Contact Manifolds In Riemannian Geometry

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
This text focuses on developing an intimate acquaintance with the geometric meaning of curvature and thereby introduces and demonstrates all the main technical tools needed for a more advanced course on Riemannian manifolds. It covers proving the four most fundamental theorems relating curvature and topology: the Gauss-Bonnet Theorem, the Cartan-Hadamard Theorem, Bonnet's Theorem, and a special case of the Cartan-Ambrose-Hicks Theorem.
' The Sixth International Workshop on Complex Structures and Vector Fields was a continuation of the previous five workshops (1992, 1994, 1996, 1998, 2000) on similar research projects. This series of workshops aims at higher achievements in studies of new research subjects. The present volume will meet with the satisfaction of many readers. Contents:Real Analytic Almost Complex Manifolds (L N Apostolova)Involutive Distributions of Codimension One in Kaehler Manifolds (G Ganchev)Three Theorems on Isotropic Immersions (S Maeda)On the Meilikhson Theorem (M S Marinov)Curvature Tensors on Almost Contact Manifolds with B-Metric (G Nakova)Complex Structures and the Quark Confinement (I B Pestov)Curvature Operators in the Relativity (V Videv & Y Tsankov)On Integrability of Almost Quaternionic Manifolds (A Yamada)and other papers Readership: Graduate students and researchers in complex analysis, differential geometry and mathematical physics. Keywords:Poincare Formulae;Oka''s Theorem;Quantum Field Theory;Time-Like Killing Vector Field;Kaehler Immersion;Circle;Integrability of Almost Hermitian Manifold;Hyperocmplex Manifold;Semi-Symmetric Space;Hypercomplex Manifold'
Honoring Andrei Agrachev's 60th birthday, this volume presents recent advances in the interaction between Geometric Control Theory and sub-Riemannian geometry. On the one hand, Geometric Control Theory used the differential geometric and Lie algebraic language for studying controllability, motion planning, stabilizability and optimality for control systems. The geometric approach turned out to be fruitful in applications to robotics, vision modeling, mathematical physics etc. On the other hand, Riemannian geometry and its generalizations, such as sub-Riemannian, Finslerian geometry etc., have been actively adopting methods developed in the scope of geometric control. Application of these methods has led to important results regarding geometry of sub-Riemannian spaces, regularity of sub-Riemannian distances, properties of the group of diffeomorphisms of sub-Riemannian manifolds, local geometry and equivalence of distributions and sub-Riemannian structures, regularity of the Hausdorff volume, etc.
Differential geometry began as the study of curves and surfaces using the methods of calculus. In time, the notions of curve and surface were generalized along with associated notions such as length, volume, and curvature. At the same time the topic has become closely allied with developments in topology. The basic object is a smooth manifold, to which some extra structure has been attached, such as a Riemannian metric, a symplectic form, a distinguished group of symmetries, or a connection on the tangent bundle. This book is a graduate-level introduction to the tools and structures of modern differential geometry. Included are the topics usually found in a course on differentiable manifolds, such as vector bundles, tensors, differential forms, de Rham cohomology, the Frobenius theorem and basic Lie group theory. The book also contains material on the general theory of connections on vector bundles and an in-depth chapter on semi-Riemannian geometry that covers basic material about Riemannian manifolds and Lorentz manifolds. An unusual feature of the book is the inclusion of an early chapter on the differential geometry of hyper-surfaces in Euclidean space. There is also a section that derives the exterior calculus version of Maxwell's equations. The first chapters of the book are suitable for a one-semester course on manifolds. There is more than enough material for a year-long course on manifolds and geometry.
A variety of introductory articles is provided on a wide range of topics, including variational problems on curves and surfaces with anisotropic curvature. Experts in the fields of Riemannian, Lorentzian and contact geometry present state-of-the-art reviews of their topics. The contributions are written on a graduate level and contain extended bibliographies. The ten chapters are the result of various doctoral courses which were held in 2009 and 2010 at universities in Leuven, Serbia, Romania and Spain.
The second edition of An Introduction to Differentiable Manifolds and Riemannian Geometry, Revised has sold over 6,000 copies since publication in 1986 and this revision will make it even more useful. This is the only book available that is approachable by "beginners" in this subject. It has become an essential introduction to the subject for mathematics students, engineers, physicists, and economists who need to learn how to apply these vital methods. It is also the only book that thoroughly reviews certain areas of advanced calculus that are necessary to understand the subject. Line and surface integrals Divergence and curl of vector fields
This is a volume in honor of Professor Peter Carruthers on the occasion of his 61st birthday. It is a unique collection of papers by the world's leading experts, describing the most exciting developments in many areas of theoretical physics. While traditionally physics is driven to ever smaller and simpler systems, end-of-this-century scientists see themselves confronted with complex systems in many of their areas. It is just this interdisciplinary character of complexity that is addressed in this book, with topics ranging from the origin of intelligent life and of universal scaling laws in biology via heartbeats, proteins, fireballs, phase transitions, all the way to parton branching in collisions of elementary particles at high energies. The contributions include extensive discussions on complexity (M Gell-Mann, M Feigenbaum, D Champbell, D Pines and L M Simmons), neutrino masses (R Slansky and P Rosen), high temperature superconductors (D Pines), low Moon (M Feigenbaum), origin of intelligent life (S Colgate), chaos of the heart (M Duong-Van), origin of universal scaling laws in biological systems (G West), critical behavior of quarks (R Hwa), status of LEGO (S Meshov), disoriented chiral condensate (F Cooper), and many others.
The goal of these notes is to provide a fast introduction to symplectic geometry for graduate students with some knowledge of differential geometry, de Rham theory and classical Lie groups.

