Luther Pfahler EISENHART. — **Riemannian geometry.** — Princeton landmarks in mathematics and physics. — Eighth printing. — Un vol. broché, 15,5×23, de IX, 306 p. — ISBN 0-691-02353-0. — Prix : £14.95. — Princeton University Press, Princeton, 1997.

In this book, Eisenhart succinctly surveys the key concepts of Riemannian geometry. He begins with tensor analysis, including the Riemann curvature tensor, the Christoffel symbols, and the Ricci tensor. From here the notion of a metric is introduced, and hence geodesics, parallel displacement, and the Bianchi identity are explored. Other topics include orthogonal ennuples, the geometry of subspaces, subspaces of a flat space, and groups of motions. This clear and concise guide to Riemannian geometry will be of great interest to mathematicians and theoretical physicists alike.

Theodore FRANKEL. — **The geometry of physics: an introduction.** — Un vol. relié, 19×26, de XXII, 654 p. — ISBN 0-521-38334-X. — Prix : £65.00. — Cambridge University Press, Cambridge, 1997.

This book is intended to provide a working knowledge of those parts of exterior differential forms, differential geometry, algebraic and differential topology, Lie groups, vector bundles, and Chern forms that are essential for a deeper understanding of both classical and modern physics and engineering. Included are discussions of analytical and fluid dynamics, electromagnetism (in flat and curved space), thermodynamics, the deformation tensors of elasticity, soap films, special and general relativity, the Dirac operator and spinors, and gauge fields, including Yang-Mills, the Aharonov-Bohm effect, Berry phase, and instanton winding numbers.

Christoph HUMMEL. — **Gromov's compactness theorem for pseudo-holomorphic curves.** — Progress in mathematics, vol. 151. — Un vol. relié, 16×24, de VIII, 131 p. — ISBN 3-7643-5735-5. — Prix : SFr. 48.00. — Birkhäuser Verlag, Basel, 1997.

The aim of this book is to present the original proof of Gromov's compactness for pseudo-holomorphic curves in detail. Local properties of pseudo-holomorphic curves are investigated and proved from a geometric viewpoint. Properties of particular interest are isoperimetric inequalities, a monotonicity formula, gradient bounds and the removal of singularities. A special chapter is devoted to relevant features of hyperbolic surfaces, where pairs of pants decomposition and thick-thin decomposition are described.

John M. LEE. — **Riemannian manifolds: an introduction to curvature.** — Graduate texts in mathematics, vol. 176. — Un vol. relié, 16,5×24, de XV, 224 p. — ISBN 0-387-98271-X. — Prix : DM 118.00. — Springer, New York, 1997.

The book begins with a careful treatment of the machinery of metrics, connections, and geodesics, and then introduces the curvature tensor as a way of measuring whether a Riemannian manifold is locally equivalent to Euclidean space. Submanifold theory is developed next in order to give the curvature tensor a concrete quantitative interpretation. The remainder of the text is devoted to proving the four most fundamental theorems relating curvature and topology: the Gauss-Bonnet Theorem, the Cartan-Hadamard Theorem, Bonnet's Theorem, and the characterization of manifolds of constant curvature.

Topologie des variétés, analyse globale et analyse des variétés

Stig I. ANDERSSON, Michel L. LAPIDUS, (Editors). — **Progress in inverse spectral geometry.** — Trends in mathematics. — Un vol. relié, 17×24, de 196 p. — ISBN 3-7643-5755-X. — Prix : SFr. 88.00. — Birkhäuser Verlag, Basel, 1997.

This is a collection of 10 coherent papers originating from a conference on inverse spectral geometry by leading experts in this field. This book aims at presenting a comprehensive overview

of the research frontline in inverse spectral geometry. The interdisciplinary character of inverse spectral geometry, employing techniques from geometry, global analysis, group theory and so on, is responsible not only for its fertility but also accounts for the wide variety of mathematicians contributing to the field.

Abraham BOYARSKY, Pawel GÓRA. — **Laws of chaos: invariant measures and dynamical systems in one dimension.** — Probability and its applications. — Un vol. relié. 16.5×24, de xv, 399 p. — ISBN 3-7643-4003-7. — Prix: SFr. 108.00. — Birkhäuser Verlag, Basel, 1997.

