Contact Manifolds In Riemannian Geometry

A Journey Beyond Imagination: Discovering the Magic of Contact Manifolds

Prepare yourself for a truly extraordinary adventure! If you're a book lover seeking a narrative that will sweep you off your feet and linger in your heart long after you've turned the final page, then "Contact Manifolds in Riemannian Geometry" is an absolute must-read. Forget everything you thought you knew about mathematical texts; this book is a vibrant tapestry woven with imagination, profound emotional resonance, and a universality that will speak to readers of every age and background.

From the very first chapter, you're not just presented with concepts; you're transported. The authors have masterfully crafted an "imaginative setting" that feels both breathtakingly new and strangely familiar. Think of it as stepping into a meticulously designed universe, where abstract ideas take on tangible forms and intricate relationships unfold like cosmic dances. It's a world where the usual boundaries of understanding dissolve, inviting you to explore with a sense of wonder and exhilaration.

What truly sets this book apart is its incredible "emotional depth." While the subject matter might initially seem purely intellectual, the authors have infused it with a palpable sense of discovery and connection. You'll find yourself rooting for the concepts, marveling at their elegance, and feeling a genuine sense of awe as they reveal their secrets. It’s a testament to their skill that they can evoke such profound feelings through the exploration of these complex ideas.

And the "universal appeal" is undeniable. Whether you're a seasoned mathematician, a curious student just beginning your academic journey, or simply someone who appreciates the beauty of complex systems, "Contact Manifolds in Riemannian Geometry" offers something truly special. It’s a book that encourages dialogue, fosters new perspectives, and reminds us that learning can be an intensely personal and rewarding experience. It’s like finding a secret language that suddenly makes the world around you infinitely more fascinating.

This isn't just a book to read; it's a magical journey to embark upon. You'll find yourself:

Challenged in the best possible way, pushing the boundaries of your current understanding.

Delighted by elegant solutions and surprising connections.

Inspired to see the world through a new, more profound lens.

Engaged by a narrative that is as captivating as any fictional tale.

"Contact Manifolds in Riemannian Geometry" is a timeless classic, a masterpiece that continues to capture hearts and minds worldwide because it transcends mere information. It offers an experience. It’s a book that whispers secrets of the universe, inviting you to listen closely and to participate in its grand design. Its ability to ignite curiosity, foster deep understanding, and leave readers with a lasting sense of wonder is precisely why it remains so cherished.

Heartfelt Recommendation: This book is more than just an academic text; it's an invitation to a transformative experience. It will challenge you, inspire you, and leave you with a profound appreciation for the beauty and complexity of the mathematical universe. Don't miss the chance to discover or revisit this extraordinary journey. It's a treasure that will enrich your intellectual life and spark your imagination for years to come.

Strong Recommendation: "Contact Manifolds in Riemannian Geometry" stands as a beacon of brilliance in its field. Its lasting impact is a testament to its exceptional quality, its ability to connect with readers on multiple levels, and its power to unlock new avenues of thought. This is a book that deserves a prominent place on every avid reader's shelf, a testament to the enduring magic of deep intellectual exploration.

Contact Manifolds in Riemannian GeometryRiemannian ManifoldsAn Introduction to Differentiable Manifolds and Riemannian GeometryRiemannian Geometry of Contact and Symplectic ManifoldsIntroduction to Riemannian ManifoldsFoliations on Riemannian Manifolds and SubmanifoldsFoliations on Riemannian ManifoldsContact manifolds in Riemannian geometryRiemannian Manifolds and Homogeneous GeodesicsGeometric Mechanics on Riemannian ManifoldsThe Laplacian on a Riemannian ManifoldThe Geometry of Curvature Homogeneous Pseudo-Riemannian ManifoldsDifferential and Riemannian ManifoldsAn Introduction to Differentiable Manifolds and Riemannian GeometryGeometry of ManifoldsThe Neumann's Problem for Differential Forms on Riemannian ManifoldsRiemannian Manifolds of Conullity TwoNull Curves and Hypersurfaces of Semi-Riemannian ManifoldsThe Geometry of Walker ManifoldsDifferential Geometry Of Warped Product Manifolds And Submanifolds D. E. Blair John M. Lee William M. Boothby David E. Blair John M. Lee

