMP International Conference sponsored by CEMREL, Inc. in cooperation with Southern Illinois University. — Edited by Peter Braunfeld and W. E. Deskins. — Un vol. broché, 15 × 22, de xi, 471 p. — CEMREL, Inc., St. Louis, 1975.

*Burt Kaufman*: Background. — *Thomas C. Bartee*: The applications of modern algebra in computer science. — *Hyman Bass*: Should abstract algebra be taught in secondary school? — *Peter Braunfeld*: The role of algebra in the CSMP K-12 curriculum. — *Johannes De Groot*: Interactions between algebra and geometry. — *Zoltan P. Dienes*: On the problem of the introduction of the rationals. — *Paul Erdős*: Child prodigies. — *Bernd Fischer*: The power set as a vector space. — *Heini Halberstam*: In praise of arithmetic. — *Marshall Hall Jr.*: Problems in arrangements and some applications. — *Israel N. Herstein*: Some views on high school algebra. — *Peter Hilton*: The relevance of elementary categorical concepts to pre-college algebra. — *Heinz Jacobinski*: Algebra for the average high school student. — *William F. Johntz*: Project S.E.E.D. and its implications for mathematics education internationally. — *Irving Kaplansky*: Classical algebra revisited. — *Donald J. Lewis*: The study of structure. — *Jurg Nievergelt*: Computers and mathematics education. — *Seymour Papert*: Teaching children to be mathematicians vs. teaching about mathematics. — *Frédérique Papy*: The group notion in teaching mathematics in primary school. — *Georges Papy*: The dimension theorem for vector spaces. — *Günter Pickert*: Universal objects in the teaching of algebra. — *Pierre Samuel*: Concrete algebra: The teaching of number theory. — *Hans Zassenhaus*: On the teaching of algebra.

Wolfgang WALTER. — **Gewöhnliche Differentialgleichungen.** — Heidelberger Taschenbücher, 110. — 2., korrigierte Auflage. — Un vol. broché, 13,5 × 20, de x, 229 p. — Prix: DM 18.80. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Einleitung.* — *Gewöhnliche Differentialgleichungen erster Ordnung*: Explizite Differentialgleichungen erster Ordnung. Elementar integrierbare Fälle. Die lineare Differentialgleichung. Verwandte Differentialgleichungen. Differentialgleichungen für Kurvenscharen. Exakte Differentialgleichungen. Implizite Differentialgleichungen erster Ordnung. Hilfsmittel aus der Funktionalanalysis. Ein Existenz- und Eindeutigkeitssatz. Der Existenzsatz von Peano. Differentialgleichungen im Komplexen. Potenzreihenentwicklung. Ober- und Unterfunktionen. Maximal- und Minimal- integrale. — *Systeme von Differentialgleichungen erster Ordnung und Differentialgleichungen höherer Ordnung*: Das Anfangswertproblem für ein System erster Ordnung. Das Anfangswertproblem für Differentialgleichungen  $n$ -ter Ordnung. Elementar-integrierbare Typen. Stetige Abhängigkeit der Lösungen. Abhängigkeit von Anfangswerten und Parametern. — *Lineare Differentialgleichungen*: Lineare Systeme. Homogene lineare Systeme. Inhomogene Systeme. Systeme mit konstanten Koeffizienten. Matrizenfunktionen. Inhomogene Systeme. Lineare Differentialgleichungen  $n$ -ter Ordnung. Lineare Differentialgleichungen  $n$ -ter Ordnung mit konstanten Koeffizienten. — *Lineare Systeme im Komplexen*: Homogene lineare Systeme im regulären Fall. Isolierte Singularitäten. Schwach singuläre Stellen. Differential-

gleichungen vom Fuchsschen Typ. Reihenentwicklungen von Lösungen. Lineare Differentialgleichungen zweiter Ordnung. — *Rand- und Eigenwertprobleme. Stabilität: Randwertaufgaben.* Das Sturm-Liouvillesche Eigenwertproblem. Kompakte selbstadjungierte Operatoren im Hilbert-Raum. Der Entwicklungssatz. Asymptotisches Verhalten. Stabilität.

Rolf NEVANLINNA; Paul Edwin KUSTAAHEIMO. — **Grundlagen der Geometrie.** — Lehrbücher und Monographien aus dem Gebiete der exakten Wissenschaften: Mathematische Reihe, vol. 43. — Un vol. relié, 17 × 24,5, de 135 p. — Prix: FS 34.00. — Birkhäuser Verlag, Basel/Stuttgart, 1976.

I. Teil: *Affine Geometrie der Ebene: Einleitung.* — *Grundrelation der Inzidenz:* Grundelemente. Inzidenzrelation. Axiome der Inzidenz. Widerspruchsfreiheit des Axiomensystems I. 1-3. Finites Modell des Axiomensystems I. 1-3. Unabhängigkeit der Axiome. Unabhängigkeit der Axiome I. 1-2. Die Lehre der Parallelen. Programm für die folgende Untersuchung. — *Grundrelation der Anordnung:* Anordnungsbeziehung. Anordnungsaxiome II. 1-3. Widerspruchsfreiheit des Systems I. 1-3, II. 1-3. Das Axiom von Pasch. Die logische Stellung des Axioms von Pasch. Grundtheoreme der Anordnung. Die äussersten Punkte, Anordnungen von kollinearen Punkten. Die Anzahl der Punkte auf einer Geraden. — *Widerspruchsfreiheit und Unvollständigkeit des Axiomensystems I. 1-3, II. 1-4:* Widerspruchsfreiheit. Arithmetisches Modell  $M_1$ . Arithmetisches Modell  $M_2$ . — *Halbstrahl, Halbebene, Winkel, Dreieck:* Halbstrahl. Halbebene. Begriff des Winkels. Dreieck. Topologische Eigenschaften. — *Das Stetigkeitsaxiom:* Punktschnitte. Das Stetigkeitsaxiom. — *Parallele Geraden:* Eine Klasseneinteilung. Eigenschaften der Klassen. Existenz paralleler Geraden. — *Das Parallelenaxiom:* Erweiterung des Axiomensystems. Der nichteuklidische Fall. Das Parallelenaxiom. — *Parallelverschiebung:* Vektoren. Richtungsvergleich von Vektoren. Parallelverschiebung eines Vektors längs einer Strecke. Parallelverschiebung längs eines polygonalen Weges. Wegeunabhängigkeit der Parallelverschiebung. Unabhängigkeit des Desarguesschen Satzes. — *Vektoralgebra:* Gleichheit von Vektoren. Vektoraddition. — Das kommutative und das assoziative Gesetz der Addition. Subtraktion. Multiplikation eines Vektors mit einer ganzen Zahl. Multiplikation mit einer rationalen Zahl. Der Satz von Archimedes. Irrationale Multiplikatoren. Die vollständige Zahlengerade. Messung von Vektoren. Grundsätze der Vektoralgebra. — *Affine Koordinatensysteme:* Über Proportionen. Proportionenlehre. Affine Koordinatensysteme. Gleichung einer Geraden. Anordnung. — *Vollständigkeit der affinen Geometrie:* Affine Geometrie und analytische Geometrie. Vollständigkeit der affinen Geometrie. — *Koordinatentransformationen:* Übergang von einem Koordinatensystem zu einem anderen. Affine Abbildungen. — *Affine Geometrie und projektive Geometrie:* Dualitätsprinzip. Die Idealpunkte und -geraden. Projektive Inzidenzgeometrie. Anordnung. — *Kongruenzlehre:* Steckenkongruenz. Kongruenz paralleler Strecken. Erweiterung der Definition der Streckenkongruenz. Die Eichlinie. Winkelkongruenz, Parallele Winkel. Kongruenz beliebiger Winkel. Konstruktion der Eichlinie. Koordinatendarstellung der Konstruktion. Die invariante quadratische Form. Invarianz der Form  $Q$  gegenüber der Transformation (14.8). — *Euklidische Geometrie:* Die affine Transformation  $T$ . Das Koordinatensystem  $K_0$  Iteration der Transformation  $T$ . Das Postulat III. 4. Die Eichlinie  $E$  ist eine Ellipse. Euklidische Längenmetrik. Länge eines Kreisbogens. Winkelmetrik. Die Metrik in einem beliebigen Koordinatensystem. Die metrischen Grundformen in Vektorform. Die Dreiecksungleichung. Das skalare Produkt. — *Lorentz-Minkowskische Geometrie:* Der hyperbolische Fall. Das Koordinatensystem  $K_0$ . Erweiterung des Kongruenzbegriffes. Kongruenzklassen. Der Fall  $n = 2$ . Der konkave Fall. Das Komplement  $\bar{R}$ . Lorentz-Minkowskische Geometrie. Bogenlänge von  $E$ , Winkel-

