Journal Of Differential Geometry And Its Applications

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The Geometry and Dynamics of Magnetic Monopoles Amer Mathematical Society

The aim of this book is to introduce and develop an arithmetic analogue of classical differential geometry. In this new geometry the ring of integers plays the role of a ring of functions on an infinite dimensional manifold. The role of coordinate functions on this manifold is played by the prime numbers. The role of partial derivatives of functions with respect to the coordinates is played by the Fermat quotients of integers with respect to the primes. The role of metrics is played by symmetric matrices with integer coefficients. The role of connections (respectively curvature) attached to metrics is played by certain adelic (respectively global) objects attached to the corresponding matrices. One of the main conclusions of the theory is that the spectrum of the integers is “ intrinsically curved ”; the study of this curvature is then the main task of the theory. The book follows, and builds upon, a series of recent research papers. A significant part of the material has never been published before.

Algebraic Topology Via Differential Geometry American Mathematical Soc.

The International Conference on Modern Mathematics and the International Symposium on Differential Geometry, in honor of Professor Su Buchin on the centenary of his birth, were held in September 2001 at Fudan University, Shanghai, China. Around 100 mathematicians from China, France, Japan, Singapore and the United States participated. The proceedings cover a broad spectrum of advanced topics in mathematics, especially in differential geometry, such as some problems of common interest in harmonic maps, submanifolds, the Yang-Mills field and the geometric theory of solitons. Contents:Asymptotic

Behavior of Yang–Mills Flow in Higher Dimensions (Y M Chen et al.)Complete Submanifolds in Euclidean Spaces with Constant Scalar Curvature (Q M Cheng)On Mathematical Ship Lofting (G C Dong et al.)On the Nirenberg Problem (M Ji)Almost Complex Manifolds and a Differential Geometric Criterion for Hyperbolicity (S Kobayashi)Harmonic Maps Between Carnot Spaces (S Nishikawa)A Survey of Complete Manifolds with Bounded Radial Curvature Function (K Shiohama)On the Hensel Lift of a Polynomial (Z X Wan)A Note on Locally Real Hyperbolic Space with Finite Volume (Y H Yang)and other papers Readership: Researchers and graduate students in mathematics. Keywords:Differential Geometry;Harmonic Map;Submanifold;Yang-Mills Field;Geometric Theory of Solitons;Cohomology

Foundations of Arithmetic Differential Geometry Princeton University Press

Book IV continues the discussion begun in the first three volumes. Although it is aimed at first-year graduate students, it is also intended to serve as a basic reference for people working in affine differential geometry. It also should be accessible to undergraduates interested in affine differential geometry. We are primarily concerned with the study of affine surfaces which are locally homogeneous. We discuss affine gradient Ricci solitons, affine Killing vector fields, and geodesic completeness. Opozda has classified the affine surface geometries which are locally homogeneous; we follow her classification. Up to isomorphism, there are two simply connected Lie groups of dimension 2. The translation group R2 is Abelian and the ax + b group is non-Abelian. The first chapter presents foundational material. The second chapter deals with Type A surfaces. These are the left-invariant affine geometries on R2. Associating to each Type A surface the space of solutions to the quasi-Einstein equation corresponding to the eigenvalue $\mu = -1$ turns out to be a very powerful technique and plays a central role in our study as it links an analytic invariant with the underlying geometry of the surface. The third chapter deals with Type B surfaces; these are the left-invariant affine geometries on the ax + b group. These geometries form a very rich family which is only partially understood. The only remaining homogeneous geometry is that of the sphere S2. The fourth chapter presents relations between the geometry of an affine surface and the geometry of the cotangent bundle equipped with the neutral signature metric of the modified Riemannian extension.

Differential Geometry and Related Topics Cambridge University Press

An explanation of the mathematics needed as a foundation for a deep understanding of general relativity or quantum field theory. Physics is naturally expressed in mathematical language. Students new to the subject must simultaneously learn an idiomatic mathematical language and the content that is expressed in that language. It is as if they were asked to read Les Misérables while struggling with French grammar. This book offers an innovative way to learn the differential geometry needed as a foundation for a deep understanding of general relativity or quantum field theory as taught at the college level. The approach taken by the authors (and used in their classes at MIT for many years) differs from the conventional one in several ways, including an emphasis on the development of the covariant derivative and an avoidance of the use of traditional index notation for tensors in favor of a semantically richer language of vector fields and differential forms.

But the biggest single difference is the authors' integration of computer programming into their explanations. By programming a computer to interpret a formula, the student soon learns whether or not a formula is correct. Students are led to improve their program, and as a result improve their understanding.

Differential Geometry Inspired by String Theory Cambridge University Press

This book presents, in a concise and direct manner, the appropriate mathematical formalism and fundamentals of differential topology and differential geometry, together with essential applications in many branches of physics.

