

Topologie algébrique

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Géométrie différentielle

Christian BÄR. — **Elementare Differentialgeometrie.** — De Gruyter Lehrbuch. — Un vol. broché, $15,5 \times 23$, de XII, 281 p. — ISBN 3-11-015519-2. — Prix: DM 48.00. — Walter de Gruyter, Berlin, 2001.

Das Buch bietet eine Einführung in die Differentialgeometrie von Kurven und Flächen. Nach einem historisch motivierten Kapitel über axiomatische euklidische Geometrie wird die Kurventheorie bis zum Studium der Totalkrümmung verknoteter Raumkurven entwickelt. Der grösste Teil des Buches widmet sich anschliessend der Flächentheorie. Verschiedene Krümmungsbegriffe werden eingeführt und die wichtigsten Klassen von Flächen, z.B. Minimalflächen, behandelt. Viele Ergebnisse und Konzepte der inneren Geometrie von Flächen, wie etwa Geodätische, Parallelverschiebung oder Jacobi-Felder, können unverändert in die riemannsche Geometrie übernommen werden. Das Buch führt bis zum Satz von Gauss-Bonnet, der die Krümmung der Fläche mit ihrer Euler-Poincaré-Charakteristik in Verbindung bringt.

Andrew PRESSLEY. — **Elementary differential geometry.** — Springer undergraduate mathematics series. — Un vol. broché, $17 \times 23,5$, de IX, 332 p. — ISBN 1-85233-152-6. — Prix: DM 59.00. — Springer, London, 2000.

Curves and surfaces are objects that everyone can see, and many of the questions that can be asked about them are natural and easily understood. Differential geometry is concerned with the precise mathematical formulation of some of these questions, and with trying to answer them using calculus techniques. It is a subject that contains some of the most beautiful and profound results in mathematics, yet many of them are accessible to higher level undergraduates. *Elementary Differential Geometry* presents the main results in the differential geometry of curves and surfaces while keeping the prerequisites to an absolute minimum. Nothing more than first courses in linear algebra and multivariate calculus are required, and the most direct and straightforward approach is used at all times. Numerous diagrams illustrate both the ideas in the text and the examples of curves and surfaces discussed there.

Topologie algébrique

Yves FÉLIX, Stephen HALPERIN, Jean-Claude THOMAS. — **Rational homotopy theory.** — Graduate texts in mathematics, vol. 205. — Un vol. relié, $16,5 \times 24,5$, de XXXII, 535 p. — ISBN 0-387-95068-0. — Prix: DM 119.00. — Springer, New York, 2001.

The three main objectives of this book are: to provide a coherent, self-contained, and user-friendly introduction to the tools and techniques of rational homotopy theory; to provide an account of the main structural theorems with proofs that are often new or much simpler than the original versions in the literature; to illustrate both the use of the mathematical technology and the consequences of the theorems in a rich variety of examples. It should be emphasized that this book is about topological spaces and that examples and applications given throughout the book are largely drawn from topology. The reader should have a basic knowledge of the fundamental group and singular homology.

John McCLEARY. — **A user's guide to spectral sequences.** — Second edition. — Cambridge studies in advanced mathematics, vol. 58. — Un vol. broché, $15,5 \times 23$, de XV, 561 p. — ISBN 0-521-56759-9 (relié: 0-521-56141-8). — Prix: £21.95 (relié: £60.00). — Cambridge University Press, Cambridge 2001.

Spectral sequences are among the most elegant, powerful, and complicated methods of computation in mathematics. This book describes some of the most important examples of spectral

sequences and some of their most spectacular applications. The first third of the book treats the algebraic foundations for this sort of homological algebra, starting from informal calculations, to give the novice a familiarity with the range of applications possible. The heart of the book is an exposition of the classical examples from homotopy theory, with chapters on the Leray-Serre spectral sequence, the Eilenberg-Moore spectral sequence, the Adams spectral sequence. The last part of the book treats applications throughout mathematics, including the theory of knots and links, algebraic geometry, differential geometry and algebra.

Topologie des variétés, analyse globale et analyse des variétés

C.K. ANAND, P. BAIRD, E. LOUBEAU and J.C. WOOD. — **Harmonic morphisms, harmonic maps, and related topics.** — Chapman & Hall/CRC research notes in mathematics, vol. 413. — Un vol. broché, 15,5 × 23,5, de 309 p. — ISBN 1-58488-032-5. — Prix : £39.99. — Chapman & Hall/CRC, Boca Raton, 2000.

This volume reports the proceedings of the conference in the city of Brest and forms the first work primarily devoted to harmonic morphisms, bringing together contributions from the founders of the subject, leading specialists, and experts in other related fields. Starting with “The beginnings of harmonic morphisms”, which provides the essential background, the first section includes papers on the stability of harmonic morphisms, global properties, harmonic polynomial morphisms, Bochner technique, f -structures, symplectic harmonic morphisms, and discrete harmonic morphisms. The second section addresses the wider domain of harmonic maps and contains some of the most recent results on harmonic maps and surfaces. The final section highlights the rapidly developing subject of constant mean curvature surfaces.

Sylvain CAPPELL, Andrew RANICKI and Jonathan ROSENBERG, (Editors). — **Surveys on surgery theory, vol. 2: papers dedicated to C.T.C. Wall.** — Annals of mathematics studies, vol. 149. — Un vol. broché, 15,5 × 23,5, de vii, 449 p. — ISBN 0-691-08815-2. — Prix : US\$35.00. — Princeton University Press, Princeton, N.J., 2001.

The sixtieth birthday of C.T.C. Wall led the editors of this volume to reflect on the extraordinary accomplishments of surgery theory as well as its current enormously varied interactions with algebra, analysis, and geometry. Workers in many of these areas have often lamented the lack of a single source surveying surgery theory and its applications. Because no person could write such a survey, the editors asked a variety of experts to report on the areas of current interest. The topics covered include current applications of surgery, Wall’s finiteness obstruction, algebraic surgery, automorphisms and embeddings of manifolds, surgery theoretic methods for the study of group actions and stratified spaces, metrics of positive scalar curvature, and surgery in dimension four. In addition to the editors, contributors are S. Ferry, M. Weiss, B. Williams, T. Goodwillie, J. Klein, S. Weinberger, B. Hughes, S. Stolz, R. Kirby, L. Taylor, and F. Quinn.

Klaus JÄNICH. — **Vector analysis.** — Translated by Leslie Kay. — Undergraduate texts in mathematics. — Un vol. relié, 18,5 × 24, de xiv, 281 p. — ISBN 0-387-98649-9. — Prix : DM 69.00. — Springer, New York, 2001.

Classical vector analysis deals with vector fields, the gradient, divergence, and curl operators, line, surface, and volume integrals, and the integral theorems of Gauss, Green, and Stokes. Modern vector analysis distills these into the Cartan calculus and a general form of Stokes’ theorem. This essentially modern text carefully develops vector analysis on manifolds, reinterprets it from the classical viewpoint (and with the classical notation) for three-dimensional Euclidean space, and then goes on to introduce de Rham cohomology and Hodge theory. The material is accessible to an undergraduate student with calculus, linear algebra, and some topology as prerequisites.