This book is a pedagogical resource for studying probabilistic concepts in the analysis of one-dimensional chaotic systems. It combines three important areas of modern mathematics, dynamical systems, measure theory, and ergodic theory, making it a truly up-to-date text for a graduate course for students of applied sciences. Chaotic systems arising from piecewise linear transformations are studied in detail since the probability density functions of such transformations can be easily found using linear algebra and provide a useful means to approximate the invariant measures of more complex dynamical systems. This book is rich in examples and graphic illustrations and includes over one hundred pages of problem sets and their solutions.

Thomas E. CECIL, Shiing-shen CHERN, (Editors). — **Tight and taut submanifolds: papers in memory of Nicolaas H. Kuiper.** — Mathematical Sciences Research Institute publications, vol. 32. — Un vol. relié, 16×24, de xvii, 349 p. — ISBN 0-521-62047-3. — Prix: £30.00. — Cambridge University Press, Cambridge, 1997.

This book contains six articles by experts in the field and an extensive bibliography. It is dedicated to the memory of Nicolaas H. Kuiper, and the first paper is an unfinished but insightful exposition of the subject of tight immersions and maps, written by Kuiper. Other papers survey topics such as the smooth and polyhedral portions of the theory of tight immersions: taut, Dupin, and isoparametric submanifolds of Euclidean space: taut submanifolds of arbitrary complete Riemannian manifolds: and real hypersurfaces in complex space forms with constant principal curvature.

Guy DAVID, Stephen SEMMES. — **Fractured fractals and broken dreams: self-similar geometry through metric and measure.** — Oxford lecture series in mathematics and its applications, vol. 7. — Un vol. relié, 16×24, de ix, 212 p. — ISBN 0-19-850166-8. — Prix: £35.00. — Clarendon Press, Oxford, 1997.

The book proposes new notions of coherent geometric structure. Fractal patterns have emerged in many contexts, but there is confusion over exactly what is a "pattern" and what is not. How can the structure lying within objects and the relationships between them be made precise? The foundations laid here provide a fresh approach to a familiar field, with a wide range of open problems given, large and small, and a variety of examples with diverse connections to other branches of mathematics.

A.T. FOMENKO, and S.V. MATVEEV. — **Algorithmic and computer methods for three-manifolds.** — Mathematics and its applications, vol. 425. — Un vol. relié, 16.5×24.5, de xii, 334 p. — ISBN 0-7923-4770-6. — Prix: Dfl. 320.00. — Kluwer Academic Publishers, Dordrecht, 1997.

This monograph presents a comprehensive coverage of three-dimensional topology, as well as exploring some of its frontiers. Many important applied problems of mechanics and theoretical physics can be reduced to algorithmic problems of three-dimensional topology, which can then be solved using computers. Although much progress in this field has been made in recent years, these results have not been readily accessible to a wider audience up to now. This book is based on courses the authors have given over several years, and summarizes the most outstanding achievements of modern computer topology.

Maurice de GOSSON. — **Maslov classes, metaplectic representation and Lagrangian quantization.** — Mathematical research, vol. 95. — Un vol. broché, 17×24, de 186 p. — ISBN 3-05-501714-5. — Prix: DM 98.00. — Akademie Verlag, Berlin, 1997.

This book is devoted to the study of various Maslov classes that intervene in theories of geometric quantization. The relationship between these classes and the metaplectic group is thoroughly studied. The construction and the properties of these Maslov classes are applied to define a new concept, that of Lagrangian catalogue, which is a collection of "cohomological wave functions", whose behavior under Hamiltonian flows is studied.

Yi-Zhi HUANG. — **Two-dimensional conformal geometry and vertex operator algebras.** — Progress in mathematics, vol. 148. — Un vol. relié, 16×24, de XII, 280 p. — ISBN 0-8176-3829-6. — Prix: SFr. 98.00. — Birkhäuser, Boston, 1997.

The focus of this monograph is to formulate and prove one main theorem: the equivalence between the algebraic and geometric formulations of the notion of vertex operator algebra. The author introduces a geometric notion of vertex operator algebra in terms of complex powers of the determinant line bundles over certain moduli spaces of spheres with punctures and local analytic coordinates, and proves that this notion is precisely equivalent to the algebraic notion of vertex operator algebra. In particular a detailed algebraic and analytic study of the sewing operation in the moduli space is presented. Solutions of exercises are provided.