Index to the Journal of Differential Geometry, 1967-2007 Springer Science & Business Media

The literature on natural bundles and natural operators in differential geometry, was until now, scattered in the mathematical journal literature. This book is the first monograph on the subject, collecting this material in a unified presentation. The book begins with an introduction to differential geometry stressing naturality and functionality, and the general theory of connections on arbitrary fibered manifolds. The functional approach to classical natural bundles is extended to a large class of geometrically interesting categories. Several methods of finding all natural operators are given and these are identified for many concrete geometric problems. After reduction each problem to a finite order setting, the remaining discussion is based on properties of jet spaces, and the basic structures from the theory of jets are therefore described here too in a self-contained manner. The relations of these geometric problems to corresponding questions in mathematical physics are brought out in several places in the book, and it closes with a very comprehensive bibliography of over 300 items. This book is a timely addition to literature filling the gap that existed here and will be a standard reference on natural operators for the next few years.

Complex Differential Geometry American Mathematical Soc.

These papers have been organized into five volumes by subject matter. The first volume deals with topology, the second with algebraic geometry, the third with geometric ideas, the fourth with geometric analysis, and the fifth with geometric flows. These five volumes provide a condensed version of the Journal of Differential Geometry, helping readers to understand the development of the field of geometry over the past fifty years.

Handbook of Differential Geometry Morgan & Claypool Publishers

A thoroughly revised introduction to non-commutative geometry.

Differential Geometry in the Large Elsevier

Differential geometry plays an increasingly important role in modern theoretical physics and applied mathematics. This textbook gives an introduction to geometrical topics useful in theoretical physics and applied mathematics, covering: manifolds, tensor

fields, differential forms, connections, symplectic geometry, actions of Lie groups, bundles, spinors, and so on. Written in an informal style, the author places a strong emphasis on developing the understanding of the general theory through more than 1000 simple exercises, with complete solutions or detailed hints. The book will prepare readers for studying modern treatments of Lagrangian and Hamiltonian mechanics, electromagnetism, gauge fields, relativity and gravitation. Differential Geometry and Lie Groups for Physicists is well suited for courses in physics, mathematics and engineering for advanced undergraduate or graduate students, and can also be used for active self-study. The required mathematical background knowledge does not go beyond the level of standard introductory undergraduate mathematics courses.

Aspects of Differential Geometry IV Walter de Gruyter GmbH & Co KG

The theory of complex manifolds overlaps with several branches of mathematics, including differential geometry, algebraic geometry, several complex variables, global analysis, topology, algebraic number theory, and mathematical physics. Complex manifolds provide a rich class of geometric objects, for example the (common) zero locus of any generic set of complex polynomials is always a complex manifold. Yet complex manifolds behave differently than generic smooth manifolds; they are more coherent and fragile. The rich yet restrictive character of complex manifolds makes them a special and interesting object of study. This book is a self-contained graduate textbook that discusses the differential geometric aspects of complex manifolds. The first part contains standard materials from general topology, differentiable manifolds, and basic Riemannian geometry. The second part discusses complex manifolds and analytic varieties, sheaves and holomorphic vector bundles, and gives a brief account of the surface classification theory, providing readers with some concrete examples of complex manifolds. The last part is the main purpose of the book; in it, the author discusses metrics, connections, curvature, and the various roles they play in the study of complex manifolds. A significant amount of exercises are provided to enhance student comprehension and practical experience.

communications Programme: Iop Expanding Physi

Systems governed by non-linear differential equations are of fundamental importance in all branches of science, but our understanding of them is still extremely limited. In this book a particular system, describing the interaction of magnetic monopoles, is investigated in detail. The use of new geometrical methods produces a reasonably clear picture of the dynamics for slowly moving monopoles. This picture clarifies the important notion of solitons, which has attracted much attention in recent years. The

soliton idea bridges the gap between the concepts of "fields" and "particles," and is here explored in a fully three-dimensional context. While the background and motivation for the work comes from physics, the presentation is mathematical. This book is interdisciplinary and addresses concerns of theoretical physicists interested in elementary particles or general relativity and mathematicians working in analysis or geometry. The interaction between geometry and physics through non-linear partial differential equations is now at a very exciting stage, and the book is a contribution to this activity. Originally published in 1988. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

Journal of Differential Geometry Journal of Differential GeometryGeometry and Complexity Theory

In the series of volumes which together will constitute the "Handbook of Differential Geometry" we try to give a rather complete survey of the field of differential geometry. The different chapters will both deal with the basic material of differential geometry and with research results (old and recent). All chapters are written by experts in the area and contain a large bibliography. In this second volume a wide range of areas in the very broad field of differential geometry is discussed, as there are Riemannian geometry, Lorentzian geometry, Finsler geometry, symplectic geometry, contact geometry, complex geometry, Lagrange geometry and the geometry of foliations. Although this does not cover the whole of differential geometry, the reader will be provided with an overview of some its most important areas. . Written by experts and covering recent research . Extensive bibliography . Dealing with a diverse range of areas . Starting from the basics

Surveys in Differential Geometry, 2017 American Mathematical Soc.