messung. Orthogonalsysteme. Physikalische Deutung der Lorentz-Minkowskischen Geometrie. — *Galilei-Geometrie*: Der semidefinite Fall. Galilei-Geometrie. Orthogonalsysteme. Physikalische Deutung des Systems. — II. Teil: *Finite Geometrie*: Inzidenz: Einleitung. Inzidenzaxiome. Koordinaten. Addition. Multiplikation. Die Gleichung der Geraden. Anzahl Punkte, Monomorphie des Inzidenzsystems. — *Anordnung*: Axiome der Anordnung. Zerlegung des Paschschen Axioms. Algebraisierung der Zwischenrelation. Die Konfiguration von drei verschiedenen kollinearen Punkten. Das schärfere Paschsche Axiom. — *Kongruenz*: Axiome der Kongruenz. Die Eichlinien. Die analytische Darstellung der Eichlinien im Fall  $p \neq 2$ . Der Fall  $p = 2$ . Winkelkongruenz.

**Numerische Methoden der Approximationstheorie. Band 3.** — Vortragsauszüge der Tagung über Numerische Methoden der Approximationstheorie, vom 25. bis 31. Mai 1975, im Mathematischen Forschungsinstitut Oberwolfach, (Schwarzwald). — Herausgegeben von L. Collatz, H. Werner und G. Meinardus. — International series of numerical mathematics, Vol. 30. — Un vol. relié, 17 × 24, de 333 p. — Prix: FS 42.00. — Birkhäuser Verlag, Basel/Stuttgart, 1976.

*Anselone, P. M., Lee, J. W.*: Double approximation methods for the solution of Fredholm integral equations. — *Arndt, H.; Eickenscheidt, B.*: Zur Konvergenz von Splines. — *Barnhill, R. E.*: Blending function interpolation: a survey and some new results. — *Brass, H.*: Interpolation und  $E_n |f|$ -Abschätzung. — *Braess, D.*: Über das Anzahlproblem bei der rationalen  $L_2$ -Approximation. — *De Boor, C.; Lyche, T.; Schumaker, L. L.*: On calculation with B-splines. — *Bredendiek, E.; Collatz, L.*: Simultanapproximation bei Randwertaufgaben. — *Cromme, L.*: Bemerkungen zur Numerischen Behandlung nichtlinearer Aufgaben der Tschebyscheff-Approximation. — *Delvos, F. J.*: Approximative Flächeninterpolation. — *Kasma, S.; Wetterling, W.*: Überbestimmte Eigenwertaufgaben. — *Kaufmann, E. H.; Taylor, G. D.*: An application of a restricted range version of the differential correction algorithm to the design of digital systems. — *Klotz, V.*: Ein Aufstiegsverfahren zur Konstruktion polynomialer Minimallösungen in der komplexen Ebene. — *Krabs, W.*: Ein Kontroll-Approximationsproblem für die schwingende Saite. — *Lempio, F.*: Minimumnormprobleme und zeitoptimale Steuerungen. — *Rivlin, Th. J.*: Bounds for trigonometric polynomials. — *Whiteman, J. R.; Schiff, B.*: Finite element approximation of singular functions.

Madan Lal PURI. — **Stochastic processes and related topics.** — Volume 1 of the Proceedings of the Summer Research Institute on statistical inference for stochastic processes, Bloomington, Indiana, 1975. — Un vol. relié, 16 × 24, de xiii, 315 p. — Prix: \$17.50. — Academic Press, New York/San Francisco/London, 1975.

*J. L. Doob*: Analytic sets and stochastic processes. — *L. Lecam*: On local and global properties in the theory of asymptotic normality of experiments. — *David R. Brillinger*: Statistical inference for stationary point processes. — *M. R. Leadbetter*: Aspects of extreme value theory for stationary processes—a survey. — *William E. Pruitt*: Some dimension results for processes with independent increments. — *Donald L. Iglehart*: Conditioned limit theorems for random walks. — *G. Kallianpur*: Canonical representations of equivalent Gaussian processes. — *Peter Ney*: A comparison method for critical branching processes and an application to age structure. — *K. B. Athreya*: Stochastic iteration of stable processes. — *J. B. H. Kemperman*: The ergodic behavior of a class of

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Madan Lal PURI. — **Statistical inference and related topics.** — Volume 2 of the Proceedings of the Summer Research Institute on statistical inference for stochastic processes, Bloomington, Indiana, 1975. — Un vol. relié, 16 × 24, de xi, 352 p. — Prix: \$18.00. — Academic Press Inc., New York/San Francisco/London, 1975.

*J. Pfanzagl*: On asymptotically complete classes. — *Ronald Pyke*: Multidimensional empirical processes: some comments. — *Jon A. Wellner*: Monte Carlo of two-dimensional Brownian sheets. — *Keh-Shin Lii and Murray Rosenblatt*: Asymptotic results on a spline estimate of a probability density. — *Richard A. Vitale*: A Bernstein polynomial approach to density function estimation. — *Shanti S. Gupta and Deng-Yuan Huang*: On some parametric and nonparametric sequential subset selection procedures. — *Pranab Kumar Sen*: Rank statistics, martingales and limit theorems. — *Y. S. Chow and K. K. Lan*: Optimal stopping rules for  $X_n/n$  and  $S_n/n$ . — *Michael J. Klass*: A survey of the  $S_n/n$  problem. — *Herman Rubin*: Some non-standard problems of inference in stochastic processes. — *Georges G. Roussas*: Asymptotic properties of maximum probability estimates in the IID case. — *Prem S. Puri*: A stochastic process under the influence of another arising in the theory of epidemics. — *J. S. Rustagi*: Inference in a distribution related to  $2 \times 2$  Markov Chain. — *C. B. Bell*: Statistical inference for some special families of stochastic processes. — *Ronald Biondini and M. M. Siddiqui*: Record values in Markov sequences.

**Applications of methods of functional analysis to problems in mechanics.** — Joint symposium IUTAM/IMU held in Marseille, September 1-6, 1975. Edited by P. Germain and B. Nayroles. — Lecture Notes in Mathematics, 503. — Un vol. broché, 16,5 × 24, de xix, 531 p. — Prix: DM 42.00. Springer Verlag, Berlin/Heidelberg/New York, 1976.