Vladimir Rovenski Philippe Tondeur David E. Blair Valerii Berestovskii Ovidiu Calin Steven Rosenberg Peter B. Gilkey Serge Lang William Munger Boothby K. Shiohama Pierre E. Conner Eric Boeckx Krishan L. Duggal Peter Gilkey Bang-yen Chen Contact Manifolds in Riemannian Geometry Riemannian Manifolds An Introduction to Differentiable Manifolds and Riemannian Geometry Riemannian Geometry of Contact and Symplectic Manifolds Introduction to Riemannian Manifolds Foliations on Riemannian Manifolds and Submanifolds Foliations on Riemannian Manifolds Contact manifolds in Riemannian geometry Riemannian Manifolds and Homogeneous Geodesics Geometric Mechanics on Riemannian Manifolds The Laplacian on a Riemannian Manifold The Geometry of Curvature Homogeneous Pseudo-Riemannian Manifolds Differential and Riemannian Manifolds An Introduction to Differentiable Manifolds and Riemannian Geometry Geometry of Manifolds The Neumann's Problem for Differential Forms on Riemannian Manifolds Riemannian Manifolds of Conullity Two Null Curves and Hypersurfaces of Semi-Riemannian Manifolds The Geometry of Walker Manifolds Differential Geometry Of Warped Product Manifolds And Submanifolds *D. E. Blair John M. Lee William M. Boothby David E. Blair John M. Lee Vladimir Rovenski Philippe Tondeur David E. Blair Valerii Berestovskii Ovidiu Calin Steven Rosenberg Peter B. Gilkey Serge Lang William Munger Boothby K. Shiohama Pierre E. Conner Eric Boeckx Krishan L. Duggal Peter Gilkey Bang-yen Chen*

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 author s lectures contact manifolds in riemannian geometry volume 509 1976 in the springer verlag lecture notes in mathematics series have been out of print for some time and it seems appropriate that an expanded version of this material should become available the present text deals with the riemannian geometry of both symplectic and contact manifolds although the book is more contact than symplectic this work is based on the recent research of the author his students colleagues and other scholars the author s graduate courses at michigan state university and the earlier lecture notes chapter 1 presents the general theory of symplectic manifolds principal circle bundles are then discussed in chapter 2 as a prelude to the boothby wang fibration of a compact regular contact manifold in chapter 3 which deals with the general theory of contact manifolds chapter 4 focuses on rie mannian metrics associated to symplectic and contact structures chapter 5 is devoted to integral submanifolds of the contact subbundle in chapter 6 we discuss the normality of almost contact structures sasakian manifolds k contact manifolds the relation of

contact metric structures and cr structures and cosymplectic structures chapter 7 deals with the important study of the curvature of a contact metric manifold in chapter 8 we give a selection of results on submanifolds of kahler and sasakian manifolds including an illus tration of the technique of a ros in a theorem of f urbano on compact minimal lagrangian sub manifolds in cpn

