Géométrie

Objekttyp: **Chapter**

Zeitschrift: **L'Enseignement Mathématique**

Band (Jahr): **47 (2001)**

Heft 3-4: **L'ENSEIGNEMENT MATHÉMATIQUE**

PDF erstellt am: **22.09.2024**

all unified by the same idea: they are all realizations of some operator equations in Banach spaces. One permeating theme in these equations involves the role of the Fredholm property. The work is carefully written, is self-contained and covers a broad range of topics and results. Key ideas are developed in a step-by-step approach, beginning with the required background material and culminating in the final chapters with state-of-the art topics.

Nikolay D. KOPACHEVSKI, Selim G. KREIN. — **Operator approach to linear problems of hydrodynamics. Vol. 1: Self-adjoint problems for an ideal fluid.** — Operator theory: advances and applications, vol. 128. — Un vol. relié, 17×24, de xxiv, 384 p. — ISBN 3-7643-5406-2. — Prix: SFr. 248.00. — Birkhäuser, Basel, 2001.

This is the first volume of a set of two devoted to the operator approach to linear problems in hydrodynamics. It presents functional analytic methods applied to the study of small movements and normal oscillations of hydromechanical systems having cavities filled with either ideal or viscous fluids. The work is a sequel to and at the same time substantially extends the volume *Operator methods in linear hydrodynamics: evolution and spectral problems* by N.D. Kopachevsky, S.G. Krein and Ngo Zuy Kan, published in 1989 by Nauka in Moscow. It includes several new problems on the oscillations of partially dissipative hydrosystems and the oscillations of visco-elastic or relaxing fluids. The work relies on the authors' and their students' work of the last 30-40 years.

Carlos S. KUBRUSLY. — **Elements of operator theory.** — Un vol. relié, 16,5×24, de xiii, 527 p. — ISBN 0-8176-4174-2. — Prix: SFr. 128.00. — Birkhäuser, Boston, 2001.

This book is aimed at a new generation of researchers and graduate students who need to apply operator theory to their field. Written in a user-friendly, motivating style, fundamental topics are presented in a systematic fashion, i.e. set theory, algebraic structures, topological structures, Banach spaces, Hilbert spaces, culminating with the spectral theorem, one of the landmarks in the theory of operators on Hilbert spaces. The exposition is concept-driven and as much as possible avoids the formula-computational approach.

Calcul des variations

Arturo LOCATELLI. — **Optimal control: an introduction.** — Un vol. relié, 17,5×24, de viii, 294 p. — ISBN 3-7643-6408-4. — Prix: SFr. 68.00. — Birkhäuser, Basel, 2001.

The book reflects the author's experience of teaching control theory courses at a variety of levels over a span of thirty years. The level of exposition, the choice of topics, the relative weight given to them, the degree of mathematical sophistication, and the nature of the numerous illustrative examples, owe to the author's commitment to effective teaching. The book is suited for undergraduate/graduate students who have already been exposed to basic linear system and control theory and possess the calculus background usually found in any undergraduate curriculum in engineering.

Géométrie

Mauro BILIOTTI, Vikram JHA, Norman L. JOHNSON. — **Foundations of translation planes.** — Monographs and textbooks in pure and applied mathematics, vol. 243. — Un vol. relié, 16×23,5, de xv, 542 p. — ISBN 0-8247-0609-9. — Prix: US$195.00. — Marcel Dekker, New York, 2001.

This book provides a comprehensive coverage of the construction and analysis of translation planes with regard to spreads, partial spreads. It coordinates structures, automorphisms, auto-

topisms, and collineation groups – emphasizing the manipulation of incidence structures by various coordinate systems, including quasifields, spreads, and matrix spreadsets.

E. BUJALANCE, A.F. COSTA, E. MARTÍNEZ, (Editors). — **Topics on Riemann surfaces and Fuchsian groups.** — London Mathematical Society lecture note series, vol. 287. — Un vol. broché, 15×23, de XIII, 177 p. — ISBN 0-521-00350-4. — Prix: £24.95. — Cambridge University Press, Cambridge, 2001.

This book presents a cross-section of different aspects of Riemann surfaces, introducing the reader to the basics as well as highlighting new developments in the field. It provides a mixture of classical material, recent results and some non-mainstream topics. The book is based on lectures from the conference "Topics on Riemann Surfaces and Fuchsian Groups" held in Madrid to mark the twenty-fifth anniversary of the Universidad Nacional de Educación a Distancia. For those wishing to pursue research in this area, this volume offers a valuable summary of contemporary thought and a source of fresh geometric and algebraic insights.

D.L. JOHNSON. — **Symmetries**. — Springer undergraduate mathematics series. — Un vol. broché, 17×23,5, de XI, 198 p. — ISBN 1-85233-270-0. — Prix: DM 64.09. — Springer, London, 2001.