This text addresses symplectomorphisms, local forms, contact manifolds, compatible almost complex structures, Kaehler manifolds, hamiltonian mechanics, moment maps, symplectic reduction and symplectic toric manifolds. It contains guided problems, called homework, designed to complement the exposition or extend the reader's understanding. There are by now excellent references on symplectic geometry, a subset of which is in the bibliography of this book. However, the most efficient introduction to a subject is often a short elementary treatment, and these notes attempt to serve that purpose. This text provides a taste of areas of current research and will prepare the reader to explore recent papers and extensive books on symplectic geometry where the pace is much faster. For this reprint numerous corrections and clarifications have been made, and the layout has been improved.

Unlike many other texts on differential geometry, this textbook also offers interesting applications to geometric mechanics and general relativity. The first part is a concise and self-contained introduction to the basics of manifolds, differential forms, metrics and curvature. The second part studies applications to mechanics and relativity including the proofs of the Hawking and Penrose singularity theorems. It can be independently used for one-semester courses in either of these subjects. The main ideas are illustrated and further developed by numerous examples and over 300 exercises. Detailed solutions are provided for many of these exercises, making An Introduction to Riemannian Geometry ideal for self-study.

Book endorsed by the Sunyer Prize Committee (A. Weinstein, J. Oesterle et. al.).

An excellent reference for anyone needing to examine properties of harmonic vector fields to help them solve research problems. The book provides the main results of harmonic vector fields with an emphasis on Riemannian manifolds using past and existing problems to assist you in analyzing and furnishing your own conclusion for further research. It emphasizes a combination of theoretical development with practical applications for a solid treatment of the subject useful to those new to research using differential geometric methods in extensive detail. A useful tool for any scientist conducting research in the field of harmonic analysis Provides applications and modern techniques to problem solving A clear and concise exposition of differential geometry of harmonic vector fields on Reimannian manifolds Physical Applications of Geometric Methods

Proceedings of the Conference on Differential Geometry, Budapest, Hungary, July 27-30, 1996

This book presents a selection of the most recent algorithmic advances in Riemannian geometry in the context of machine learning, statistics, optimization, computer vision, and related fields. The unifying theme of the different chapters in the book is the exploitation of the geometry of data using the mathematical machinery of Riemannian geometry. As demonstrated by all the chapters in the book, when the data is intrinsically non-Euclidean, the utilization of this geometrical information can lead to better algorithms that can capture more accurately the structures inherent in the data, leading ultimately to better empirical performance. This book is not intended to be an encyclopedic compilation of the applications of Riemannian geometry. Instead, it focuses on several important research directions that are currently actively pursued by researchers in the field. These include statistical modeling and analysis on manifolds,optimization on manifolds, Riemannian manifolds and kernel methods, and dictionary learning and sparse coding on manifolds. Examples of applications include novel algorithms for Monte Carlo sampling and Gaussian Mixture Model fitting, 3D brain image analysis,image classification, action recognition, and motion tracking.