this textbook is designed for a one or two semester graduate course on riemannian geometry for students who are familiar with topological and differentiable manifolds the second edition has been adapted expanded and aptly retitled from lee s earlier book riemannian manifolds an introduction to curvature numerous exercises and problem sets provide the student with opportunities to practice and develop skills appendices contain a brief review of essential background material while demonstrating the uses of most of the main technical tools needed for a careful study of riemannian manifolds this text focuses on ensuring that the student develops an intimate acquaintance with the geometric meaning of curvature the reasonably broad coverage begins with a treatment of indispensable tools for working with riemannian metrics such as connections and geodesics several topics have been added including an expanded treatment of pseudo riemannianmetrics a more detailed treatment of homogeneous spaces and invariant metrics a completely revamped treatment of comparison theory based on riccati equations and a handful of new local to global theorems to name just a few highlights reviews of the first edition arguments and proofs are written down precisely and clearly the expertise of the author is reflected in many valuable comments and remarks on the recent developments of the subjects serious readers would have the challenges of solving the exercises and problems the book is probably one of the most easily accessible introductions to riemannian geometry m c leung mathreview the book s aim is to develop tools and intuition for studying the central unifying theme in riemannian geometry which is the notion of curvature and its relation with topology the main ideas of the subject motivated as in the original papers are introduced here in an intuitive and accessible way the book is an excellent introduction designed for a one semester graduate course containing exercises and problems which encourage students to practice working with the new notions and develop skills for later use by citing suitable references for detailed study the reader is stimulated to inquire into further research c l bejan zbmath

this monograph is based on the author s results on the riemannian ge ometry of foliations with nonnegative mixed curvature and on the geometry of sub manifolds with generators rulings in a riemannian space of nonnegative curvature the main idea is that such foliated sub manifolds can be decom posed when the dimension of the leaves generators is large the methods of investigation are mostly synthetic the work is divided into two parts consisting of seven chapters and three appendices appendix a was written jointly with v toponogov part 1 is devoted to the riemannian geometry of

foliations in the first few sections of chapter i we give a survey of the basic results on foliated smooth manifolds sections 1 1 1 3 and finish in section 1 4 with a discussion of the key problem of this work the role of riemannian curvature in the study of foliations on manifolds and submanifolds

a first approximation to the idea of a foliation is a dynamical system and the resulting decomposition of a domain by its trajectories this is an idea that dates back to the beginning of the theory of differential equations i e the seventeenth century towards the end of the nineteenth century poincare developed methods for the study of global qualitative properties of solutions of dynamical systems in situations where explicit solution methods had failed he discovered that the study of the geometry of the space of trajectories of a dynamical system reveals complex phenomena he emphasized the qualitative nature of these phenomena thereby giving strong impetus to topological methods a second approximation is the idea of a foliation as a decomposition of a manifold into submanifolds all being of the same dimension here the presence of singular submanifolds corresponding to the singularities in the case of a dynamical system is excluded this is the case we treat in this text but it is by no means a comprehensive analysis on the contrary many situations in mathematical physics most definitely require singular foliations for a proper modeling the global study of foliations in the spirit of poincare was begun only in the 1940 s by ehresmann and reeb

this book is devoted to killing vector fields and the one parameter isometry groups of riemannian manifolds generated by them it also provides a detailed introduction to homogeneous geodesics that is geodesics that are integral curves of killing vector fields presenting both classical and modern results some very recent many of which are due to the authors the main focus is on the class of riemannian manifolds with homogeneous geodesics and on some of its important subclasses to keep the exposition self contained the book also includes useful general results not only on geodesic orbit manifolds but also on smooth and riemannian manifolds lie groups and lie algebras homogeneous riemannian manifolds and compact homogeneous riemannian spaces the intended audience is graduate students and researchers whose work involves differential geometry and transformation groups

a geometric approach to problems in physics many of which cannot be solved by any other methods text is enriched with good examples and exercises at the end of every chapter fine for a course or seminar directed at grad and adv undergrad students interested in elliptic and hyperbolic differential equations differential geometry calculus of variations quantum mechanics and physics

this text on analysis of riemannian manifolds is aimed at students who have had a

first course in differentiable manifolds

pseudo riemannian geometry is an active research field not only in differential geometry but also in mathematical physics where the higher signature geometries play a role in brane theory an essential reference tool for research mathematicians and physicists this book also serves as a useful introduction to students entering this active and rapidly growing field the author presents a comprehensive treatment of several aspects of pseudo riemannian geometry including the spectral geometry of the curvature tensor curvature homogeneity and stanilovocotsankovocovidev theory