Jürgen JOST. — **Nonpositive curvature: geometric and analytic aspects.** — Lectures in mathematics ETH Zürich. — Un vol. broché, 17×24, de VIII, 108 p. — ISBN 3-7643-5736-3. — Prix: SFr. 32.00. — Birkhäuser Verlag, Basel, 1997.

This book discusses various geometric and analytic aspects of non-positive curvature, starting with a discussion of Riemannian examples and rigidity theorems. It then treats generalized notions of nonpositive curvature in metric geometry in the sense of Alexandrov and Busemann, as well as the theory of harmonic maps with values in such spaces.

Bruce P. KITCHENS. — **Symbolic dynamics: one-sided, two-sided and countable state Markov shifts.** — Universitext. — Un vol. broché, 15,5×23,5, de X, 252 p. — ISBN 3-540-62738-3. — Prix: DM 58.00. — Springer, Berlin, 1998.

This is a thorough introduction to the dynamics of one-sided and two-sided Markov shifts on a finite alphabet and to the basic properties of Markov shifts on a countable alphabet. These are the symbolic dynamical systems defined by a finite transition rule. The basic properties of these systems are established using elementary methods. The connections to other types of dynamical systems, cellular automata and information theory are illustrated with numerous examples.

Y. KOSMANN-SCHWARZBACH, B. GRAMMATICOS, K.M. TAMIZHMANI, (Editors). — **Integrability of nonlinear systems.** — Proceedings of the CIMPA School, Pondicherry University, India, 8-26 January 1996. — Lecture notes in physics, vol. 495. — ISBN 3-540-63353-7. — Prix: DM 116.00. — Springer-Verlag, Berlin, 1997.

.J. Ablowitz: Nonlinear waves, solitons and IST. — B. Grammaticos and A. Ramani: Integrability - and how to detect it. — J. Hietarinta: Introduction to the Hirota bilinear method. — Y. Kosmann-Schwarzbach: Lie bialgebras, Poisson Lie groups and dressing transformations. — M.D. Kruskal, N. Joshi and R. Halburd: Analytic and asymptotic methods for nonlinear singularity analysis: a review and extensions of tests for the Painlevé property. — M. Lakshmanan: Bifurcations, chaos, controlling and synchronization of certain nonlinear oscillators. — F. Magri: Eight lectures on integrable systems. — J. Satsuma: Bilinear formalism in soliton theory. — M.A. Semenov-Tian-Shansky: Quantum and classical integrable systems.

Valentine S. KULIKOV. — **Mixed Hodge structures and singularities.** — Cambridge tracts in mathematics, vol. 132. — Un vol. relié, 16×24, de XXI, 186 p. — ISBN 0-521-62060-0. — Prix: £30.00. — Cambridge University Press, Cambridge, 1998.

This book is both an introduction to, and a survey of, some topics of singularity theory; in particular the studying of singularities by means of differential forms. Here some ideas and notions that arose in global algebraic geometry, namely mixed Hodge structures and the theory of period maps, are developed in the local situation to study the case of isolated singularities of holomorphic functions. The author introduces the Gauss-Manin connection on the vanishing cohomology of a singularity, that is on the cohomology fibration associated to the Milnor fibration, and draws on the work of Brieskorn and Steenbrink to calculate this connection, and the limit mixed Hodge structure.

W.B. Raymond LICKORISH. — **An introduction to knot theory.** — Graduate texts in mathematics, vol. 175. — Un vol. relié, 16×24, de X, 201 p. — ISBN 0-387-98254-X. — Prix: DM 89.00. — Springer, New York, 1997.

This volume is an introduction to mathematical knot theory — the theory of knots and links of simple closed curves in three-dimensional space. Three distinct techniques are employed: geometric topology manoeuvres; combinatorics; and algebraic topology. Each topic is developed until significant results are achieved, and chapters end with exercises and brief accounts of state-of-the-art research. Readers are assumed to have knowledge of the basic ideas of the fundamental group and simple homology theory, although explanations throughout the text are plentiful.

NGUYEN DINH CONG. — **Topological dynamics of random dynamical systems.** — Oxford mathematical monographs. — Un vol. relié, 16×24, de VIII, 203 p. — ISBN 0-19-850157-9. — Prix: £45.00. — Clarendon Press, Oxford, 1997.

