Topologie algébrique

Objekttyp: **Chapter**

Zeitschrift: **L'Enseignement Mathématique**

Band (Jahr): **49 (2003)**

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

PDF erstellt am: **25.05.2024**

manifold is, even initially, a subtle object, appealing to highly non-natural concepts, the first three chapters devote themselves to introducing the various concepts and tools of Riemannian geometry in the most natural and motivating way, following in particular Gauss and Riemann.

Udo HERTRICH-JEROMIN. — **Introduction to Möbius differential geometry.** — London Mathematical Society lecture note series, vol. 300. — Un vol. broché, 15×23, de XI, 413 p. — ISBN 0-521-53569-7. — Prix : £29.95. — Cambridge University Press, Cambridge, 2003.

The book introduces the reader to the geometry of surfaces and submanifolds in the conformal n-sphere. Various models for Möbius geometry are presented: the classical projective model; the quaternionic approach; and an approach that uses the Clifford algebra of the space of homogeneous coordinates of the classical model — the use of 2+2 matrices in this context is elaborated. For each model, in turn, applications are discussed. Topics comprise conformally flat hypersurfaces, isothermic surfaces and their transformation theory, Willmore surfaces, orthogonal systems, and the Ribaucour transformation, as well as analogous discrete theories for isothermic surfaces and orthogonal systems. Certain relations with curved flats, a particular type of integrable system, are revealed.

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F.E.A. JOHNSON. — **Stable modules and the D(2)-problem.** — London Mathematical Society lecture note series, vol. 301 — Un vol. broché, 15×23, de IX, 267 p. — ISBN 0-521-53749-5. — Prix : £29.95. — Cambridge University Press, Cambridge, 2003.

This book is concerned with two fundamental problems in low-dimensional topology. Firstly the D(2)-problem, which asks whether cohomology detects dimension, and secondly the realization problem, which asks whether every algebraic 2-complex is geometrically realizable. The author shows that for a large class of fundamental groups these problems are equivalent. Moreover, in the case of finite groups, Professor Johnson develops general methods and gives complete solutions in a number of instances. In particular, he presents a complete treatment of Yoneda extension theory from the viewpoint of derived objects and proves that for groups of period four, two-dimensional homotopy types are parametrized by isomorphism classes of projective modules. The book is carefully written with an eye on the wider context and as such is suitable for graduate students wanting to learn low-dimensional homotopy theory as well as for established researchers in the field.

Elon Lages LIMA. — **Fundamental groups and covering spaces.** — Un vol. relié, 16×23,5, de VII, 210 p. — ISBN 1-56881-131-4. — Prix : US$49.00. — A. K. Peters, Natick, Massachusetts, 2003.

This is an introductory book on fundamental groups, perhaps the simplest non-trivial algebraic structure that one can attach to a space, and their topological soul mates, the covering spaces. An accomplished example of the algebraic topologist's dream come true, covering spaces are a geometric (that is, topological) structure that is completely characterized by its algebraic counterpart. Fundamental groups and covering spaces are interesting not only for their intrinsic elegance, but are also important auxiliary instruments in complex analysis, differential geometry, group theory, and physics. This book provides several illustrative examples from these areas. In keeping with its introductory aim, basic concepts are clearly defined, proofs are complete, and no results from the exercises are assumed in the text.