The present book contains 14 papers published in the Special Issue “Differential Geometry” of the journal Mathematics. They represent a selection of the 30 submissions. This book covers a variety of both classical and modern topics in differential geometry. We mention properties of both rectifying and affine curves, the geometry of hypersurfaces, angles in Minkowski planes, Euclidean submanifolds, differential operators and harmonic forms on Riemannian manifolds, complex manifolds, contact manifolds (in particular, Sasakian and trans-Sasakian manifolds), curvature invariants, and statistical manifolds and their submanifolds (in particular, Hessian manifolds). We wish to mention that among the authors, there are both well-known geometers and young researchers. The authors are from countries with a tradition in differential geometry: Belgium, China, Greece, Japan, Korea, Poland, Romania, Spain, Turkey, and United States of America. Many of these papers were already cited by other researchers in their articles. This book is useful for specialists in differential geometry, operator theory, physics, and information geometry as well as graduate students in mathematics.

This book focuses on Hamilton's Ricci flow, beginning with a detailed discussion of the required aspects of differential geometry, progressing through existence and regularity theory, compactness theorems for Riemannian manifolds, and Perelman's noncollapsing results, and culminating in a detailed analysis of the evolution of curvature, where recent breakthroughs of Böhm and Wilking and Brendle and Schoen have led to a proof of the differentiable 1/4-pinching sphere theorem.

The basic goals of the book are: (i) to introduce the subject to those interested in discovering it, (ii) to coherently present a number of basic techniques and results, currently used in the subject, to those working in it, and (iii) to present some of the results that are attractive in their own right, and which lend themselves to a presentation not overburdened with technical machinery.

This book aims to bridge the gap between probability and differential geometry. It gives two constructions of Brownian motion on a Riemannian manifold: an extrinsic one where the manifold is realized as an embedded submanifold of Euclidean space and an intrinsic one based on the ``rolling'' map. It is then shown how geometric quantities (such as curvature) are reflected by the behavior of Brownian paths and how that behavior can be used to extract information about geometric quantities. Readers should have a strong background in analysis with basic knowledge in stochastic calculus and differential geometry. Professor Stroock is a highly-respected expert in probability and analysis. The clarity and style of his exposition further enhance the quality of this volume. Readers will find an inviting introduction to the study of paths and Brownian motion on Riemannian manifolds.

This volume is a collection of original and expository papers in the fields of Mathematics in which Gauss had made many fundamental discoveries. The contributors are all outstanding in their fields and the volume will be of great interest to all research mathematicians, research workers in the history of science, and graduate students in Mathematics and Mathematical Physics.

Sub-Riemannian geometry (also known as Carnot geometry in France, and non-holonomic Riemannian geometry in Russia) has been a full research domain for fifteen years, with motivations and ramifications in several parts of pure and applied mathematics, namely: control theory classical mechanics Riemannian geometry (of which sub-Riemannian geometry constitutes a natural generalization, and where sub-Riemannian metrics may appear as limit cases) diffusion on manifolds analysis of hypoelliptic operators Cauchy-Riemann (or CR) geometry. Although links between these domains had been foreseen by many authors in the past, it is only in recent years that sub- Riemannian geometry has been recognized as a possible common framework for all these topics. This book provides an introduction to sub-Riemannian geometry and presents the state of the art and open problems in the field. It consists of five coherent and original articles by the leading specialists: Andr Bellache: The tangent space in sub-Riemannian geometry Mikhael Gromov: Carnot-Carathodory spaces seen from within Richard Montgomery: Survey of singular geodesics Hctor J. Sussmann: A cornucopia of four-dimensional abnormal sub-Riemannian minimizers Jean-Michel Coron: Stabilization of controllable systems.

This volume contains the contributions by the participants in the eight of a series workshops in complex analysis, differential geometry and mathematical physics and related areas.Active specialists in mathematical physics contribute to the volume, providing not only significant information for researchers in the area but also interesting mathematics for non-specialists and a broader audience. The contributions treat topics including differential geometry, partial differential equations, integrable systems and mathematical physics.

