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Kapitel: Topologie des variétés, analyse globale et analyse des variétés

Topologie générale

Dušan REPOVS, Pavel Vladimirovič SEMENOV. — **Continuous selections of multivalued mappings.** — Mathematics and its applications, vol. 455. — Un vol. relié, 17×25, de VIII, 356 p. — ISBN 0-7923-5277-7. — Prix: Dfl. 295.00. — Kluwer Academic Publishers, Dordrecht, 1998.

This book is the first systematic and comprehensive study of the theory of continuous selections of multivalued mappings. This interesting branch of modern topology was introduced by E.A. Michael in the 1950s and has since witnessed an intensive development with various applications outside topology, e.g. in geometry of Banach spaces, manifolds theory, convex sets, fixed points theory, differential inclusions, optimal control, approximation theory, and mathematical economics. The work can be used in different ways: the first part is an exposition of the basic theory, with details. The second part is a comprehensive survey of the main results. Lastly, the third part collects various kinds of applications of the theory.

Topologie algébrique

Michael CRABB, Ioan JAMES. — **Fibrewise homotopy theory.** — Springer monographs in mathematics. — Un vol. relié, 16×24, de VIII, 341 p. — ISBN 1-85233-014-7. — Prix: DM 159.00. — Springer, London, 1998.

Topology occupies a central position in the mathematics of today. One of the most useful ideas to be introduced in the past sixty years is the concept of the fibre bundle, which provides an appropriate framework for studying differential geometry and much else. In this book, fibrewise homotopy theory is developed ab initio, assuming only a basic knowledge of ordinary homotopy theory. The first half of the text provides a survey, beginning with an outline of the basic theory and proceeding to a selection of more specialized topics. The second is concerned with the corresponding stable theory, with some emphasis on theory appropriate for geometric applications.

Glenys LUKE and Alexander S. MISHCHENKO. — **Vector bundles and their applications.** — Mathematics and its applications, vol. 447. — Un vol. relié, 16,5×24,5, de VIII, 254 p. — ISBN 0-7923-5154-1. — Prix: Dfl. 240.00. — Kluwer Academic Publishers, Dordrecht, 1998.

The book is devoted to the basic notions of vector bundles and their applications. The focus of attention is towards explaining the most important notions and geometric constructions connected with the theory of vector bundles. Theorems are not always formulated in maximal generality but rather in such a way that the geometric nature of the objects comes to the fore. Whenever possible examples are given to illustrate the role of vector bundles. *Contents:* Introduction to the locally trivial bundles theory. — Homotopy invariants of vector bundles. — Geometric constructions of bundles. — Calculation methods in K-theory. — Elliptic operators on smooth manifolds and K-theory. — Some applications of vector bundle theory.

Topologie des variétés, analyse globale et analyse des variétés

Frédéric PHAM. — **Géométrie et calcul différentiel sur les variétés: cours, études et exercices.** — 2^{e} édition. — Sciences supérieures. Mathématiques. — Un vol. broché, 17×24, de XII, 260 p. — ISBN 2-10-004129-0. — Prix: FF 215.00. — Dunod, Paris, 1999.

La première partie a pour but de consolider les acquis essentiels du calcul différentiel de licence. Elle a été profondément remaniée pour cette deuxième édition. La deuxième partie

présente la théorie intrinsèque des variétés (avec comme objectif essentiel la compréhension des notions de fibré tangent et fibré normal) et enchaîne sur les premiers rudiments de la topologie algébrique (homotopie et revêtements). Elle se termine par une ébauche de théorie de l'intégration sur les variétés, où l'on fait connaissance avec l'homologie et la cohomologie.

Andrew RANICKI. — **High dimensional knot theory: algebraic surgery in codimension 2.** — With an appendix by Elmar WINKELNKEMPER. — Springer monographs in mathematics. — Un vol. relié, 16×24, de XXXVI, 646 p. — ISBN 3-540-63389-8. — Prix: DM 189.00. — Springer, Berlin, 1998.

This is the first book entirely devoted to high-dimensional knots. The main theme is the application of the author's algebraic theory of surgery to provide a unified treatment of the invariants of codimension 2 embeddings, generalizing the Alexander polynomials and Seifert forms of classical knot theory. Many results in the research literature are thus brought into a single framework, and new results are obtained. The treatment is particularly effective in dealing with open books, which are manifolds with codimension 2 submanifolds such that the complement fibres over a circle.

Robert ROUSSARIE. — **Bifurcations of planar vector fields and Hilbert's sixteenth problem.** — Progress in mathematics, vol. 164. — Un vol. relié, 16×24, de XVII, 204 p. — ISBN 3-7643-5900-5. — Prix: SFr. 98.00. — Birkhäuser Verlag, Basel, 1998.

In a coherent, exhaustive and progressive way, this book presents the tools for studying local bifurcations of limit cycles in families of planar vector fields. A systematic introduction is given to such methods as division of an analytic family of functions in its ideal coefficients, and asymptotic expansion of non-differentiable return maps and desingularisation. The exposition moves from classical analytic geometric methods applied to regular limit periodic sets to more recent tools for singular limit sets. The methods can be applied to theoretical problems such as Hilbert's 16^{th} problem, but also for the purpose of establishing bifurcation diagrams of specific families as well as explicit computations.

David SPRING. — **Convex integration theory: solutions to the *h*-principle in geometry and topology.** — Monographs in mathematics, vol. 92. — Un vol. relié, 17×24, de VIII, 212 p. — ISBN 3-7643-5805-X. — Prix: SFr. 128.00. — Birkhäuser Verlag, Basel, 1998.

This book provides a comprehensive study of convex integration theory in immersion-theoretic topology. This book is the first to present an exacting record and exposition of all of the basic concepts and technical results of convex integration theory in higher order jet spaces, including the theory of iterated convex hull extensions and the theory of relative *h*-principles. A second feature of the book is its detailed presentation of applications of the general theory to topics in symplectic topology, divergence free vector fields on 3-manifolds, isometric immersions, totally real embeddings, underdetermined non-linear systems of PDEs, the relaxation theorem in optimal control theory, as well as applications to the traditional immersion-£ theoretical topics such as immersions, submersions, *k*-mersions and free maps.

Probabilités et processus stochastiques

Richard F. BASS. — **Diffusions and elliptic operators.** — Probability and its applications. — Un vol. relié, 15,5×24, de XIII, 232 p. — ISBN 0-387-98315-5. — Prix: DM 118.00. — Springer, New York, 1998.

This book discusses the interplay of diffusion processes and partial differential equations (PDEs) with an emphasis on probabilistic methods in PDEs. It begins with stochastic