This book is the first to deal with the theory of topological dynamics of random dynamical systems. The book presents in detail the solutions to the most fundamental problems of topological dynamics: the linearization of nonlinear smooth systems, and the classification and structural stability of linear hyperbolic systems. Employing the tools and methods of algebraic ergodic theory, the theory presented here leads to surprisingly beautiful results, showing the richness of random dynamical systems as well as giving a gentle generalization of classical deterministic theory.

Masahiro SHIOTA. — **Geometry of subanalytic and semialgebraic sets.** — Progress in mathematics, vol. 150. — Un vol. relié, 16,5×24,5, de XII, 431 p. — ISBN 3-7643-4000-2. — Prix: SFr. 158.00. — Birkhäuser, Boston, 1997.

Subanalytic and semialgebraic sets were introduced for topological and systematic investigations of real analytic and algebraic sets. One of the author's purposes is to show that almost all (known and unknown) properties of subanalytic and semialgebraic sets follow abstractly from some fundamental axioms. Another is to develop methods of proof that use finite processes instead of integration of vector fields. The proofs are elementary, but the results obtained are new and significant – for example, for singularity theorists and topologists. Further, the new methods and tools developed provide solid foundations for further research by model theorists (logicians) who are interested in applications of model theory to geometry.

S. SUZUKI, (Editor). — **Lectures at knots '96.** — International Conference Center, Waseda University, Tokyo, 22-31 July 1996. — Series on knots and everything, vol. 15. — Un vol. relié, 16×22,5, de IX, 290 p. — ISBN 981-02-3094-X. — Prix: £40.00. — World Scientific, Singapore, 1997.

K. Morimoto: Tunnel number and connected sum of knots. — A. Kawauchi: Topological imitations. — S. Kamada: Surfaces in 4-space, a view of normal forms and braidings. — K. Motegi: Knot types of satellite knots and twisted knots. — T. Deguchi, K. Tsurusaki: Random knots and links and applications to polymer physics. — L.H. Kauffman: Knots and diagrams. — K. Taniyama: On spatial graphs. — G. Buck, J. Simon: Energy and length of knots. — T. Kohno: Chern-Simons perturbative invariants. — C. McA. Gordon: Combinatorial methods in Dehn surgery.

Probabilités et processus stochastiques

L. DECREUSEFOND, Jon GJERDE, B. ØKSENDAL, A.S. ÜSTÜNEL, (Editors). — **Stochastic analysis and related topics VI.** — Proceedings of the sixth Oslo-Silivri workshop, Geilo, 1996. — Progress in probability, vol. 42. — Un vol. relié, 16×25, de VI, 408 p. — ISBN 0-8176-4018-5. — Prix: SFr. 228.00. — Birkhäuser, Boston, 1998.

This workshop features lectures on stochastic differential systems with memory and lectures on backward stochastic differential equations with applications to viscosity solutions of semi-linear PDEs. In addition, the contributed lectures present such mathematical topics as stochastic calculus of variations on Lie groups, boundary value problems, linear and nonlinear SDEs and SPDEs, non-Kolmogorov type probabilistic models, and some applications to fluid flow, population growth and economics. The selection of topics demonstrates the principle of the common interest among many researchers in these powerful stochastic techniques.

Hugh GORDON. — **Discrete probability.** — Undergraduate texts in mathematics. — Un vol. relié, 16×24, de XII, 266 p. — ISBN 0-387-98227-2. — Prix: DM 68.00. — Springer, New York, 1997.

This work is a post-calculus-level textbook for a first course in probability. Basic concepts, such as counting, independence, conditional probability, random variables, approximation of probabilities, generating functions, random walks, and Markov chains, are presented with clear explanations and many worked-out exercises. Throughout the book appear various comments on the history of the study of probability. The author presents biographical information about some of the well known contributors to probability, such as Fermat, Pascal, the Bernoullis, de Moivre, Bayes, Laplace, Poisson, Markov, and many others.

D. JEULIN, (Editor). — **Advances in theory and applications of random sets.** — Proceedings of the International Symposium. — Un vol. relié, 16,5×22,5, de X, 326 p. — ISBN 981-02-3001-X. — Prix: £61.00. — World Scientific, Singapore, 1997.

This volume contains the invited lectures given by leading scientists in this field. It shows the applications of the theory of random sets to many practical domains: models issued from this theory, by means of image simulation and analysis by computer, are applied in various fields such as biology or materials. On a different scale, they are used to simulate mineral ore deposits, oil reservoirs, or even astronomical data. Finally they provide sources of textures to encode or to generate artificial images.