This book provides an introduction to Riemannian geometry, the geometry of curved spaces, for use in a graduate course. Requiring only an understanding of differentiable manifolds, the author covers the introductory ideas of Riemannian geometry followed by a selection of more specialized topics. Also featured are Notes and Exercises for each chapter, to develop and enrich the reader's appreciation of the subject. This second edition, first published in 2006, has a clearer treatment of many topics than the first edition, with new proofs of some theorems and a new chapter on the Riemannian geometry of surfaces. The main themes here are the effect of the curvature on the usual notions of classical Euclidean geometry, and the new notions and ideas motivated by curvature itself. Completely new themes created by curvature include the classical Rauch comparison theorem and its consequences in geometry and topology, and the interaction of microscopic behavior of the geometry with the macroscopic structure of the space.

Presents a geometric treatment of problems in physics involving quantum harmonic oscillators, quartic oscillators, minimal surfaces, and Schrodinger's, Einstein's and Newton's equations. With examples and exercises, this text is directed at graduate and advanced undergraduate students, as well as applied mathematicians and theoretical physicists.

A warped product manifold is a Riemannian or pseudo-Riemannian manifold whose metric tensor can be decomposed into a Cartesian product of the y geometry and the x geometry — except that the x-part is warped, that is, it is rescaled by a scalar function of the other coordinates y. The notion of warped product manifolds plays very important roles not only in geometry but also in mathematical physics, especially in general relativity. In fact, many basic solutions of the Einstein field equations, including the Schwarzschild solution and the Robertson–Walker models, are warped product manifolds. The first part of this volume provides a self-contained and accessible introduction to the important subject of pseudo-Riemannian manifolds and submanifolds. The second part presents a detailed and up-to-date account on important results of warped product manifolds, including several important spacetimes such as Robertson–Walker's and Schwarzschild's. The famous John Nash's embedding theorem published in 1956 implies that every warped product manifold can be realized as a warped product submanifold in a suitable Euclidean space. The study of warped product submanifolds in various important ambient spaces from an extrinsic point of view was initiated by the author around the beginning of this century. The last part of this volume contains an extensive and comprehensive survey of numerous important results on the geometry of warped product submanifolds done during this century by many geometers.

Differential Geometry is a wide field. We have chosen to concentrate upon certain aspects that are appropriate for an introduction to the subject; we have not attempted an encyclopedic treatment. Book III is aimed at the first-year graduate level but is certainly accessible to advanced undergraduates. It deals with invariance theory and discusses invariants both of Weyl and not of Weyl type; the Chern?Gauss?Bonnet formula is treated from this point of view. Homothety homogeneity, local homogeneity, stability theorems, and Walker geometry are discussed. Ricci solitons are presented in the contexts of Riemannian, Lorentzian, and affine geometry.

This volume contains the papers presented at a symposium on differential geometry at Shinshu University in July of 1988. Carefully reviewed by a panel of experts, the papers pertain to the following areas of research: dynamical systems, geometry of submanifolds and tensor geometry, lie sphere geometry, Riemannian geometry, Yang-Mills Connections, and geometry of the Laplace operator.

This volume contains the courses and lectures given during the workshop on Differential Geometry and Topology held at Alghero, Italy, in June 1992. The main goal of this meeting was to offer an introduction in attractive areas of current research and to discuss some recent important achievements in both the fields. This is reflected in the present book which contains some introductory texts together with more specialized contributions. The topics covered in this volume include circle and sphere packings, 3-manifolds invariants and combinatorial presentations of manifolds, soliton theory and its applications in differential geometry, G-manifolds of low cohomogeneity, exotic differentiable structures on R4, conformal deformation of Riemannian manifolds and Riemannian geometry of algebraic manifolds. Contents:Asystatic G-Manifolds (A Alekseevsky & D Alekseevsky)Les Paquets de Cercles (M Berger)Smooth Structures on Euclidean Spaces (S Demichelis)Surface Theory, Harmonic Maps and Commuting Hamiltonian Flows (D Ferus)Metric Invariants of Kähler Manifolds (M Gromov)On the Sphere Packing Problem and the Proof of Kepler's Conjecture (W Y Hsiang)A 3-Gem Approach to Turaev-Viro Invariants (S L S Lins)Cohomology Operations and Modular Invariant Theory (L Lomonaco)Scalar Curvature and Conformal Deformation of Riemannian Manifolds (A Ratto)Lectures on Combinatorial Presentations of Manifolds (O Viro) Readership: Mathematicians. keywords:

This book contains a clear exposition of two contemporary topics in modern differential geometry: distance geometric analysis on manifolds, in particular, comparison theory for distance functions in spaces which have well defined bounds on their curvature the application of the Lichnerowicz formula for Dirac operators to the study of Gromov's invariants to measure the K-theoretic size of a Riemannian manifold. It is intended for both graduate students and researchers.

