

# Géométrie différentielle

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volume contains some of the papers presented at the meeting, complemented by several papers of experts who were unable to attend. These 35 refereed articles report on recent and original results in various areas of operator theory and connected fields, many of them strongly related to contributions of Szőkefalvi-Nagy. The scientific part of the book is preceded by fifty pages of biographical material, including several photos.

### ***Calcul des variations***

Sergiu AIZICOVICI, Nicolae H. PAVEL, (Editors). — **Differential equations and control theory.** — Lecture notes in pure and applied mathematics, vol. 225. — Un vol. broché,  $18 \times 26$ , de VIII, 328 p. — ISBN 0-8247-0681-1. — Prix: US\$ 150.00. — Marcel Dekker, New York, 2002.

Based on papers presented at the International Workshop on Differential Equations and Optimal Control held recently at Ohio University, Athens, this current reference contains new applied, deterministic, stochastic, and theoretical methods. *Differential Equations and Control Theory* details nonlinear programming and control with closed range operators... numerical approximation of the Riccati equation... Wentzell boundary conditions... impulse control for stochastic Navier-Stokes equations... current discoveries on the Lavrentiev phenomenon... least action for  $N$ -body problems... and more.

Jean-Baptiste HIRIART-URRUTY, Claude LEMARÉCHAL. — **Fundamentals of convex analysis.** — Grundlehren text editions. — Un vol. broché,  $16 \times 24$ , de x, 259 p. — ISBN 3-540-42205-6. — Prix: € 44.95. — Springer, Berlin, 2001.

This book is an abridged version of the two volumes *Convex Analysis and Minimization Algorithms I and II* (Grundlehren der mathematischen Wissenschaften Vol. 305 and 306), which presented an introduction to the basic concepts in convex analysis and a study of convex minimization problems. The “backbone” of both volumes was extracted, some material deleted that was deemed too advanced for an introduction, or too closely related to numerical algorithms. Some exercises were included and finally the index has been considerably enriched. The main motivation of the authors was to “light the entrance” of the monument Convex Analysis.

### ***Géométrie***

Audun HOLME. — **Geometry: our cultural heritage.** — Un vol. relié,  $16 \times 24$ , de xvi, 378 p. — ISBN 3-540-41949-7. — Prix: € 34.95. — Springer, Berlin, 2002.

This book contains selected topics from the history of geometry, with “modern proofs” of some of the results, as well as a fully modern treatment of selected basic issues in geometry. The book aims at future teachers of mathematics. All too often the geometry which goes into the syllabus for teacher-students presents the material as pedantic and formalistic, suppressing its dynamic character and its role as part of the foundation for our common cultural heritage. The motivation for the book is to open up these aspects of the field. Another motivation is to provide an invitation to mathematics in general. Thus the book also aims at an informed public interested in making a new beginning in mathematics.

### ***Géométrie différentielle***

Scot ADAMS. — **Dynamics on Lorentz manifolds.** — Un vol. relié,  $17 \times 23$ , de xiii, 402 p. — ISBN 981-02-4382-0. — Prix: £29.00. — World Scientific, Singapore, 2001.

Within the general framework of the dynamics of “large” groups on geometric spaces, the focus is on the types of groups that can act in complicated ways on Lorentz manifolds, and on

the structure of the resulting manifolds and actions. This particular area of dynamics is an active one, and not all the results are in their final form. However, at this point, a great deal can be said about the particular Lie groups that come up in this context. It is impressive that, even assuming very weak recurrence of the action, the list of possible groups is quite restricted. For the most complicated of these groups, one can also describe reasonably well the local structure of the actions that arise.

David E. BLAIR. — **Riemannian geometry of contact and symplectic manifolds.** — Progress in mathematics, vol. 203. — Un vol. relié, 16×24, de XII, 260 p. — ISBN 0-8176-4261-7. — Prix: SFr. 136.50. — Birkhäuser, Boston, 2002.

The first part of the book examines the general theory of symplectic manifolds. Principal circle bundles are then discussed as a prelude to the Boothby-Wang fibration of a compact regular contact manifold in a chapter which deals with the general theory of contact manifolds. The next chapter focuses on the general setting of Riemannian metrics associated with both symplectic and contact structures. Topics treated in the subsequent chapters include integral submanifolds of the contact subbundle, Sasakian manifolds, the important study of the curvature of contact metric manifolds, submanifold theory in both the Kähler and Sasakian settings, tangent sphere bundles, curvature functionals, complex contact manifolds and 3-Sasakian manifolds.

Jürgen JOST. — **Riemannian geometry and geometric analysis.** — Third edition. — Universitext. — Un vol. broché, 24×16, de XIII, 532 p. — ISBN 3-540-42627-2. — Prix: € 44.95. — Springer, Berlin, 2002.

This third edition gives a new presentation of Morse theory and Floer homology that emphasizes the geometric aspects and integrates it into the context of Riemannian geometry and geometric analysis. It also gives a new presentation of the geometric aspects of harmonic maps. This uses geometric methods from the theory of geometric spaces of nonpositive curvature and, at the same time, sheds light on these, as an excellent example of the integration of deep geometric insights and powerful analytical tools.