*C. Baiocchi*: Inéquations quasi-variationnelles dans les problèmes à frontière libre en hydraulique. — *T. B. Benjamin*: The alliance of practical and analytical insights into the non-linear problems of fluid mechanics. — *J. L. Lions*: Asymptotic behaviour of solutions of variational inequalities with highly oscillating coefficients. — *J. J. Moreau*: Application of convex analysis to the treatment of elastoplastic systems. — *J. T. Oden and J. K. Lee*: Theory of mixed and hybrid finite-element approximations in linear elasticity. — *F. Stummel*: Perturbation of domains in elliptic boundary value problems. — *J. Aguirre-Puente and M. Fremond*: Frost propagation in wet porous media. — *R. Amiel and G. Geymonat*: Viscous fluid flow in chemically reacting and diffusing systems. — *S. S. Antman and R. C. Browne*: Local invertibility conditions for geometrically exact nonlinear rod and shell theories. — *E. R. Arantes Oliveira*: Some applications of functional analysis in the mathematical theory of structures. — *D. J. Ball and J. R. Hewit*: Functional analysis applied to the optimisation of a temperature profile. — *M. S. Berger and L. E. Fraenkel*: Global free boundary problems and the calculus of variations in the large. — *K. Beyer and E. Zeidler*: Proof of existence and uniqueness of tidal waves with general vorticity distributions. — *R. E. D. Bishop and W. G. Price*: A critical appraisal of certain contemporary ship model testing techniques. — *J. L. Bona, D. K. Bose and*

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*P. Bremaud*: La méthode des semi-martingales en filtrage quand l'observation est un processus ponctuel marqué. — *R. V. Chacon et J. B. Walsh*: One dimensional potential embedding. — *J. Jacod et J. Memin*: Un théorème de représentation des martingales pour les ensembles régénératifs. — *N. Kazamaki*: A simple remark on the conditioned square functions for martingale transforms. — *H. Kunita*: Absolute continuity of Markov processes. — *V. Mandrekar*: Germ-field Markov property for multiparameter processes. — *P.-A. Meyer*: La théorie de la prédiction de F. Knight. — *P.-A. Meyer et M. Yor*: Sur la théorie de la prédiction, et le problème de décomposition des tribus  $\mathcal{F}^{\circ} t +$ . — *P.-A. Meyer*: Generation of  $\sigma$ -fields by step processes. — *P.-A. Meyer*: Démonstration probabiliste de certaines inégalités de Littlewood-Paley: *Exposé I*: Les inégalités classiques. — *Exposé II*: L'opérateur carré du champ. — Correction aux « Inégalités de Littlewood-Paley ». — *Exposé III*: Les inégalités générales. — *Exposé IV*: Semi-groupes de convolution symétriques. — *M. Nagasawa*: A probabilistic approach to

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**Spaces of analytic functions.** — Seminar held at Kristiansand, Norway, June 9-14, 1975. — Edited by O. B. Bekken, B. K. Øksendal and A. Stray. — Lecture Notes in Mathematics, 512. — Un vol. broché,  $16,5 \times 24$ , de VIII, 204 p. — Prix: DM 23.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*E. M. Amar*: Hilbert space methods and interpolating sets in the spectrum of an algebra of operators. — *Eggert Briem*: Extreme orthogonal boundary measures for  $A(K)$  and decompositions for compact convex sets. — *Anne-Marie Chollet*: Boundary zero-sets of  $A^\infty$  functions on strictly pseudo-convex domains. — *H. G. Dales*: Higher point derivations on commutative Banach algebras. — *A.-M. Davie*: Classification of essentially normal operators. — *A. Debiard and B. Gaveau*: Fine potential and function algebras. — *Claes Fernstrøm*: Bounded point evaluations and approximations in  $L^p$  by analytic functions. — *T. W. Gamelin*: Hartogs series, Hartogs functions and Jensen measures. — *Sten Kaijer*: Some remarks on injective Banach algebras. — *K. B. Laursen*: Some remarks on automatic continuity. — *A. Pelczynski*: On Banach space properties of uniform algebras. — *Donald Sarason*: Algebras between  $L^\infty$  and  $H^\infty$ . — *H. S. Shapiro*: The modulus of continuity of an analytic function. — *Nessim Sibony*: Analytic structure in the spectrum of a uniform algebra. — *H. Skoda*: Boundary values for the solutions of the  $\bar{\partial}$ -equation and applications to the Nevanlinna class. — *N. Th. Varopoulos*: On a class of Banach algebras. — *Nils Øvrelid*: Pseudodifferential operators and the  $\bar{\partial}$ -equation.

**Robert B. WARFIELD Jr.** — **Nilpotent groups.** — Lecture Notes in Mathematics, 513. — Un vol. broché,  $16,5 \times 24$ , de VIII, 115 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Rudiments. — The upper central series. — Tensor products and the lower central series. — Idempotent radicals on the category of nilpotent groups. — Groups with abelian central quotient. — The Hall-Petresco formula and residual boundedness. —

Completions, and the structure of complete groups. — Localization. — Nilpotent actions, Kolchin's theorem, and Engel conditions. — Nilpotent groups admitting exponents in a ring. — Unipotent representations and Malcev completions of  $R$ -groups. — The Malcev correspondance.

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*Boutot, Jean-François*: Frobenius et cohomologie locale (d'après R. Hartshorne et R. Speiser, M. Hochster et J. L. Roberts, C. Peskine et L. Szpiro). — *Cartier, Pierre*: Vecteurs différentiables dans les représentations unitaires des groupes de Lie. — *Gramain, André*: Sphères d'homologie rationnelle (d'après J. Barge, J. Lannes, F. Latour et P. Vogel). — *Illusie, Luc*: Cohomologie cristalline (d'après P. Bertholet). — *Sabbagh, Gabriel*: Caractérisation algébrique des groupes de type fini ayant un problème de mots résoluble (théorème de Boone-Higman, travaux de B. H. Neumann et Macintyre). — *Szpiro, Lucien*: Cohomologie des ouverts de l'espace projectif sur un corps de caractéristique zéro (d'après A. Ogus). — *Bony, Jean-Michel*: Polynômes de Bernstein et monodromie (d'après B. Malgrange). — *Chazarain, Jaques*: Spectre des opérateurs elliptiques et flots hamiltoniens. — *Combes, François*: Les facteurs de von Neumann de type III (d'après A. Connes). — *Demazure, Michel*: Démonstration de la conjecture de Mumford (d'après W. Haboush). — *Sibony, Nessim*: Noyau de Bergman et applications biholomorphes dans des domaines strictement pseudo-convexes (d'après Charles Fefferman). — *Verdier, Jean-Louis*: Le théorème de Riemann-Roch pour les variétés algébriques éventuellement singulières (d'après P. Baum, W. Fulton et R. MacPherson). — *Bombieri, Enrico*: A lower bound for the zeros of Riemann's zeta function on the critical line (following N. Levinson). — *Borel, Armand*: Formes automorphes et séries de Dirichlet (d'après R. P. Langlands). — *Godement, Roger*: De l'équation de Schrödinger aux fonctions automorphes. — *Kozsul, Jean-Louis*: Rigidité forte des espaces riemanniens localement symétriques (d'après G. D. Mostow). — *Mazur, Barry et Serre, Jean-Pierre*: Points rationnels des courbes modulaires  $X_0(N)$ . — *Meyer, Paul-André*: Régularité des processus gaussiens (d'après X. Fernique).

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*The universal approach*: Definitions. The Stone-Cech compactification of the discrete group  $T$ . The action of  $\beta T$  on  $X$ . Pointed flows and the Ellis group. — *Proximal flows*: Proximal and distal flows. Proximal and weakly mixing flows. Strongly amenable groups. The universal proximal flow. Examples of proximal flows. — *Strongly proximal flows*: Definitions. Affine flows. Amenable groups. A countably infinite amenable group has  $2^c$  different invariant means. Fixed point theorems. Disjointness. Proximal and strongly proximal. — *The Furstenberg boundary of a Lie group*: Basic facts from Lie group theory. Characterization of amenable Lie groups. Boundaries of connected Lie groups. The boundaries of  $SL(n, \mathbf{R})$ . Disjointness. Proximal flows for Lie groups. —  *$\mu$ -harmonic functions*:  $\mu$ -harmonic functions and amenability. Contractible measures. Basic facts from probability theory. The Poisson flow associated with  $\mu$ . C. D.-groups. — *Harmonic functions on a symmetric space*: For  $\mathbf{G}$  simple,  $\mathbf{K}$  is a maximal closed subgroup of  $\mathbf{G}$ . The Furstenberg compactification of a symmetric Riemann space. Harmonic functions on  $D$ .

