Two Dimensional Manifolds Of Bounded Curvature

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Variational Problems in Topology

The Riemann Legacy

Two-dimensional manifolds of bounded curvature

Mathematical Reviews

Intrinsic Geometry of Surfaces

Surveys in Differential Geometry

very small domain (environment) affects through analytic continuation the whole of Riemann surface, or analytic manifold . Riemann was a master at applying this principle and also the first who noticed and emphasized that a meromorphic function is determined by its 'singularities'. Therefore he is rightly regarded as the father of the huge 'theory of singularities' which is developing so quickly and whose importance (also for physics) can hardly be overe~timated. Amazing and mysterious for our cognition is the role of Euclidean space. Even today many philosophers believe (following Kant) that 'real space' is Euclidean and other spaces being 'abstract constructs of mathematicians, should not be called

spaces'. The thesis is no longer tenable - the whole of physics testifies to that. Nevertheless, there is a grain of truth in the 3 'prejudice': E (three-dimensional Euclidean space) is special in a particular way pleasantly familiar to us - in it we (also we mathematicians!) feel particularly 'confident' and move with a sense of greater 'safety' than in non-Euclidean spaces. For this reason perhaps, Riemann space M stands out among the multitude of 'interesting geometries'. For it is: 1. Locally Euclidean, i. e. , M is a differentiable manifold whose tangent spaces TxM are equipped with Euclidean metric Uxi 2. Every submanifold M of Euclidean space E is equipped with Riemann natural metric (inherited from the metric of E) and it is well known how often such submanifolds are used in mechanics (e. g. , the spherical pendulum).

Flows on 2-dimensional Manifolds

Ever since Lorensen and Cline published their paper on the Marching Cubes algorithm, isosurfaces have been a standard technique for the visualization of 3D volumetric data. Yet there is no book exclusively devoted to isosurfaces. Isosurfaces: Geometry, Topology, and Algorithms represents the first book to focus on basic algorithms for isosurface construction. It also gives a rigorous mathematical perspective on some of the algorithms and results. In color throughout, the book covers the Marching Cubes algorithm and variants, dual contouring algorithms, multilinear interpolation, multiresolution isosurface extraction, isosurfaces in four dimensions, interval

volumes, and contour trees. It also describes data structures for faster isosurface extraction as well as methods for selecting significant isovalues. For designers of visualization software, the book presents an organized overview of the various algorithms associated with isosurfaces. For graduate students, it provides a solid introduction to research in this area. For visualization researchers, the book serves as a reference to the vast literature on isosurfaces.

The Cambridge Colloquium 1916

Robert Geroch's lecture notes "Infinite-Dimensional Manifolds" provide a concise, clear, and helpful introduction to a wide range of subjects, which are essential in mathematical and theoretical physics - Banach spaces, open mapping theorem, splitting, bounded linear mappings, derivatives, mean value theorem, manifolds, mappings of manifolds, scalar and vector fields, tensor products, tensor spaces, natural tensors, tensor fields, tensor bundles, Lie derivatives, integral curves, geometry of Lie derivatives, exterior derivatives, derivative operators, partial differential equations, and Riemannian geometry. Like in his other books, Geroch explains even the most abstract concepts with the help of intuitive examples and many (over 60) figures. Like Geroch's other books, this book too can be used for self-study since each chapter contains examples plus a set of problems given in the Appendix.

Fluctuating geometries in statistical mechanics and field theory

Siberian Mathematical Journal

Annals of Differential Equations

Transactions

Russian Mathematical Surveys

Physics letters : [part B].

Hardbound. This session of was organized with two principal purposes. Firstly to introduce a common language and culture to a mixed audience, composed of field theorists, string theorists, condensed matter physicists and statistical mechanicians. Secondly, to expose young researchers to the recent advances in various areas of theoretical physics, where the concepts of extended objects, geometry and fluctuations are currently playing an important role.Courses included an introduction to the problem of random paths in disordered media; theoretical and numerical approaches to quantized geometries, from random paths to surfaces/strings to four-dimensional gravity; physics of amphiphilic membranes and the models of random surfaces used to describe them; defects in various physical systems; recent developments on the formulation of two-dimensional

gauge theories as string theories. Problems of condensed matter physics were surveyed and a seminar on the renor

The Theory of Chaotic Attractors

A 1988 classic, covering Two-dimensional Surfaces; Domains on the Plane and on Surfaces; Brunn-Minkowski Inequality and Classical Isoperimetric Inequality; Isoperimetric Inequalities for Various Definitions of Area; and Inequalities Involving Mean Curvature.