Basic algebraic notions -- Introduction -- A historical perspective in the algebraic context -- Algebraic preliminaries -- Jordan normal form -- Indefinite geometry -- Algebraic curvature tensors -- Hermitian and para-Hermitian geometry -- The Jacobi and skew symmetric curvature operators -- Sectional, Ricci, scalar, and Weyl curvature -- Curvature decompositions -- Self-duality and anti-self-duality conditions -- Spectral geometry of the curvature operator -- Osserman and conformally Osserman models -- Osserman curvature models in signature (2, 2) -- Ivanov-Petrova curvature models -- Osserman Ivanov-Petrova curvature models -- Commuting curvature models -- Basic geometrical notions -- Introduction -- History -- Basic manifold theory -- The tangent bundle, lie bracket, and lie groups -- The cotangent bundle and symplectic geometry -- Connections, curvature, geodesics, and holonomy -- Pseudo-Riemannian geometry -- The Levi-Civita connection -- Associated natural operators -- Weyl scalar invariants -- Null distributions -- Pseudo-Riemannian holonomy -- Other geometric structures -- Pseudo-Hermitian and para-Hermitian structures -- Hyper-para-Hermitian structures -- Geometric realizations -- Homogeneous spaces, and curvature homogeneity -- Technical results in differential equations -- Walker structures -- Introduction -- Historical development -- Walker coordinates -- Examples of Walker manifolds -- Hypersurfaces with nilpotent shape operators -- Locally conformally flat metrics with nilpotent Ricci operator -- Degenerate pseudo-Riemannian homogeneous structures -- Para-Kaehler geometry -- Two-step nilpotent lie groups with degenerate center -- Conformally symmetric pseudo-Riemannian metrics -- Riemannian extensions -- The affine category -- Twisted Riemannian extensions defined by flat connections -- Modified Riemannian extensions defined by flat connections -- Nilpotent Walker manifolds -- Osserman Riemannian extensions -- Ivanov-Petrova Riemannian extensions -- Three-dimensional Lorentzian Walker manifolds -- Introduction -- History -- Three dimensional Walker geometry -- Adapted coordinates -- The Jordan normal form of the Ricci operator -- Christoffel symbols, curvature, and the Ricci tensor -- Locally symmetric Walker manifolds -- Einstein-like manifolds -- The spectral geometry of the curvature tensor -- Curvature commutativity properties -- Local geometry of Walker manifolds with -- Foliated Walker manifolds -- Contact Walker manifolds -- Strict Walker manifolds -- Three dimensional homogeneous Lorentzian manifolds -- Three dimensional lie groups and lie algebras -- Curvature homogeneous Lorentzian manifolds -- Diagonalizable Ricci operator -- Type II Ricci operator -- Four-dimensional Walker manifolds -- Introduction -- History -- Four-dimensional Walker manifolds -- Almost para-Hermitian geometry -- Isotropic almost para-Hermitian structures -- Characteristic classes -- Self-dual Walker manifolds -- The spectral geometry of the curvature tensor -- Introduction -- History -- Four-dimensional Osserman metrics -- Osserman metrics with diagonalizable Jacobi operator -- Osserman Walker type II metrics -- Osserman and Ivanov-Petrova metrics -- Riemannian extensions of affine surfaces -- Affine surfaces with skew symmetric Ricci tensor -- Affine surfaces with symmetric and degenerate Ricci tensor -- Riemannian extensions with commuting curvature operators -- Other examples with commuting curvature operators -- Hermitian geometry -- Introduction -- History -- Almost Hermitian geometry of Walker manifolds -- The proper almost Hermitian structure of a Walker manifold -- Proper almost hyper-para-Hermitian structures -- Hermitian Walker manifolds of dimension four -- Proper Hermitian Walker structures -- Locally conformally Kaehler structures -- Almost Kaehler Walker four-dimensional manifolds -- Special Walker manifolds -- Introduction -- History -- Curvature commuting conditions -- Curvature homogeneous strict Walker manifolds -- Bibliography.