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*G. Allain*: La représentation des formes de Dirichlet. — *M. Arsove and H. Leutwiler*: Potential theoretic semigroups. — *C. Bellaïche, A. Decarreau, D. Pesenti and A. Robert*: Opérations  $\Gamma$  et  $d\Gamma$  de Segal. — *C. Berg*: Transformation de Fourier de mesures de type positif sur un group abélien localement compact. — *C. Berg*: Semi-groupes de convolution sur les groupes non-moyennables. — *C. Constantinescu*: Le problème de Dirichlet pour des systèmes d'équations non-linéaires. — *D. Dehen*: Semi-groupes localement équi-continus sur des espaces localement convexes. — *G. Forst*: Familles résolvantes de mesures. — *W. Hansen*: Cônes simpliciaux de fonctions surharmoniques. — *J. Kral*: Singularités non essentielles de solutions des équations aux dérivées partielles. — *G. Lumer*: Images numériques, principe du maximum généralisé et résolvantes. — *D. Pesenti*: Produit de Wick des formes sesquilineaires. — *D. Pesenti*: Relations de commutation canoniques, structures de  $\Phi OK$  et champs de Segal. — *G. Ritter*: Famille résolvante associée à des opérateurs ne vérifiant pas le principe du maximum. *J. P. Roth*: Approximation des opérateurs dissipatifs. — *J. P. Roth*: Semi-groupes invariants sur un espace homogène. — *G. Royer*: I. Propriété asymptotique des distributions de Wightman. — *G. Royer*: II. Théorie de la diffusion de Haag-Ruelle. — *M. Samuelides*: Analyticité vectorielle et champ scalaire neutre. — *P. Sjögren*: Approximation dans les espaces de Banach et mesures spectrales (d'après Butzer, Nessel, Trebels).

Oscar ZARISKI et Pierre SAMUEL. — **Commutative algebra, volume II.** — *Graduate texts in mathematics*, 29. — Un vol. relié,  $16 \times 24$ , de x, 414 p. — Prix: DM 36.20. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

*Valuation theory*: Introductory remarks. Places. Specialization of places. Existence of places. The center of a place in a subring. The notion of the center of a place in algebraic geometry. Places and field extensions. The case of an algebraic field extension. Valuations. Places and valuations. The rank of a valuation. Valuations and field extensions. Ramification theory of general valuations. Classical ideal theory and valuations. Prime divisors in fields of algebraic functions. Examples of valuations. An existence theorem for composite centered valuations. The abstract Riemann surface of a field. Derived normal models. — *Polynomial and power series rings*: Formal power series. Graded rings and

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Nathan JACOBSON. — **Lectures in abstract algebra. III. Theory of fields and Galois theory.** — Graduate texts in mathematics, 32. — Un vol. relié 16 × 24, de XI, 320 p. — Prix: DM 36.20. — Springer Verlag, New York/Heidelberg/Berlin, 1975.

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John WERMER. — **Banach algebras and several complex variables.** — Second edition. — Graduate texts in mathematics, 35. — Un vol. relié, 16 × 24, de VIII, 160 p. — Prix: DM 36.20. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

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John L. KELLEY; Isaac NAMIOKA. — **Linear topological spaces.** — Graduate texts in mathematics, 36. — Un vol. relié, 16 × 24, de xv, 246 p. — Prix: DM 36.20. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

*Linear spaces*: Linear spaces. Convexity and order. Separation and extension theorems. — *Linear topological spaces*: Topological spaces. Linear topological spaces, linear functionals, quotient and products. Normability, metrizability, and embedding; local convexity. Completeness. Function spaces. — *The category theorems*: Category in topological spaces. The absorption theorem and the difference theorem. The closed graph theorem. Equicontinuity and boundedness. — *Convexity in linear topological spaces*: Convex subsets of linear topological spaces. Continuous linear functionals. Extreme points. — *Duality*: Pairings. The weak topologies. Topologies for  $E$  and  $E^*$ . Boundedness. The evaluation map into the second adjoint. Dual transformations. Pseudo-metrizable spaces. — *Appendix*: Ordered linear spaces.  $L$  and  $M$  spaces.

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Introduction. Homotopy functors. Mock bundles. Coefficients. Geometric theories. Equivariant theories and operations. Sheaves. The geometry of  $CW$  complexes.

A. AUSLENDER. — **Optimisation: méthodes numériques.** — Maîtrise de mathématiques et applications fondamentales. — Un vol. relié, 16 × 24, de 175 p. — Prix: FF 115.00. — Masson, Paris/New York/Barcelone/Milan, 1976.

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3. Application à la programmation mathématique: Les méthodes de descente. 4. Applications à la théorie du minimax. — *Méthodes numériques en programmation convexe non différentiable*: 1. Projection sur un convexe fermé: recherche d'un point commun à une famille de convexes fermés. 2. Méthodes de sous-gradients. 3. Approximation par une suite de problèmes plus simples. — *Méthodes de décomposition*: 1. Décomposition sur un espace produit. 2. Méthodes duales de décomposition. 3. Méthodes de décomposition du type paramétrisation. — *Egalités et inégalités variationnelles*: 1. Notions fondamentales. 2. Résolution d'inégalités variationnelles avec opérateurs multivoques. 3. Méthodes de descente. 4. Méthodes de pénalisation. 5. Méthodes d'accumulation. — *Applications dans les sciences exactes et naturelles et en recherche opérationnelle*: 1. Passage de problèmes d'optimisation dont l'espace de base est de dimension infinie à d'autres dont l'espace de base est de dimension finie. 2. Applications aux problèmes de mathématiques appliquées. 3. Applications à la mécanique. 4. Applications à la physique. 5. Applications à la chimie. 6. Applications à la biologie. 7. Application à la recherche opérationnelle.

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Introduction. A static problem for the nonlinear string. A static problem for the nonlinear membrane. The rotating string. Existence of positive solutions. Bifurcation theory for second order ordinary differential equations. Application to the inextensible elastica. Buckling of the circular plate.

A. JEFFREY. — **Quasilinear hyperbolic systems and waves.** — Research notes in mathematics, 5. — Un vol. broché, 17 × 24, de 230 p. — Prix: £6.90. — Pitman Publishing, London/San Francisco/Melbourne, 1976.

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line. Formation of shock on the wavefront. Special cases. Bifurcation of wavefront. Wavefront propagation in  $\mathbf{R}^3 \times t$ .  $C^1$  wavefront propagation in shallow water. Smooth fronted  $C^2$  waves in the shallow water approximation.

**Bäcklund transformations, the inverse scattering method, solitons, and their applications.** — NSF research workshop on contact transformations. — Edited by R. M. Miura. — Lecture notes in Mathematics, 515. — Un vol. broché,  $24 \times 16,5$ , de VIII, 295 p. — Prix: DM 28.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

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$[C^b(X), Q]$ , b) Cas des espaces  $[C(X), \mathcal{P}]$ . 3. Espaces tonnelé,  $d$ -tonnelé,  $\sigma$ -tonnelé, évaluable  $d$ -évaluable et  $\sigma$ -évaluable associés: a) Cas des espaces  $[C(X), \mathcal{P}]$ . Support d'un borné de  $[C(X), \mathcal{P}]_s^*$ . Tonneaux,  $d$ -tonneaux et  $\sigma$ -tonneaux  $[C(X), \mathcal{P}]$ . Caractérisation des espaces  $[C(X), \mathcal{P}]$  tonnelés,  $d$ -tonnelés,  $\sigma$ -tonnelés, évaluable,  $d$ -évaluable,  $\sigma$ -évaluable. Espaces tonnelés,  $d$ -tonnelé,  $\sigma$ -tonnelé, évaluable,  $d$ -évaluable et  $\sigma$ -évaluable associés à  $[C(X), \mathcal{P}]$ ; b) Cas des espaces  $[C^b(X), Q]$ . 4. Espaces bornologiques associés: a) Cas des espaces  $[C(X), \mathcal{P}]$ ; b) Cas des espaces  $[C^b(X), Q]$ . 5. Applications à l'espace  $C_s(X)$ . — *Conditions de séparabilité et de compacité faible*. 1. Séparabilité par semi-norme. 2. Séparabilité de l'espace  $[C(X), \mathcal{P}]$ . 3. Séparabilité de l'espace  $[C^b(X), Q]$ . 4. Critères de compacité dans  $C_s(X)$ . 5. Critères de compacité dans  $[C(X), \mathcal{P}]_a$ .

