

# Calcul des variations

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Albrecht BÖTTCHER, Israel GOHBERG, Peter JUNGHANNS, (Editors). — **Toeplitz matrices and singular integral equations: the Bernd Silbermann anniversary volume.** — Operator theory: advances and applications, vol. 135. — Un vol. relié, 17×24, de vi, 328 p. — ISBN 3-7643-6877-2. — Prix: SFr. 169.00. — Birkhäuser, Basel, 2002.

This volume, dedicated to Bernd Silbermann on his sixtieth birthday, collects research articles on Toeplitz matrices and singular integral equations written by leading area experts. The subjects of the contributions include Banach algebraic methods, Toeplitz determinants and random matrix theory, Fredholm theory and numerical analysis for singular integral equations, and efficient algorithms for linear systems with structured matrices, and reflect Bernd Silbermann's broad spectrum of research interests. The volume also contains a biographical essay and a list of publications.

Allan M. KRALL. — **Hilbert space, boundary value problems and orthogonal polynomials.** — Operator theory: advances and applications, vol. 133. — Un vol. relié, 17×24, de xiv, 352 p. — ISBN 3-7643-6701-6. — Prix: SFr. 192.00. — Birkhäuser, Basel, 2002.

This monograph consists of three parts: the abstract theory of Hilbert spaces, leading up to the spectral theory of unbounded self-adjointed operators; the application to linear Hamiltonian systems, giving the details of the spectral resolution; further applications such as to orthogonal polynomials and Sobolev differential operators. Written in textbook style this up-to-date volume is geared towards graduate and postgraduate students and researchers interested in boundary value problems of linear differential equations or in orthogonal polynomials.

M. W. WONG. — **Wavelet transforms and localization operators.** — Operator theory: advances and applications, vol. 136. — Un vol. relié, 17×24, de vi, 156 p. — ISBN 3-7643-6789-X. — Prix: SFr. 144.00. — Birkhäuser, Basel, 2002.

The focus of this book is on the Schatten-von Neumann properties and the product formulas of localization operators defined in terms of infinite-dimensional and square-integrable representations of locally compact and Hausdorff groups. Wavelet transforms, which are the building blocks of localization operators, are also studied in their own right. Daubechies operators on the Weyl-Heisenberg group, localization operators on the affine group, and wavelet multipliers on the Euclidean space are investigated in detail. The study is carried out in the perspective of pseudo-differential operators, quantization and signal analysis. Although the emphasis is put on locally compact and Hausdorff groups, results in the context of homogeneous spaces are given in order to unify the various localization operators into a single theory. Several new spectral results on pseudo-differential operators in the setting of localization operators are presented for the first time.

## *Calcul des variations*

K.-H. HOFFMANN, I. LASIECKA, G. LEUGERING, J. SPREKELS, F. TRÖLTZSCH, (Editors). — **Optimal control of complex structures: International Conference in Oberwolfach, June 4-10, 2000.** — International Series of Numerical Mathematics, vol. 139. — Un vol. relié, 17×24, de viii, 278 p. — ISBN 3-7643-6682-6. — Prix: SFr. 152.00. — Birkhäuser, Basel, 2002.

Interest in the area of control of systems defined by partial differential equations has increased strongly in recent years. A major reason has been the requirement of these systems for sensible continuum mechanical modeling and optimization or control techniques which account for typical physical phenomena. Particular examples of problems on which substantial progress

has been made are the control and stabilization of mechatronic structures, the control of growth of thin films and crystals, the control of laser and semi-conductor devices, and shape optimization problems for turbomachine blades, shells, smart materials and microdiffractive optics.

## *Géométrie*

Boris ASANCHEYEV. — **Épures de géométrie descriptive: concours d'entrée à l'École normale supérieure.** — Un vol. relié, 17,5×24, de 231 p. — ISBN 2 7056 6447 5. — Prix: € 22.00. — Hermann, Paris, 2002.

Durant presque tout le dix-neuvième siècle et la première moitié du vingtième, la géométrie descriptive fait partie de tous les concours aux grandes écoles. Cette technique mathématique, dont Gaspard Monge fut le théoricien, alliait les connaissances de la géométrie à la maîtrise du dessin. Son apparition dans les épreuves d'admission à l'École normale supérieure date de 1858. Elle fut supprimée du concours, suite à une profonde réforme de l'enseignement des mathématiques en général et de la géométrie en particulier, en 1960. Le présent recueil résulte du désir d'exhumer les sujets et leur interprétation, uniquement pour le plaisir des yeux. C'est aussi un témoignage sur un enseignement qui fit partie de la culture de l'ingénieur pendant plus d'un siècle. Ce livre s'adresse à ceux qui ont connu la géométrie descriptive, mais aussi à tous ceux qui aiment voir les coniques sans points d'inflexion et ceux d'une cubique effectivement alignés.

## *Ensembles convexes et inégalités géométriques*

Jiří MATOUŠEK. — **Lectures on discrete geometry.** — Graduate texts in mathematics, vol. 212. — Un vol. broché, 15,5×23,5, de XIII, 481 p. — ISBN 0-387-95374-4. — Prix: € 44.95. — Springer, New York, 2002.

This book is primarily a textbook introduction to various areas of discrete geometry. In each area, it explains several key results and methods, in an accessible and concrete manner. It also contains more advanced material in separate sections, and thus, it can serve as a collection of surveys in several narrower subfields. The main topics include basics on convex sets, convex polytopes, and hyperplane arrangements; combinatorial complexity of geometric configurations; intersection patterns and transversals of convex sets; geometric Ramsey-type results; polyhedral combinatorics and high-dimensional convexity; and lastly, embeddings of finite metric spaces into normed spaces.

## *Géométrie différentielle*

Gilles HALBOUT, (Editor). — **Deformation quantization.** — Proceedings of the Meeting of Theoretical Physicists and Mathematicians, Strasbourg, May 31 – June 2, 2001. — Rencontre entre physiciens théoriciens et mathématiciens, Strasbourg, 31 mai – 2 juin 2001. — IRMA lectures in mathematics and theoretical physics, vol. 1. — Un vol. broché, 17×24, de 236 p. — ISBN 3-11-017247-X. — Prix: € 34.95. — Walter de Gruyter, Berlin, 2002.

This book contains eleven refereed research papers on deformation quantization by leading experts in the respective fields. Topics are: star-products over Poisson manifolds, quantization of Hopf algebras, index theorems, globalization and cohomological problems. Both the mathematical and the physical approach ranging from asymptotic quantum electrodynamics to operads and prop theory will be presented. Historical remarks and surveys set the results presented in perspective.