The series is devoted to the publication of monographs and high-level textbooks in mathematics, mathematical methods and their applications. Apart from covering important areas of current interest, a major aim is to make topics of an interdisciplinary nature accessible to the non-specialist. The works in this series are addressed to advanced students and researchers in mathematics and theoretical physics. In addition, it can serve as a guide for lectures and seminars on a graduate level. The series de Gruyter Studies in Mathematics was founded ca. 35 years ago by the late Professor Heinz Bauer and Professor Peter Gabriel with the aim to establish a series of monographs and textbooks of high standard, written by scholars with an international reputation presenting current fields of research in pure and applied mathematics. While the editorial board of the Studies has changed with the years, the aspirations of the Studies are unchanged. In times of rapid growth of mathematical knowledge carefully written monographs and textbooks written by experts are needed more than ever, not least to pave the way for the next generation of mathematicians. In this sense the editorial board and the publisher of the Studies are devoted to continue the Studies as a service to the mathematical community. Please submit any book proposals to Niels Jacob. Titles in planning include Flavia Smarazzo and Alberto Tesei, Measure Theory: Radon Measures, Young Measures, and Applications to Parabolic Problems (2019) Elena Cordero and Luigi Rodino, Time-Frequency Analysis of Operators (2019) Mark M. Meerschaert, Alla Sikorskii, and Mohsen Zayernouri, Stochastic and Computational Models for Fractional Calculus, second edition (2020) Mariusz Lema?czyk, Ergodic Theory: Spectral Theory, Joinings, and Their Applications (2020) Marco Abate, Holomorphic Dynamics on Hyperbolic Complex Manifolds (2021) Miroslava Antic, Joeri Van der Veken, and Luc Vrancken, Differential Geometry of Submanifolds: Submanifolds of Almost Complex Spaces and Almost Product Spaces (2021) Kai Liu, Ilpo Laine, and Lianzhong Yang, Complex Differential-Difference Equations (2021) Rajendra Vasant Gurjar, Kayo Masuda, and Masayoshi Miyanishi, Affine Space Fibrations (2022)

This book is focused on the interrelations between the curvature and the geometry of Riemannian manifolds. It contains research and survey articles based on the main talks delivered at the International Congress "Curvature in Geometry", held in Lecce, Italy, June 11-14, 2003. The congress was organized in honor of Lieven Vanhecke, as a tribute to his many contributions to mathematics. The volume describesrecent developments and research trends in several relevant topics related to Riemannian geometry, the field in which the mathematical activity of L. Vanhecke is most fruitful and inspiring. Contributors include: Blair, D.; Borisenko, A.;Calvaruso, G.;Cortes, V.;Djoric, M.;Ferrarotti, M.;Garcia?Rio, E.;Gilkey, P.;Gil?Medrano, O.;Gonzàles Dàvila, C.;Hajkova, V.; Huckleberry, A.;Kowalski, O.;Nagy, P.; Naveira, A.;Okumura, M.; Sekigawa, K.;Terng, C.L.;Tsukada, K.;and Wolf, J. This bookwill appeal to graduate students and researchers in diverse areas of geometry. TOC:Nagy, P.:Totally geodesic decomposition of Lie group * Blair, D.:Curvature of Contact Metric Manifolds * Gilkey, P.: Curvature homogeneous pseudo-Riemannian manifolds of balanced signature (p,p) which are Osserman, Ivanon?Petrova and Szabo but which are not locally homogeneous (tentative title) * Ferrarotti, M.: Lipschits cone-like trivializations of isolated singularities * Borisenko, A.: Rigidity of Hadamard manifolds * Cortes, V.:Pluriharmonic maps, t*t equations and special Kaehler manifolds * Sekigawa, K.:

Goldberg conjecture and related topics * Naveira, A.:Two problems in real and complex integral geometry * Terng, C.L.: Geometry of Surfaces and Integrable Systems *Gil?Medrano, O.:Volume and energy of vector fields and distributions: variational approach and examples * Hajkova, V.; Kowalski, O.:3-dimensional Riemannian manifolds with curvature restrictions * Gonzàles Dàvila, C.: Jacobi fields on homogeneous Riemannian manifolds * Tsukada, K.: Symmetric submanifolds of Riemannian symmetric spaces * Garcia?Rio, E.:Total survatures of geodesic spheres * Calvaruso, G.: Semi-Symmetric unit tangent bundles * Wolf, J.;Huckleberry, A.:Schubert fibrations of cycle domains * Djoric, M.;Okumura, M.:On the shape operator of CR submanifolds of maximal CR dimension