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multiples. — *Eléments de la théorie de la synchronisation* : La théorie de la synchronisation. Les fonctions associées. Choix des nombres  $m$  et  $N$ . Cas du système autonome. Synchronisation d'un oscillateur non linéaire entretenu par un couple périodique. Courbe de réponse. Stabilité. Excitation paramétrique d'un système non linéaire. Une généralisation du théorème de synchronisation. — *Sur l'existence de solution périodique de certaines équations différentielles non linéaires ; méthode de point fixe ; méthode numérique* : Extension du théorème de Brouwer. Le théorème de Carathéodory. Application des théorèmes de point fixe à la recherche de solution périodique d'une équation différentielle. Matrice de Green; problème de Sturm-Liouville. Une approche numérique du problème des solutions périodiques (M. Urabe). — *Equations différentielles dans les espaces de Banach* : Continuité de la solution par rapport à un paramètre (J. Kurzweil). Application: la méthode de la moyenne. Retour sur le problème de l'existence des solutions. Indice de non compacité d'un ensemble. Continuité des points fixes par rapport à un paramètre. Une généralisation du théorème d'Ascoli-Arzelà. Application à la théorie des équations différentielles. Continuité des solutions par rapport à un paramètre. Application. Equations différentielles fonctionnelles dans les espaces de Banach. — *Problèmes*.

John J. BENEDETTO. — **Real variable and integration, with historical notes.** — *Mathematische Leitfäden.* — Un vol. broché,  $16 \times 23$ , de 278 p. — Prix: DM 48.00. — B. G. Teubner, Stuttgart, 1976.

Classical real variable. — Lebesgue measure and general measure theory. — The Lebesgue integral. — The relationship between differentiation and integration on  $R$ . — Spaces of measures and the Radon-Nikodym theorem. — Weak convergence of measures. — *Appendices*: Metric spaces and Banach spaces. Fubini's theorem. The Riesz representation theorem.

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Quasi-periodic solutions in problems of nonlinear mechanics. — General solutions of nonlinear differential equations in the neighbourhood of quasi-periodic solutions. — A smoothing technique. — Trajectories on a torus. — Linear systems with quasi-periodic coefficients. — Neighbourhood of an invariant smooth toroidal manifold. — Neighbourhood of a compact invariant manifold of a non-autonomous system.

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*Introduction:* Algebraic and geometric structures. Analytical structures. — Existence and uniqueness theorems. — Singularities. — Riccati's equation. — Linear differential equations: first and second order. — Special second order linear differential equations. — Representation theorems. — Complex oscillation theory. — Linear  $n$ -th order and matrix differential equations. — The Schwarzian. — First order nonlinear differential equations. — Second order nonlinear differential equations and some autonomous systems.

Irving W. BURR. — **Statistical quality control methods.** — Statistics, vol. 16. — Un vol. relié, 18 × 26, de XII, 522 p. — Prix: FS 105.00. — Marcel Dekker, New York/Basel, 1976.

*Introduction:* What is statistics? Why statistical quality control? Aim of book. Prerequisites. Suggestions to the student. — *Brief review of statistical background:* Population and sample. Parameter and statistics. Notations. Probability definitions and laws. Distribution of sample statistics. Statistical estimation. Testing hypotheses. — *Control charts in general:* Running records of performance. Random and assignable causes. The control chart for interpreting variations in quality. Two purposes of control charts. Economic balance between two errors. Meaning of a process in control and potential advantages. — *Control charts for measurements:* Control charts for averages, ranges and standard deviations, from given standards. Control charts for averages, ranges and standard deviations, analyzing past data. Comparison of the two charts for variability. Comparison of a process with specifications. Continuing the charts. Illustrative examples. Kinds of assignable causes. When to set standard values—process capability. Use of runs for out of controlness. — *Background of control charts for measurements:* The empirical approach to sampling distributions. Control charts for samples from normal populations of  $x$ 's problems. — *Control charts for attributes:* Control charts for defectives. Control charts for defects. General comments on control charts for attributes. A method of rating product quality. — *Miscellaneous topics in control charts:* Control charts for individual measurements, moving ranges. Tool wear and other gradual process changes. Charts for  $\bar{X}$  and  $s$ , large samples. Charts for  $\bar{X}$  and  $R$  or  $s$ , with varying sample size. Different types of samples. Relative efficiency of different types of charts. Artificial "specifications" for greater efficiency in attribute charts. Summary charts for  $\bar{X}$  and  $\bar{R}$ . Variations of control charts. — *Applications of control charts:* What manufacturing problem to work on. Attacking an industrial problem. List of typical applications of control charts. Use in the laboratory. The quality control person. Bibliography on applications. — *Acceptance sampling by attributes:* Why acceptance sampling? Characteristics of sampling plans. Acceptance criteria for attribute acceptance plans. Operating characteristic ( $OC$ ) curve. Defectives. The average outgoing quality curve,  $AOQ$  curve. The average sample number curve,  $ASN$  curve. The average total inspection curve,  $ATI$  curve. Characteristics of double sampling plans. Further notations on  $OC$  curves. Characteristics for defects plans. Devising a sampling plan to match two points on an  $OC$  curve. Use of control chart record with acceptance sampling. Summary—General principles of sampling acceptance and some misconceptions. — *Some standard plans for attributes:* The Dodge-Romig sampling inspection tables. The ABC or military standard 105D plan. — *Acceptance sampling by measurements:* Potential greater efficiency by variables than by attributes. Dependence upon knowledge of distribution of individual  $x$ 's. Use of control charts and frequency distributions for past data. Decision-making on lot means, known  $\sigma_x$ . Decision

making on percent beyond a specification, known  $\sigma_x$ . Decision making on percent beyond a specification, unknown  $\sigma_x$ . Single sampling for variability. Military standard 414 plan. Checking a process setting and a process capability. — *Sequential analysis*: The general approach. Sequential probability ratio test. Six special cases of sequential analysis summarized. Some examples. Use in checking a process setting. A sequential test for process capability, using ranges. Use in the laboratory. Two derivations of acceptance-rejection constants. — *Some other sampling plans*: Sampling inspection of continuous production. Chain sampling plans, ChSP-1, Skip-lot sampling plan. Cusum charts. — *Statistics of combinations, tolerances for mating parts*: Statistics of sums and differences. Use of distributions in assemblies. Tolerancing assemblies by specifying process controls and acceptance sampling. Products, quotients, and other functions. — *Some other frequency distributions*: Moments of distributions. Some frequency distribution models. A goodness of fit test for frequency data.

Sergio A. ALBEVERIO; Raphael J. HØEGH-KROHN. — **Mathematical theory of Feynman path integrals**. — Lecture Notes in Mathematics, vol. 523. — Un vol. broché, 16,5 × 24,5, de iv, 139 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

The Fresnel integral of functions on a separable real Hilbert space. — The Feynman path integral in potential scattering. — The Fresnel integral relative to a non singular quadratic form. — Feynman path integrals for the anharmonic oscillator. — Expectations with respect to the ground state of the harmonic oscillator. — Expectations with respect to the Gibbs state of the harmonic oscillator. — The invariant quasifree states. — The Feynman history integrals for the relativistic quantum boson field.

Clifford O. BLOOM; Nicholas D. KAZARINOFF. — **Short wave radiation problems in inhomogeneous media**: asymptotic solutions. — Lecture Notes in Mathematics, vol. 522. — Un vol. broché, 16,5 × 24,5, de v, 104 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*A priori bounds*: Geometric preliminaries. The basic inequality. A lower bound for  $(\nabla u Q) \cdot \nabla \bar{u}$ . Far-field behavior of coefficients of the  $|Lu|^2$  and  $|u|^2$ -terms. The radiation integral. A priori estimates in weighted  $L_2$ -norms. An a priori estimate for  $|u(x, \lambda)|$ . — *Global existence, smoothness, and nonfocussing of optical paths in a refractive medium*: Ray coordinate systems and convexity relative to  $n^{1/2}(x)$ . An existence theorem. Solution of the ray equations. Existence of ray fields on unbounded domains. First derivatives of  $X$  and the Jacobian. Higher derivatives of  $X$ . The main theorem. — *A uniform approximation to the solution of Ursell's radiating body problem*: The Ansatz. Analysis of the  $A^j$  and  $B^j - 2$ . The radiation condition. General obstacles. An Ansatz for more general boundary conditions. — *Existence of solutions*.