Annals of Mathematics

Topics in Bifurcation Theory and Applications

A Course of Mathematical Analysis

The editors felt that the time was right for a book on an important topic, the history and development of the notions of chaotic attractors and their "natu ral" invariant measures. We wanted to bring together a coherent collection of readable, interesting, outstanding papers for detailed study and comparison. We hope that this book will allow serious graduate students to hold seminars to study how the research in this field developed. Limitation of space forced us painfully to exclude many excellent, relevant papers, and the resulting choice reflects the

interests of the editors. Since James Alan Yorke was born August 3, 1941, we chose to have this book commemorate his sixtieth birthday, honoring his research in this field. The editors are four of his collaborators. We would particularly like to thank Achi Dosanjh (senior editor math ematics), Elizabeth Young (assistant editor mathematics), Joel Ariaratnam (mathematics editorial), and Yong-Soon Hwang (book production editor) from Springer Verlag in New York for their efforts in publishing this book.

Surface Topology

An essential book for anyone using Russian mathematical and scientific literature Russian-English Dictionary of Mathematics embraces all major branches of mathematics from elementary topics to advanced studies in topology and discrete mathematics. Terms from the newest branches of mathematics, such as the theories of games, trees, knots, and braids, are included as well. Containing more than 27,000 entries, Russian-English Dictionary of Mathematics is larger and provides a broader scope than any other bilingual mathematics dictionary now in use. Many adjectives and verbs are included, and a copious amount of synonyms are provided for various terms. Secondary terms are grouped under principal terms for easier reference. Russian-English Dictionary of Mathematics provides the most comprehensive vocabulary aid available for translators, readers, and writers of Russian mathematical and scientific literature.

Geometry IV

Infinite-Dimensional Manifolds

Many of the modern variational problems in topology arise in different but overlapping fields of scientific study: mechanics, physics and mathematics. In this work, Professor Fomenko offers a concise and clean explanation of some of these problems (both solved and unsolved), using current methods and analytical topology. The author's skillful exposition gives an unusual motivation to the theory expounded, and his work is recommended reading for specialists and nonspecialists alike, involved in the fields of physics and mathematics at both undergraduate and graduate levels.

The Cambridge Colloquium

This book analyses in depth the geometrical aspects of the simplicial quantum gravity model known as the dynamical triangulations approach. The authors provide a compact and convenient account suitable both to introduce the non-expert reader to the spirit of the subject and to provide a well-chosen mathematical route to the heart of the matter for the expert. The techniques described in the book are novel and allow points of current interest in the subject of simplicial quantum gravity to be addressed. The authors discuss piecewise linear manifolds and give entropy estimates of the number of triangulations of 3- and 4-manifolds. Continuum

physics is recovered through scaling limits and computer simulation is used to study simplicial quantum gravity extensively. The beginner will appreciate the introduction to the field and the expert the comprehensive account of recent results and developments.

Russian-English Dictionary of Mathematics

The Geometry of Dynamical Triangulations

This book contains two surveys on modern research into non-regular Riemannian geometry, carried out mostly by Russian mathematicians. Coverage examines two-dimensional Riemannian manifolds of bounded curvature and metric spaces whose curvature lies between two given constants. This book will be immensely useful to graduate students and researchers in geometry, in particular Riemannian geometry.

Differential Geometry

This textbook contains ideas and problems involving curves, surfaces, and knots, which make up the core of topology. Carlson (mathematics, Rose-Hulman Institute of Technology) introduces some basic ideas and problems concerning manifolds, especially one- and two- dimensional manifolds. A sampling of topics includes classification of compact surfaces, putting

more structure on the surfaces, graphs and topology, and knot theory. It is assumed that the reader has a background in calculus. Annotation copyrighted by Book News Inc., Portland, OR.

Contributions from the Mathematical and Physical Departments

Colloquium Lectures

Time-evolution in low-dimensional topological spaces is a subject of puzzling vitality. This book is a state-of-the-art account, covering classical and new results. The volume comprises Poincaré-Bendixson, local and Morse-Smale theories, as well as a carefully written chapter on the invariants of surface flows. Of particular interest are chapters on the Anosov-Weil problem, C*-algebras and non-compact surfaces. The book invites graduate students and non-specialists to a fascinating realm of research. It is a valuable source of reference to the specialists.

Nonlinear Differential Equations and Dynamical Systems

Isosurfaces

Surgery on Compact Manifolds

Bulletin of the American Mathematical Society

A new edition of a classic book originally published in 1970 and now updated and expanded to include the very latest developments. The volume remains the single most important book on the topic. Features an attractive cover.

Topology of Surfaces, Knots, and Manifolds

This textbook presents the most efficient analytical techniques in the local bifurcation theory of vector fields. It is centered on the theory of normal forms and its applications, including interaction with symmetries. The first part of the book reviews the center manifold reduction and introduces normal forms (with complete proofs). Basic bifurcations are studied together with bifurcations in the presence of symmetries. Special attention is given to examples with reversible vector fields, including the physical example given by the water waves. In this second edition, many problems with detailed solutions are added at the end of the first part (some systems being in infinite dimensions). The second part deals with the Couette-Taylor hydrodynamical stability problem, between concentric rotating cylinders. The spatial structure of various steady or unsteady solutions results directly from the analysis of the reduced system on a center manifold. In this part we also study bifurcations (simple here) from group orbits of solutions in an elementary way (avoiding

heavy algebra). The third part analyzes bifurcations from time periodic solutions of autonomous vector fields. A normal form theory is developed, covering all cases, and emphasizing a partial Floquet reduction theory, which is applicable in infinite dimensions. Studies of period doubling as well as Arnold's resonance tongues are included in this part.