The central theme of this book is the interaction between the curvature of a complete Riemannian manifold and its topology and global geometry. The first five chapters are preparatory in nature. They begin with a very concise introduction to Riemannian geometry, followed by an exposition of Toponogov's theorem--the first such treatment in a book in English. Next comes a detailed presentation of homogeneous spaces in which the main goal is to find formulas for their curvature. A quick chapter of Morse theory is followed by one on the injectivity radius. Chapters 6-9 deal with many of the most relevant contributions to the subject in the years 1959 to 1974. These include the pinching (or sphere) theorem, Berger's theorem for symmetric spaces, the differentiable sphere theorem, the structure of complete manifolds of non-negative curvature, and finally, results about the structure of complete manifolds of non-positive curvature. Emphasis is given to the phenomenon of rigidity, namely, the fact that although the conclusions which hold under the assumption of some strict inequality on curvature can fail when the strict inequality on curvature can fail when the strict inequality is relaxed to a weak one, the failure can happen only in a restricted way, which can usually be classified up to isometry. Much of the material, particularly the last four chapters, was essentially state-of-the-art when the book first appeared in 1975. Since then, the subject has exploded, but the material covered in the book still represents an essential prerequisite for anyone who wants to work in the field.

Contents: Riemannian ManifoldsSubmanifolds of Riemannian ManifoldsComplex ManifoldsSubmanifolds of Kaehlerian ManifoldsContact ManifoldsSubmanifolds of Sasakian Manifoldsf-StructuresProduct ManifoldsSubmersions Readership: Mathematicians. Keywords:Riemannian Manifold;Submanifold;Complex Manifold;Contact Manifold;Kaehlerian Manifold;Sasakian Manifold;Anti-Invariant Submanifold;CR Submanifold;Contact CR Submanifold;Submersion

Proceedings of the Colloquium on Differential Geometry, Debrecen, Hungary, July 26-30, 1994

The book introduces the basic notions in Symplectic and Contact Geometry at the level of the second year graduate student. It also contains many exercises, some of which are solved only in the last chapter. We begin with the linear theory, then give the definition of symplectic manifolds and some basic examples, review advanced calculus, discuss Hamiltonian systems, tour rapidly group and the basics of contact geometry, and solve problems in chapter 8. The material just described can be used as a one semester course on Symplectic and Contact Geometry. The book contains also more advanced material, suitable to advanced graduate students and researchers. Contents: Symplectic Vector SpacesSymplectic ManifoldsHamiltonian Systems and Poisson AlgebraGroup ActionsContact ManifoldsSolutions of Selected ExercisesEpilogue: The C0-Symplectic and Contact Topology Readership: Graduate students, researchers and more advanced mathematicians. Symplectic;Contact GeometryKey Features: It is briefThe easy part has been tested and been used for a short courseThe advanced material develops things related to one of the author's research furtherThere is no book, going from the very elementary part to the very advanced level, like this one

This book provides an upto date information on metric, connection and curva ture symmetries used in geometry and physics. More specifically, we present the characterizations and classifications of Riemannian and Lorentzian manifolds (in particular, the spacetimes of general relativity) admitting metric (i.e., Killing, ho mothetic and conformal), connection (i.e., affine conformal and projective) and curvature symmetries. Our approach, in this book, has the following outstanding features: (a) It is the first-ever attempt of a comprehensive collection of the works of a very large number of researchers on all the above mentioned symmetries. (b) We have aimed at bringing together the researchers interested in differential geometry and the mathematical physics of general relativity by giving an invariant as well as the index form of the main formulas and results. (c) Attempt has been made to support several main mathematical results by citing physical example(s) as applied to general relativity. (d) Overall the presentation is self contained, fairly accessible and in some special cases supported by an extensive list of cited references. (e) The material covered should stimulate future research on symmetries. Chapters 1 and 2 contain most of the prerequisites for reading the rest of the book. We present the language of semi-Euclidean spaces, manifolds, their tensor calculus; geometry of null curves, non-degenerate and degenerate (light like) hypersurfaces. All this is described in invariant as well as the index form.

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