Jan GRANDELL. — **Doubly stochastic Poisson processes**. — Lecture Notes in Mathematics, vol. 529. — Un vol. broché, 16,5 × 24,5, de x, 234 p. — Prix: DM 25.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Definitions and basic properties. — Some miscellaneous results. — Characterization and convergence of non-atomic random measures. — Limit theorems. — Estimation of random variables. — Linear estimation of random variables in stationary doubly stochastic Poisson sequences. — Estimation of second order properties of stationary doubly stochastic Poisson sequences. — Point processes and random measures. — Hilbert space and random variables. — Some time series analysis.

**Séminaire Pierre Lelong (Analyse) Année 1974/75.** — Ed. par Pierre Lelong. — Lecture Notes in Mathematics, vol. 524. — Un vol. broché, 16,5 × 24,5, de v, 222 p. — Prix: DM 23.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Contient 16 exposés par: G. Trautmann, A. Rapp, J.-L. Stehle, P. Mazet, J.-J. Risler, C. Servien, J.-L. Ermine, M. Waldschmidt, P. Berner, A. Tognoli, P. Kree, W. Schachermayer, R. Aron.

P. L. BUTZER; E. L. STARK. — **Dissertationen in Mathematik an den Hochschulen der Bundesrepublik Deutschland in der Zeit von 1961 bis 1970: eine Bibliographie.** — Hrsg von Präsidium der Deutschen Mathematiker-Vereinigung. — Un vol. broché, 16 × 23,5, de XII, 101 p. — B. G. Teubner, Stuttgart, 1975.

Une liste de 1131 doctorats décernés en sciences mathématiques par 30 universités de la République fédérale allemande et Berlin ouest pendant la période de 1961 à 1970. Sont énumérés les noms des candidats, le titre de la thèse et le nom du directeur de thèse et des coexamineurs. (Les noms des candidats sont classés par universités). Cet ouvrage est un supplément du « Jahresbericht der Deutschen Mathematiker-Vereinigung », vol. 76, 1975.

Wolfgang KROLL. — **Lehr- und Aufgabenbuch zur Differentialrechnung: eine Einführung in die reelle Analysis.** — Un vol. broché, 17 × 24, de VI, 266 p. — Ferd. Dümmler, Bonn, 1976.

*Stetigkeit*: Grundbegriffe. Der Funktionsbegriff. Stetigkeit. — *Differentialrechnung*: Kartesische Diagramme. Die Tangente. Der Ableitungskalkül. Anwendungen der Differentialrechnung auf Funktionsuntersuchungen. Grenzwerte.

Nathan JACOBSON. — **Lectures in abstract algebra;** — Vol. 1: basic concepts. — Graduate texts in mathematics, vol. 30. — Un vol. relié, 16 × 24,5, de XII, 217 p. — Prix: DM 26.40. — Springer Verlag, New York/Heidelberg/Berlin.

Concepts from set theory, the system of natural numbers. — Semi-groups and groups. — Rings, integral domains and fields. — Extensions of rings and fields. — Elementary factorization theory. — Groups with operators. — Modules and ideals. — Lattices.

Jacques NIMIER. — **Mathématique et affectivité: une explication des échecs et des réussites.** — Collection Laurence Pernoud. — Un vol. broché, 16 × 23,5, de 244 p. — Editions Stock, Paris, 1976.

*Les différents thèmes*: Les mathématiques et l'ordre. Les mathématiques comme objet dangereux. Défenses contre le sentiment de danger. Valeurs attribuées aux mathématiques. Attitudes vis-à-vis des mathématiques. — *Texte et analyse d'un entretien*: Entretien avec un garçon de série A. Analyse de cet entretien. — *Conclusions*: L'enseignement des mathématiques. La formation des professeurs. La place de la psychologie dans l'enseignement. — *Annexes*: Méthodologie et échantillon. Etudes du choix des verbes. Etude du choix des adjectifs. Etudes des différences avec les autres disciplines.

Robert M. BETHEA; Benjamin S. DURAN; Thomas L. BOUILLION. — **Statistical methods for engineers and scientists.** — Statistics, vol. 15. — Un vol. relié, 17 × 23,5, de xxii, 583 p. — Prix: FS 90.00. — Marcel Dekker, New York/Basel, 1975.

*Probability*: Definition of probability. Possible ways for events to occur. Probability computation rules. A posteriori probability. — *Distributions*: Definitions. Theoretical distributions. Other theoretical distributions. — *Descriptive statistics*: Measures of location. Measures of variability. — *Expected values and moments*: Discrete distributions. Continuous distributions. Joint distributions and independence of random variables. Moments. Examples. — *Statistical inference: Estimation*: Statistical estimation. Point estimates. Interval estimates. Chi-square distributions. The *t*-distribution. The *F*-distribution. Estimation of the mean. Comparison of two means. Estimation involving paired observations. The variance. Estimation of a variance. Comparison of two variances. Estimation of a proportion *P*. Comparison of two proportions. — *Statistical inference: Hypothesis testing*: Types of errors. Testing of hypotheses. One-tailed and two-tailed tests. Tests concerning the mean. Tests on the difference of two means. Paired *t*-test. Testing a proportion *P*. Testing the difference of two proportions. Tests concerning the variance. Testing the equality of variances. Other  $\chi^2$  tests. Contingency tests. — *Analysis of variance*: One-way analysis of variance. Two-way analysis of variance. Confidence intervals and tests of hypotheses. Interaction. Model for the three-way analysis of variance. Bartlett's test for equality of variances. — *Regression analysis*: Simple linear regression. Regression using matrices. Multiple linear regression. Polynomial regression. Nonlinear regression. Correlation analysis. Testing equality of slopes. Transformation of data in regression analysis. — *Orthogonal polynomials in polynomial regression*: Fitting a quadratic by orthogonal polynomials. Tests of significance. — *Experimental design*: Sources of error. Completely randomized designs. Randomized complete block design. Latin square designs. Graeco-Latin square. Factorial experiments. Other designs. Design efficiency. — *Appendix A*: Matrix algebra. — *Appendix B*: Answers to selected problems. — *Appendix C*: Tables of statistical functions.

**Œuvres de Paul Painlevé.** — Vol. 3: Equations différentielles du second ordre. Mécanique, Quelques documents. — Un vol. relié, 23 × 27,5, avec portrait et facsimilés, de 826 p. — Prix: FF 180.00. — Editions du Centre national de la recherche scientifique, Paris, 1975.

*Equations différentielles du second ordre*: Sommaire. Extrait d'une note de J. Drach (suite). Notes aux Comptes Rendus de l'Académie des Sciences traitant des équations différentielles du second ordre et d'ordre supérieur, classées dans l'ordre chronologique. Notes de P. Boutroux. Notes de R. Liouville. Mémoire sur les équations différentielles dont l'intégrale générale est uniforme. Table des matières du mémoire précédent. Sur les équations différentielles du second ordre et d'ordre supérieur. Table des matières du mémoire précédent. — *Mécanique*: Sommaire. Préface d'A. Lichnerowicz, membre de l'Institut. Notice sur les travaux scientifiques (compléments). Notes aux Comptes Rendus de l'Académie des Sciences traitant de mécanique. Note de M. Pescara. Notes de J. Chazy et J. Trouset. Mémoire sur la transformation des équations de la dynamique. Tables des matières du mémoire précédent. Leçons sur l'intégration des équations de la dynamique et applications (extrait). Sur les mouvements et les trajectoires réels des systèmes. Table des matières du mémoire précédent. Leçons sur le frottement (introduction). Mémoire sur les intégrales premières du problème des *n* corps. Table des matières du mémoire précédent. Analyse des « axiomes de la mécanique » [127] par E. Cartan. Réception à

Cambridge. Les résistances d'un liquide au mouvement d'un solide. Table des matières du mémoire précédent. P. Painlevé physicien par Ch. Platrier. — *Quelques documents* : Lettre de H. Villat à P. Painlevé. Rapport d'E. Picard sur P. Painlevé. Rapport d'H. Poincaré sur P. Painlevé. Le problème de l'intégration des équations différentielles par P. Painlevé. Rapport sur les mémoires de J. Hadamard par P. Painlevé (prix Vaillant). Rapport sur les mémoires de P. Boutroux, J. Chazy, R. Garnier (Grand prix des sciences mathématiques). Rapport sur les travaux de M. Vessiot par P. Painlevé (extrait). Discours présidentiel. Discours au Maréchal Foch. H. Poincaré par P. Painlevé. A. France (Discours de P. Painlevé). P. Painlevé par E. Fichot (extrait). Commémoration. Mortel souvenir. Compléments et correspondance.