Written by the author of *Elements of Logic via Numbers and Sets*, the main object of study for this book is geometry, with group theory providing an appropriate language in which to express geometrical ideas. Key features include: An overview of the preliminaries from group theory and geometry; coverage of the discrete subgroups of the Euclidean group; a clear and complete derivation and classification of the 17 plane crystallographic groups; tessellations of various spaces (they are constructed, described and classified); a brief introduction to hyperbolic geometry. Each chapter contains a number of exercises, most with solutions, and suggestions for background, alternative and further reading.

L. Christine KINSEY, Teresa E. MOORE. — **Symmetry, shape, and space: an introduction to mathematics through geometry.** — Un vol. broché, 20×24, de XVIII, 494 p. — ISBN 1-930190-09-3. — Prix: DM 138.99. — Key College Publishing, Emeryville, in cooperation with Springer, New York, 2002.

This book is appropriate for introduction to mathematics and liberal arts mathematics courses and assumes no mathematics beyond the high school level. Geometry is the basis of the text because the visual nature of the subject allows students to use their intuition and imagination while developing the ability to think critically. Varied content within the text, activities, and examples leads students into an investigative process and provides the experience of doing and discovering mathematics as mathematicians do. Many of the exercises in the text require students to express their ideas clearly in writing, while other exercises require drawings or physical models, which help make math a more hands-on experience. The dual geometric and algebraic nature of mathematics is integrated throughout the text.

Burkard POLSTER, Günter STEINKE. — **Geometries on surfaces.** — Encyclopedia of mathematics and its applications, vol. 84. — Un vol. relié, 16×24, de XXII, 490 p. — ISBN 0-521-66058-0. — Prix: £65.00. — Cambridge University Press, Cambridge, 2001.

This book summarizes all known major results and open problems related to these classical geometries and their close (nonclassical) relatives. Topics covered include: classical geometries; methods for constructing nonclassical geometries; classifications and characterisations of geometries. This work is related to a host of other fields including interpolation theory, convexity,

differential geometry, topology, the theory of Lie groups and many more. The authors detail these connections, some of which are well known, but many much less so.

Ensembles convexes et inégalités géométriques

Herbert EDELSBRUNNER. — **Geometry and topology for mesh generation.** — Cambridge monographs on applied and computational mathematics, vol. 6. — Un vol. relié, 16×23,5, de XII, 177 p. — ISBN 0-521-79309-2. — Prix: £29.95. — Cambridge University Press, Cambridge, 2001.

The book combines topics in mathematics (geometry and topology), computer science (algorithms), and engineering (mesh generation). The original motivation for these topics was the difficulty faced (both conceptually and in technical execution) in any attempt to combine elements of combinatorial and numerical algorithms. Mesh generation is a topic in which a meaningful combination of these different approaches to problem solving is inevitable. The book develops methods from both areas that are amenable to combination and explains recent breakthrough solutions to meshing that fit into this category.

Jack E. GRAVER. — **Counting on frameworks: mathematics to aid the design of rigid structures.** — Dolciani mathematical expositions, vol. 25. — Un vol. broché, 15×23, de XII, 180 p. — ISBN 0-8835-331-0. — Prix: £23.95. — The Mathematical Association of America, Washington, distributed by Cambridge University Press, Cambridge, 2001.

Rigidity theory is a body of mathematics developed to aid in designing structures. Consider scaffolding that is constructed by bolting together rods and beams. The ultimate question is: "Is the scaffolding sturdy enough to hold the workers and their equipment?" There are several features of the structure that have to be considered in answering this question. Just how to design properly braced scaffolding (or the basic skeleton of any structure) is the problem that motivates rigidity theory. The purpose of this book is to develop a mathematical model for rigidity.

Géométrie différentielle

Lawrence CONLON. — **Differentiable manifolds.** — Birkhäuser advanced texts. — Second edition. — Un vol. relié, 17×24, de XII, 418 p. — ISBN 0-8176-4134-3. — Prix: SFr. 98.00. — Birkhäuser, Boston, 2001.

This second edition contains a significant amount of new material, which, in addition to classroom use, will make it a useful reference text. Topics that can be omitted safely in a first course are clearly marked, making this edition easier to use for such a course, as well as for private study by non-specialists wishing to survey the field. The themes of linearization, (re)integration, and global versus local calculus are emphasized throughout. Additional features include a treatment of the elements of multivariable calculus, formulated to adapt readily to the global context, an exploration of bundle theory, and a further (optional) development of Lie theory than is customary in textbooks at this level.

Seán DINEEN. — **Multivariate calculus and geometry.** — Springer undergraduate mathematics series. — Second edition. — Un vol. broché, 17×24, de XII, 254 p. — ISBN 1-85233-472-X. — Prix: DM 59.00. — Springer, London, 2001.

In this revised edition, which includes additional exercises and expanded solutions, Seán Dineen gives a solid description of the basic concepts, via simple familiar examples which are then tested in technically demanding situations. The author recognises the varied backgrounds students bring to the subject and only assumes the minimal prerequisite knowledge necessary for