Stefano MARCHIAFAVA, Paolo PICCINNI, Massimiliano PONTECORVO, (Editors). — **Proceedings of the second Meeting “Quaternionic Structures in Mathematics and Physics”.** — Rome, Italy, 6-10 September 1999. — Un vol. relié, 18×26, de xv, 469 p. — ISBN 981-02-4630-7. — Prix: £ 101.00. — World Scientific, Singapore, 2001.

During the last five years, after the first Meeting on “Quaternionic Structures in Mathematics and Physics”, interest in quaternionic geometry and its applications has continued to increase. Progress has been made in constructing new classes of manifolds with quaternionic structures (quaternionic Kähler, hyper-Kähler, hyper-complex, etc.), studying the differential geometry of special classes of such manifolds and their submanifolds, understanding relations between the quaternionic structure and other differential-geometric structures, and also in physical applications of quaternionic geometry. Some generalizations of classical quaternion-like structures (like HKT structures and hyper-Kähler manifolds with singularities) appeared naturally and were studied. Some of those results are published in this book.

Ian R. PORTEOUS. — **Geometric differentiation: for the intelligence of curves and surfaces.** — Second edition. — Un vol. broché, 15,5×23, de xv, 333 p. — ISBN 0-521-00264-8 (relié: 0-521-81040-X). — Prix: £24.95 (relié: £70.00). — Cambridge University Press, Cambridge, 2001.

This is a revised and extended version of the popular first edition, inspired by the work of Thom and Arnol'd on singularity theory. Such topics as umbilics, ridges and subparabolic lines,

all robust features of a smooth surface, which are rarely treated in elementary courses on differential geometry, are considered here in detail. These features are of immediate relevance in modern areas of application such as interpretation of range data from curved surfaces and the processing of magnetic resonance and cat-scan images. The text is based on extensive teaching at Liverpool University to audiences of advanced undergraduate and beginning postgraduate students in mathematics.

Gabor TOTH. — **Finite Möbius groups, minimal immersions of spheres, and moduli.** — Universitext. — Un vol. relié,  $16 \times 24$ , de xvi, 317 p. — ISBN 0-387-95323-X. — Prix: € 74.95. — Springer, New York, 2002.

In this book, the author traces the development of the study of spherical minimal immersions over the past 30-plus years, including Takahashi's 1966 proof regarding the existence of isometric minimal immersions, DoCarmo and Wallach's study of the uniqueness of the standard minimal immersions that have been obtained by the equivariant construction as  $SU(2)$ -orbits, first used by Mashimo in 1984 and then later by DeTurck and Ziller in 1992. In trying to make this monograph accessible not just to research mathematicians but to mathematics graduate students as well, the author included sizeable pieces of material from upper-level undergraduate courses, additional graduate level topics such as Felix Klein's classic treatise of the icosahedron, and a valuable selection of exercises.

### *Topologie algébrique*

Allen HATCHER. — **Algebraic topology.** — Un vol. broché,  $17,5 \times 25,5$ , de xii, 544 p. — ISBN 0-521-79540-0 (relié: 0-521-79160X). — Prix: £20.95 (relié: £60.00). — Cambridge University Press, Cambridge, 2002.

This geometrically flavored introduction to algebraic topology has the dual goals of serving as a textbook for a standard graduate-level course and as a background reference for many additional topics that do not usually fit into such a course. The broad coverage includes both the homological and homotopical sides of the subject. Care has been taken to present a readable, self-contained exposition, with many examples and exercises, aimed at the student or the researcher from another area of mathematics seeing the subject for the first time.

### *Topologie des variétés, analyse globale et analyse des variétés*

Stanko DIMIEV, Kouei SEKIGAWA, (Editors). — **Perspectives of complex analysis, differential geometry and mathematical physics.** — Proceedings of the 5<sup>th</sup> International Workshop on Complex Structures and Vector Fields, St. Konstantin, Bulgaria, 3-9 September 2000. — Un vol. relié,  $16 \times 23$ , de x, 208 p. — ISBN 981-02-4597-1. — Prix: £58.00. — World Scientific, Singapore, 2001.

This workshop brought together specialists in complex analysis, differential geometry, mathematical physics and applications for stimulating cross-disciplinary discussions. The lectures presented ranged over various current topics in those fields. The proceedings will be of value to graduate students and researchers in complex analysis, differential geometry and theoretical physics, and also related fields. 18 papers by V.P. Kostov, L.N. Apostolova, M.S. Marinov, K.P. Petrov, A.M. Kytmanov, S.G. Myslivets, S. Dimiev, J. Ławryniewicz, L.M. Tovar, Y. Hashimoto, K. Ohba, K. Kikuchi, S. Nagami, T. Adachi, H. Hashimoto, K. Mashimo, G. Ganchev, V. Mihova, V. Milousheva, M. Hristov, M. Manev, B.G. Dimitrov, I.B. Pestov, S. Manoff, G. Zlatanov.