F. KARTESZI. — **Introduction to finite geometries.** — North Holland texts in advanced mathematics, vol. 2. — Un vol. relié, 15,5 × 23, de XIII, 266 p. — Prix: Dfl 95.00. — North Holland Publishing Company, Amsterdam/Oxford/American Elsevier Publishing Company Inc., New York, 1976.

*Basic concepts concerning finite geometries*: The finite plane. Isomorphic planes, incidence tables. Construction of finite planes, cyclic planes. The  $\Gamma$ -table of a finite projective plane. Coordinate systems on the finite plane. The concepts of Galois planes and Galois fields. Closed subplane of a finite projective plane. The notion of the finite affine plane. Different kinds of finite hyperbolic planes. Galois planes and the theorem of Desargues. A non-Desarguesian plane. Collineations and groups of collineations of finite planes. Line preserving mappings of a finite affine plane and of a finite regular hyperbolic plane. Finite projective planes and complete orthogonal systems of Latin squares. The composition of the linear functions and the  $D(X, Y)$  plane. Problems and exercises. — *Galois geometries*: The notion of Galois spaces. The Galois space as a configuration of its subspaces. The generalization of Pappus' theorem on the Galois plane. Coordinates on a Galois plane. Mappings determined by linear transformations. Linear mapping of a given quadrangle onto another given quadrangle. The concept of an oval on a finite plane. Conics on a Galois plane. Point configurations of order 2 on a Galois plane of even order. The canonical equation of curves of the second order on the Galois planes of even order. Point configurations of order 2 on a Galois plane of odd order. Correspondences between two pencils of lines. A theorem of Segre. Supplementary notes concerning the construction of Galois planes. Collineations and homographies on Galois planes. The characteristics of a finite projective plane. The set of collineations mapping a Galois plane onto itself. Desarguesian finite planes. Problems and exercises. — *Geometrical configurations and nets*: The concept of geometrical configurations. Two pentagons inscribed into each other. The pentagon theorem and the Desarguesian configuration. The concept of geometrical nets. Groups and  $R$  nets. Problems and exercises. — *Some combinatorial applications of finite geometries*: A theorem of closure of the hyperbolic space. Some fundamental facts concerning graphs. Generalizations of the Petersen graph. A combinatorial extremal problem. The graph of the Desargues configuration. Problems and exercises. — *Combinatorics and finite geometries*: Basic notions of combinatorics. Two fundamental theorems of inversive geometry. Finite inversive geometry and the  $t(v, k, \lambda)$  block design. General theorems concerning the Möbius plane. Incidence structure and the  $t$ -block design. Problems and exercises. — *Some additional themes in the theory of finite geometries*: The Fano plane and the theorem of Gleason. The derivation of new planes from the Galois plane. A generalization of the concept of the affine plane. Problems and exercises. Notes concerning algebraic structures in general. Notes concerning finite fields and number theory. Notes concerning planar ternary structures.

**New developments in differential equations.** — Proceedings of the Second Scheveningen Conference on Differential Equations, the Netherlands, August 25-29, 1975. — Ed. by Wiktor Eckhaus. — North Holland mathematics studies, vol. 21. — Un vol. broché, 16,5 × 24, de viii, 248 p. — Prix: Dfl 60.00. — North Holland Publishing Company, Amsterdam/New York/Oxford, 1976.

*J. L. Lions*: Some topics on variational inequalities and applications. — *G Stampacchia*: Free boundary problems for Poisson's equation. — *H. Amann*: Nonlinear elliptic equations with nonlinear boundary conditions. — *H. Brezis*: On the range of the sum of nonlinear operators. — *L. A. Peletier*: On the asymptotic behavior of solutions of an equation arising in population genetics. — *C. Cuvelier*: Optimal control of a system governed by the Navier-Stokes equations coupled with the heat equation. — *G. Iooss*: Secondary or direct bifurcation of a steady solution of the Navier-Stokes equations into an invariant torus. — *W. A. Harris jr.*: Application of the method of differential inequalities in singular perturbation problems. — *P. P. N. de Groen*: A singular perturbation problem of turning point type. — *B. Kaper*: Asymptotics for a class of perturbed initial value problems. — *H. D. Niessen*: On the solution of perturbed differential equations. — *W. N. Everitt and M. Giertz*: On certain ordinary differential expressions and associated integral inequalities. — *Å. Pleijel*: On Legendre's polynomials. — *W. Jurkat, D. A. Lutz and A. Peyerimhoff*: Invariants and canonical forms for meromorphic second order differential equations. — *C. G. Lekkerkerker*: On generalized eigenfunctions and linear transport theory. — *A. Dijksma*: Integral-ordinary differential-boundary subspaces and spectral theory. — *R. Martini*: Some degenerated differential operators on vector bundles.

Ulf GRENANDER. — **Pattern synthesis: Lectures in pattern theory, vol. 1.** — Applied mathematical sciences, vol. 18. — Un vol. broché, 15 × 23, de vii, 509 p. — Prix: DM 36.20. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

*The generators*: Generators and their properties. Abstract generators. Concrete generators. Sources of generators. — *The configurations*: Rules and restrictions. The bond structure. Free configurations. Linear connection type. Bounded arity greater than two. Free type connections. Partial order connection type. Other connection types. Full graph structure. Probabilities on  $\mathcal{L}(\mathcal{R})$ . Mapping in configuration space. — *The images*: The image algebra. Abstract sequence images. Other abstract images. Temporal and other one-dimensional patterns. Plane patterns. Spatial patterns. Space-time patterns: Motion and behavior. Space-time patterns: Growth and decay. Boolean patterns. — *The deformations*: Deformations on generators, configurations, images. Automorphic deformations. Changes in contrast. Background deformations. Incomplete observations. Indirect observations. Other deformations.

**Probability in Banach spaces.** — Proceedings of the First International Conference on Probability in Banach spaces, 20-26 July 1975, Oberwolfach. — Ed. by A. Beck. — Lecture Notes in Mathematics, vo. 526. — Un vol. broché, 16,5 × 24, de vi, 290 p. — Prix: DM 28.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Charles R. Baker*: Absolute continuity and applications to information theory. — *Anatole Beck*: Cancellation in Banach spaces. — *Antoine Brunel and Louis Sucheston*: On sequences invariant under spreading in Banach spaces. — *S. D. Chatterji*: Vector-valued martingales and their applications. — *Mark J. Christensen and A. T. Bharucha-Reid*: Algebraic models for Gaussian measures on Banach spaces. — *X. Fernique*: Evaluations de processus gaussiens composés. — *D. J. H. Garling*: Functional central

limit theorems in Banach spaces. — *Daniel P. Giesy*: Strong laws of large numbers for independent sequences of Banach space-valued random variables. — *Evarist M. Giné*: Some remarks on the central limit theorem in  $C(S)$ . — *Marjorie G. Hahn*: What second-order Lipschitz conditions imply the CLT? — *Naresh C. Jain*: Central limit theorem in a Banach space. — *J. Kuelbs*: The law of the iterated logarithm for Banach space valued random variables. — *Hui-Hsiung Kuo*: Distribution theory on Banach space. — *S. Kwapién*: A theorem on the Rademacher series with vector valued coefficients. — *V. Mandrekar*: Central limit problem on  $L_p$  ( $p \geq 2$ ) I. Lévy-Khinchine representation. — *Michel B. Marcus*: Some new results on central limit theorems for  $C(S)$ -valued random variables. — *W. J. Padgett and R. L. Taylor*: Almost sure convergence of weighted sums of random elements in Banach spaces. — *Gilles Pisier*: Sur la loi du logarithme itéré dans les espaces de Banach. — *J. Rosiński*: Invariance principle for Banach space valued random variables and under random partitions. — *Hiroshi Sato*: Banach support of a probability measure in a locally convex space. — *R. L. Taylor and W. J. Padgett*: Weak laws of large numbers in Banach spaces and their extensions. — *K. Urbanik*: Decomposability properties of probability measures on Banach spaces. — *Peter Warren and Joseph Howell*: A strong law of large numbers for orthogonal Banach space-valued random variables. — *A. Weron*: On weak second order and Gaussian random elements. — *W. A. Woyczyński*: Asymptotic behavior of martingales in Banach spaces.