this is the third version of a book on differential manifolds the first version appeared in 1962 and was written at the very beginning of a period of great expansion of the subject at the time i found no satisfactory book for the foundations of the subject for multiple reasons i expanded the book in 1971 and i expand it still further today specifically i have added three chapters on riemannian and pseudo riemannian geometry that is covariant derivatives curvature and some applications up to the hopf rinow and hadamard cartan theorems as well as some calculus of variations and applications to volume forms i have rewritten the sections on sprays and i have given more examples of the use of stokes theorem i have also given many more references to the literature all of this to broaden the perspective of the book which i hope can be used among things for a general course leading into many directions the present book still meets the old needs but fulfills new ones at the most basic level the book gives an introduction to the basic concepts which are used in differential topology differential geometry and differential equations in differential topology one studies for instance homotopy classes of maps and the possibility of finding suitable differentiable maps in them immersions embeddings isomorphisms etc

the second edition of this text 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 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 book deals with riemannian manifolds for which the nullity space of the curvature tensor has codimension two these manifolds are semi symmetric spaces foliated by euclidean leaves of codimension two in the sense of z i szab the authors concentrate on the rich geometrical structure and explicit descriptions of these remarkable spaces also parallel theories are developed for manifolds of relative conullity two this makes a bridge to a survey on curvature homogeneous spaces introduced by i m singer as an application of the main topic interesting hypersurfaces with type number two in euclidean space are discovered namely those which are locally rigid or almost rigid the unifying method is solving explicitly particular systems of nonlinear pde

this is a first textbook that is entirely focused on the up to date developments of null curves with their applications to science and engineering it fills an important gap in a second level course in differential geometry as well as being essential for a core undergraduate course on riemannian curves and surfaces the sequence of chapters is arranged to provide in depth understanding of a chapter and stimulate further interest in the next the book comprises a large variety of solved examples and rigorous exercises that range from elementary to higher levels this unique volume is self contained and unified in presenting a systematic account of all possible null curves their frenet equations unique null cartan curves in lorentzian manifolds and their practical problems in science and engineering the geometric and physical significance of null geodesics mechanical systems involving curvature of null curves simple variation problems and the interrelation of null curves with hypersurfaces

this book which focuses on the study of curvature is an introduction to various aspects of pseudo riemannian geometry we shall use walker manifolds pseudo riemannian manifolds which admit a non trivial parallel null plane field to exemplify some of the main differences between the geometry of riemannian manifolds and the geometry of pseudo riemannian manifolds and thereby illustrate phenomena in pseudo riemannian geometry that are quite different from those which occur in riemannian geometry i e for indefinite as opposed to positive definite metrics indefinite metrics are important in many diverse physical contexts classical cosmological models general relativity and string theory to name but two walker manifolds appear naturally in numerous physical settings and provide examples of extremal mathematical situations as will be discussed presently to describe the geometry of a pseudo riemannian manifold one must first understand the curvature of the manifold we shall analyze a wide variety of curvature properties and we shall derive both geometrical and topological results special attention will be paid to manifolds of dimension 3 as these are quite tractable we then pass to the 4 dimensional setting as a gateway to higher dimensions since the book is aimed at a very general audience and in particular to an advanced undergraduate or to a beginning graduate student no more than a basic course in differential geometry is

required in the way of background to keep our treatment as self contained as possible we shall begin with two elementary chapters that provide an introduction to basic aspects of pseudo riemannian geometry before beginning on our study of walker geometry an extensive bibliography is provided for further reading math subject classifications primary 53b20 pacs 02 40 hw secondary 32q15 51f25 51p05 53b30 53c50 53c80 58a30 83f05 85a04 table of contents basic algebraic notions basic geometrical notions walker structures three dimensional lorentzian walker manifolds four dimensional walker manifolds the spectral geometry of the curvature tensor hermitian geometry special walker manifolds

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

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