Journal of Differential GeometryGeometry and Complexity TheoryCambridge University Press

Forty Years of the Journal of Differential Geometry World Scientific

This book draws a colorful and widespread picture of global affine hypersurface theory up to the most recent state. Moreover, the recent development revealed that affine differential geometry – as differential geometry in general – has an exciting intersection area with other fields of interest, like partial differential equations, global analysis, convex geometry and Riemann surfaces. The second edition of this monograph leads the reader from

introductory concepts to recent research. Since the publication of the first edition in 1993 there appeared important new contributions, like the solutions of two different affine Bernstein conjectures, due to Chern and Calabi, respectively. Moreover, a large subclass of hyperbolic affine spheres were classified in recent years, namely the locally strongly convex Blaschke hypersurfaces that have parallel cubic form with respect to the Levi-Civita connection of the Blaschke metric. The authors of this book present such results and new methods of proof.

Journal of Differential Geometry Cambridge University Press

The editors of the highly esteemed Journal of Differential Geometry (published by International Press) each year present a new volume of Surveys in Differential Geometry, a collection of original contributions upon a specially chosen topic pertaining to differential geometry and related topics. The series presents an overview of recent trends, while making predictions and suggestions for future research. Each invited contributor is a prominent specialist in the field of algebraic geometry, mathematical physics, or related areas. Contributors to Surveys tend to transcend classical frameworks within their field. Once every three years, Lehigh University and Harvard University, in conjunction with the editors of the JDG, sponsor a conference whose purpose is to survey the general field of differential geometry and related subjects. Speakers at the conference are likewise selected for their prominence in a given field and for their innovative contributions to it. Hence every third volume of Surveys is a publication of those presented talks. The Surveys in Differential Geometry series is a beneficial collection for experts and non-experts alike, and in particular, for those independent of the mainstream of activity in the field of geometry.

Functional Differential Geometry Springer Science & Business Media

Two central problems in computer science are P vs NP and the complexity of matrix multiplication. The first is also a leading candidate for the greatest unsolved problem in mathematics. The second is of enormous practical and theoretical importance. Algebraic geometry and representation theory provide fertile ground for advancing work on these problems and others in complexity. This introduction to algebraic complexity theory for graduate students and researchers in computer science and mathematics features concrete examples that demonstrate the application of geometric techniques to real world problems. Written by a noted expert in the field, it offers numerous open questions to motivate future research. Complexity theory has rejuvenated classical geometric questions and brought different areas of mathematics together in new ways. This book will show the beautiful, interesting, and important questions that have arisen as a result.

Topics in Differential Geometry Amer Mathematical Society

This is a self-contained introductory textbook on the calculus of differential forms and modern differential

geometry. The intended audience is physicists, so the author emphasises applications and geometrical reasoning in order to give results and concepts a precise but intuitive meaning without getting bogged down in analysis. The large number of diagrams helps elucidate the fundamental ideas. Mathematical topics covered include differentiable manifolds, differential forms and twisted forms, the Hodge star operator, exterior differential systems and symplectic geometry. All of the mathematics is motivated and illustrated by useful physical examples.

A New Approach to Differential Geometry using Clifford's Geometric Algebra Cambridge University Press

Holomorphic vector bundles have become objects of interest not only to algebraic and differential geometers and complex analysts but also to low dimensional topologists and mathematical physicists working on gauge theory. This book, which grew out of the author's lectures and seminars in Berkeley and Japan, is written for researchers and graduate students in these various fields of mathematics. Originally published in 1987. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

Geometry and Complexity Theory Amer Mathematical Society

This easy-to-read introduction takes the reader from elementary problems through to current research. Ideal for courses and self-study.

Geometry of Riemann Surfaces and Their Moduli Spaces Princeton University Press

Differential geometry has a long, wonderful history it has found relevance in areas ranging from machinery design of the classification of four-manifolds to the creation of theories of nature's fundamental forces to the study of DNA. This book studies the differential geometry of surfaces with the goal of helping students make the transition from the compartmentalized courses in a standard university curriculum to a type of mathematics that is a unified whole, it mixes geometry, calculus, linear algebra, differential equations, complex variables, the calculus of variations, and notions from the sciences. Differential geometry is not just for mathematics majors, it is also for students in engineering and the sciences. Into the mix of these ideas comes the opportunity to visualize concepts through the use of computer algebra systems such as Maple. The book emphasizes that this visualization goes hand-in-hand with the understanding of the mathematics behind the computer construction. Students will not only “see” geodesics on surfaces, but they will also see the effect that an abstract result such as the Clairaut relation can have on geodesics. Furthermore, the book shows how the equations of motion of particles constrained to surfaces are actually types of

geodesics. Students will also see how particles move under constraints. The book is rich in results and exercises that form a continuous spectrum, from those that depend on calculation to proofs that are quite abstract.