Two-dimensional Manifolds of Bounded Curvature

This updated and revised edition of a widely acclaimed and successful text for undergraduates examines topology of recent compact surfaces through the development of simple ideas in plane geometry. Containing over 171 diagrams, the approach allows for a straightforward treatment of its subject area. It is particularly attractive for its wealth of applications and variety of interactions with branches of mathematics, linked with surface topology, graph theory, group theory, vector field theory, and plane Euclidean and non-Euclidean geometry. Examines topology of recent compact surfaces through the development of simple ideas in plane geometry Contains a wealth of applications and a variety of interactions with branches of mathematics, linked with surface topology, graph theory, group theory, vector field theory, and plane Euclidean and non-Euclidean geometry

Soviet Mathematics - Doklady

The 1916 colloquium of the American Mathematical

Society was held as part of the summer meeting that took place in Boston. Two sets of lectures were presented: Functionals and their Applications. Selected Topics, including Integral Equations, by G. C. Evans, and Analysis Situs, by Oswald Veblen. The lectures by Evans are devoted to functionals and their applications. By a functional the author means a function on an infinite-dimensional space, usually a space of functions, or of curves on the plane or in 3-space, etc. The first lecture deals with general considerations of functionals (continuity, derivatives, variational equations, etc.). The main topic of the second lecture is the study of complex-valued functionals, such as integrals of complex functions in several variables. The third lecture is devoted to the study of what is called implicit functional equations. This study requires, in particular, the development of the notion of a Frechet differential, which is also discussed in this lecture. The fourth lecture contains generalizations of the Bocher approach to the treatment of the Laplace equation, where a harmonic function is characterized as a function with no flux (Evans' terminology) through every circle on the plane. Finally, the fifth lecture gives an account of various generalizations of the theory of integral equations. Analysis situs is the name used by Poincare when he was creating, at the end of the 19th century, the area of mathematics known today as topology. Veblen's lectures, forming the second part of the book, contain what is probably the first text where Poincare's results and ideas were summarized, and an attempt to systematically present this difficult new area of mathematics was made. This is how S. Lefschetz had described, in his 1924 review of the

book, the experience of ``a beginner attracted by the fascinating and difficult field of analysis situs'': ``Difficult reasonings beset him at every step, an unfriendly notation did not help matters, to all of which must be added, most baffling of all, the breakdown of geometric intuition precisely when most needed. No royal road can be created through this dense forest, but a good and thoroughgoing treatment of fundamentals, notation, terminology, may smooth the path somewhat. And this and much more we find supplied by Veblen's Lectures.'' Of the two streams of topology existing at that time, point set topology and combinatorial topology, it is the latter to which Veblen's book is almost totally devoted. The first four chapters present, in detail, the notion and properties (introduced by Poincare) of the incidence matrix of a cell decomposition of a manifold. The main goal of the author is to show how to reproduce main topological invariants of a manifold and their relations in terms of the incidence matrix. The (last) fifth chapter contains what Lefschetz called ``an excellent summary of several important questions: homotopy and isotopy, theory of the indicatrix, a fairly ample treatment of the group of a manifold, finally a bird's eye view of what is known and not known (mostly the latter) on three dimensional manifolds.''

A Basic Course in Algebraic Topology

Geometric Inequalities

This textbook is intended for a course in algebraic topology at the beginning graduate level. The main topics covered are the classification of compact 2-manifolds, the fundamental group, covering spaces, singular homology theory, and singular cohomology theory. These topics are developed systematically, avoiding all unnecessary definitions, terminology, and technical machinery. The text consists of material from the first five chapters of the author's earlier book, Algebraic Topology; an Introduction (GTM 56) together with almost all of his book, Singular Homology Theory (GTM 70). The material from the two earlier books has been substantially revised, corrected, and brought up to date.

Automatic Control of Inherently Unstable Systems with Bounded Control Inputs

Isoperimetric Inequalities in the Theory of Surfaces of Bounded External Curvature

For lecture courses that cover the classical theory of nonlinear differential equations associated with Poincare and Lyapunov and introduce the student to the ideas of bifurcation theory and chaos, this text is ideal. Its excellent pedagogical style typically consists of an insightful overview followed by theorems, illustrative examples, and exercises.

American Journal of Mathematics

This text contains an elementary introduction to continuous groups and differential invariants; an extensive treatment of groups of motions in euclidean, affine, and riemannian geometry; more. Includes exercises and 62 figures.

Monographs

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION