

# Géométrie différentielle

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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.

John M. LEE. — **Introduction to smooth manifolds.** — Graduate texts in mathematics, vol. 218. — Un vol. broché,  $15,5 \times 23,5$ , de xvii, 628 p. — ISBN 0-387-95448-1. — Prix: € 54.95. — Springer, New York, 2003.

The goal of this book is to familiarize students with the tools they will need in order to use manifolds in mathematical or scientific research — smooth structures, tangent vectors and covectors, vector bundles, immersed and embedded submanifolds, tensors, differential forms, de Rham cohomology, vector fields, flows, foliations, Lie derivatives, Lie groups, Lie algebras, and more. The approach is as concrete as possible. Along the way, it introduces the readers to some of the most important examples of geometric structures that manifolds can carry, such as Riemannian metrics, symplectic structures, and foliations. The book is aimed at students who already have a solid acquaintance with general topology, the fundamental group, and covering spaces, as well as basic undergraduate linear algebra and real analysis.

### *Topologie algébrique*

Marcelo AGUILAR, Samuel GITLER, Carlos PRIETO. — **Algebraic topology from a homotopical viewpoint.** — Universitext. — Un vol. relié,  $24 \times 16$ , de xxix, 478 p. — ISBN 0-387-95450-3. — Prix: SFr. 133.00. — Springer, Berlin, 2002.

The purpose of this book is to introduce algebraic topology using the novel approach of homotopy theory, an approach with clear applications in algebraic geometry as understood by Lawson and Voevodsky. This method allows the authors to cover the material more efficiently than the more common method using homological algebra. The basic concepts of homotopy theory, such as fibrations and cofibrations, are used to construct singular homology and cohomology, as well as  $K$ -theory. Throughout the text many other fundamental concepts are introduced, including the construction of the characteristic classes of vector bundles. Although functors appear constantly throughout the book, no previous knowledge about category theory is expected from the reader.

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

Jan CNOPS. — **An introduction to Dirac operators on manifolds.** — Progress in mathematical physics, vol. 24. — Un vol. relié,  $16 \times 24$ , de x, 211 p. — ISBN 0-8176-4298-6. — Prix: SFr. 116.00. — Birkhäuser, Boston, 2002.

In this essentially self-contained work, the basic ideas underlying the concept of Dirac operators are explored. Starting with Clifford algebras and the fundamentals of differential geometry, the text focuses on two main properties, namely, conformal invariance, which determines the local behavior of the operator, and the unique continuation property dominating its global behavior. Spin groups and spinor bundles are covered, as well as the relations with their classical counterparts, orthogonal groups and Clifford bundles. The reader will benefit, however, from some knowledge of complex analysis, which gives the simplest example of a Dirac operator. More advanced readers will appreciate the fresh approach to the theory as well as the new results on boundary value theory.

Frédéric HÉLEIN. — **Harmonic maps, conservation laws and moving frames.** — Second edition. — Cambridge tracts in mathematics, vol. 150. — Un vol. relié,  $16 \times 23$ , de xxi, 264 p. — ISBN 0-521-81160-0. — Prix: £47.50. — Cambridge University Press, Cambridge, 2002.

This book provides an accessible and self-contained introduction to harmonic map theory and its analytical aspects, covering recent developments in the regularity theory of weakly harmonic maps. The book begins by introducing these concepts, stressing the interplay between geometry, the role of symmetries and weak solutions. The reader is then presented with a guided