James E. HUMPHREYS. — **Ordinary and modular representations of Chevalley groups.** — Lecture Notes in Mathematics, vol. 528. — Un vol. broché,  $16,5 \times 24$ , de III, 127 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Irreducible modular representations*: Weights and maximal vectors. Irreducible modules. The linkage principle. Application to  $M\lambda$ . — *Projective modules*: The  $U$ -modules  $Z\lambda$  and  $Q\lambda$ . Results of Verma and Hulsurkar. Tensor products. Construction of projective modules. Small PIM's. PIM's of  $K\Gamma$ . — *Ordinary representations*: The Brauer tree of  $SL(2, p)$ . The Brauer complex of  $SL(3, p)$ . The Brauer complex of  $Sp(4, p)$ . The general case. — *Twisted groups*: Ordinary and modular representations. — *Appendix R*: Representation theory. — *Appendix S*: The Steinberg representation. — *Appendix T*: Tensoring with a projective module. — *Appendix U*: The universal enveloping algebra.

Manfred DENKER; Christian GRILLENBERGER; Karl SIGMUND. — **Ergodic theory on compact spaces.** — Lecture Notes in Mathematics, vol. 527. — Un vol. broché,  $16,5 \times 24$ , de IV, 360 p. — Prix: DM 32.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

Measure theoretical dynamical systems. Measures on compact metric spaces. Invariant measures for continuous transformations. Time averages. Ergodicity. Mixing and transitivity. Shifts and subshifts. Measures on the shift space. Partitions and generators. Information and entropy. Computation of entropy. Entropy for Bernoulli- and Markov shifts. Ergodic decompositions. Topological entropy. Topological generators. Expansive homeomorphisms. Subshifts of finite type. Variational principle for topological entropy. Measures with maximal entropy—Intrinsically ergodic systems. Entropy-expansive homeomorphisms. The specification property. Specification and expansiveness. Basic sets for axiom  $A$ . Automorphisms of the torus. More on subshifts of finite type. Preparations for generator theorems. A combinatorial construction of minimal sets. Finite generators for ergodic transformations (Krieger's theorem). Strictly ergodic embedding (theorem of Jewett and Krieger). Finite generators for aperiodic transformations. Embedding theorems for aperiodic transformations.

Hans-Jakob LUETHI. — **Komplementaritäts- und Fixpunktalgorithmen in der mathematischen Programmierung, Spieltheorie und Oekonomie.** — Lecture notes in economics and mathematical systems, vol. 129. — Un vol. broché, 16,5 × 24, de vii, 145 p. — Prix: DM 18.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Komplementarität* : Das Komplementaritätsproblem. Ein elementares Lemma aus der Graphentheorie. Das lineare Komplementaritätsproblem ( $q/M$ ). Der Lemke-Algorithmus. Spezielle Klassen von Matrizen. Anwendungen zum linearen Komplementaritätsproblem. Geometrische Interpretationen des linearen Komplementaritätsproblems. Neuere Forschungsergebnisse. Das nichtlineare Komplementaritätsproblem. Technik der Triangulation. Der Markierungsprozess. Der Basisalgorithmus. Einige spezielle Klassen nichtlinearer Probleme und Existenzsätze. Anwendungen zum nichtlinearen Komplementaritätsproblem. Spezielle Triangulation von  $R_n$ . Die Verfeinerung. — *Fixpunktalgorithmen* : Der Fixpunktsatz von Brouwer. Der Fixpunktalgorithmus von H. Scarf. Bestimmung von Fixpunkten konvexer, obenthalbstetiger Korrespondenzen. Anwendung der Fixpunktalgorithmen. Komplementarität und Fixpunkte: Abschliessende Bemerkungen.

**Mathematical systems theory.** — Proceedings of the International Symposium, Udine, Italy, June 16-27, 1975. — Ed. by G. Marchesini and S. K. Mitter. — Lecture notes in economics and mathematical systems, vol. 131. — Un vol. broché, 16,5 × 24, de x, 408 p. — Prix: DM 35.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

*Automata theory* : Contient 1 exposé de S. Eilenberg. — *Linear systems theory* : Contient 6 exposés de H. Fukawa, M. L. J. Hautus, M. Hazewinkel and R. Kalman, A. S. Morse, B. F. Wyman, J. Rissanen and L. Ljung, — *Bi-linear and non-linear systems* : Contient 5 exposés de R. W. Brockett, M. Fliess, E. Fornasini and G. Marchesini, H. Hermes, H. J. Sussmann. — *Infinite dimensional systems* : Contient 6 exposés de J. S. Baras, A. Bensoussan; M. C. Delfour and S. K. Mitter, P. Dewilde, P. A. Fuhrmann, E. W. Kamen, L. Pandolfi. — *Coding and filtering for sequential systems* : Contient 4 exposés de J. M. Goethals, G. Longo, S. I. Marcus and A. S. Willsky, A. S. Willsky. — *General dynamical systems and categorical approach to systems* : Contient 5 exposés de H. Ehrig and H. J. Kreowski, J. A. Goguen, H. J. Kreowski and H. Ehrig, J. L. Kulkowski, P. Pichler.

A. V. BALAKRISHNAN. — **Applied functional analysis.** — Applications of mathematics, vol. 3, — Un vol. relié, 16 × 24, de x, 309 p. — Prix: DM 48.40. — Springer Verlag, New York/Heidelberg/Berlin, 1976.

*Basic properties of Hilbert spaces* : Basic definitions. Examples of Hilbert spaces. Hilbert spaces from Hilbert spaces. Convex sets and projections. Orthogonality and orthonormal bases. Continuous linear functionals. Riesz representation theorem. Weak convergence. Nonlinear functionals and generalized curves. The Hahn-Banach theorem. — *Convex sets and convex programming* : Elementary notions. Support functional of a convex set. Minkowski functional. The support mapping. Separation theorem. Application to convex programming. Generalization to infinite dimensional inequalities. A fundamental result of game theory: minimax theorem. Application: theorem of Farkas. — *Functions, transformations operators* : Linear operators and their adjoints. Spectral theory of operators. Spectral theory of compact operators. Operators on separable Hilbert spaces.

$L_2$  spaces over Hilbert spaces. Multilinear forms. — *Semigroups of linear operators*: Definitions and general properties of semigroups. Generation of semigroups. Semigroups over Hilbert spaces: dissipative semigroups. Compact semigroups. Analytic (holomorphic) semigroups. Elementary examples of semigroups. Extensions. Differential equations. Cauchy problem. Controllability. State reduction: observability. Boundary input: an example. Evolution equations. — *Optimal control theory*: Preliminaries. Linear quadratic regulator problem. Linear quadratic regulator problem: infinite time interval. Hard constraints. Final value control. Time optimal control problems. — *Probability measures on a Hilbert space*: Preliminaries. Measures on cylinder sets. Characteristic functions and countable additivity. Weak random variables. Random variables. White noise. Differential systems drive by white noise. The filtering problem. Stochastic control. White noise integrals. Radon-Nikodym derivatives.

Daniel D. JOSEPH. — **Stability of fluid motions I.** — Springer tracts in natural philosophy, vol. 27. — Un vol. relié, 17 × 27, de XIII, 282 p. — Prix: DM 97.00. — Springer Verlag, Berlin/Heidelberg/New York, 1976.

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