Tensor Calculus And Differential Geometry By Prasun Kumar Nayak

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TEXTBOOK OF TENSOR CALCULUS AND DIFFERENTIAL GEOMETRY Krishna Prakashan Media

The purpose of this book is to bridge the gap between differential geometry of Euclidean space of three dimensions and the more advanced work on differential geometry of generalised space. The subject is treated with the aid of the Tensor Calculus, which is associated with the names of Ricci and Levi-Civita; and the book provides an introduction both to this calculus and to Riemannian geometry. The geometry of subspaces has been considerably simplified by use of the generalized covariant differentiation introduced by Mayer in 1930, and successfully applied by other mathematicians.

Lectures on Tensor Calculus and Differential Geometry Courier Corporation

This textbook is distinguished from other texts on the subject by the depth of the presentation and the discussion of the calculus of moving surfaces, which is an extension of tensor calculus to deforming manifolds. Designed for advanced undergraduate and graduate students, this text invites its audience to take a fresh look at previously learned material through the prism of tensor calculus. Once the framework is mastered, the student is introduced to new material which includes differential geometry on manifolds, shape optimization, boundary perturbation and dynamic fluid film equations. The language of tensors, originally championed by Einstein, is as fundamental as the languages of calculus and linear algebra and is one that every technical scientist ought to speak. The tensor technique, invented at the turn of the 20th century, is now considered classical. Yet, as the author shows, it remains remarkably vital and relevant. The author’s skilled lecturing capabilities are evident by the inclusion of insightful examples and a plethora of exercises. A great deal of material is devoted to the geometric fundamentals, the mechanics of change of variables, the proper use of the tensor notation and the discussion of the interplay between algebra and geometry. The early chapters have many words and few equations. The definition of a tensor comes only in Chapter 6 – when the reader is ready for it. While this text maintains a consistent level of rigor, it takes great care to avoid formalizing the subject. The last part of the textbook is devoted to the Calculus of Moving Surfaces. It is the first textbook exposition of this important technique and is one of the gems of this text. A number of exciting applications of the calculus are presented including shape optimization, boundary perturbation of boundary value problems and dynamic fluid film equations developed by the author in recent years. Furthermore, the moving surfaces framework is used to offer new derivations of classical results such as the geodesic equation and the celebrated Gauss-Bonnet theorem.

An Introduction to Differential Geometry Princeton University Press

Many of the earliest books, particularly those dating back to the 1900s and before, are now extremely scarce and increasingly expensive. We are republishing these classic works in affordable, high quality, modern editions, using the original text and artwork.

The Absolute Differential Calculus Elsevier

This book presents tensors and differential geometry in a comprehensive and approachable manner, providing a bridge from the place where physics and engineering mathematics end, and the place where tensor analysis begins. Among the topics examined are tensor analysis, elementary differential geometry of moving surfaces, and k-differential forms. The book includes numerous examples with solutions and concrete calculations, which guide readers through these complex topics step by step. Mindful of the practical needs of engineers and physicists, book favors simplicity over a more rigorous, formal approach. The book shows readers how to work with tensors and differential geometry and how to apply them to modeling the physical and engineering world. The authors provide chapter-length treatment of topics at the intersection of advanced mathematics, and physics and engineering: • General Basis and Bra-Ket Notation • Tensor Analysis • Elementary Differential Geometry • Differential Forms • Applications of Tensors and Differential Geometry • Tensors and Bra-Ket Notation in Quantum Mechanics The text reviews methods and applications in computational fluid dynamics; continuum mechanics; electrodynamics in special relativity; cosmology in the Minkowski four-dimensional space time; and relativistic and non-relativistic quantum mechanics. Tensor Analysis and Elementary Differential Geometry for Physicists and Engineers benefits research scientists and practicing engineers in a variety of fields, who use tensor analysis and differential geometry in the context of applied physics, and electrical and mechanical engineering. It will also interest graduate students in applied physics and engineering.

TEXTBOOK OF TENSOR CALCULUS AND DIFFERENTIAL GEOMETRY AND THEIR APPLICATIONS John Wiley & Sons

This textbook presents the foundations of tensor calculus and the elements of tensor analysis. In addition, the authors consider numerous applications of tensors to geometry, mechanics and physics.While developing tensor calculus, the authors emphasize its relationship with linear algebra. Necessary notions and theorems of linear algebra are introduced and proved in connection with the construction of the apparatus of tensor calculus; prior knowledge is not assumed. For simplicity and to enable the reader to visualize concepts more clearly, all exposition is conducted in three-dimensional space. The principal feature of the book is that the

authors use mainly orthogonal tensors, since such tensors are important in applications to physics and engineering.With regard to applications, the authors construct the general theory of second-degree surfaces, study the inertia tensor as well as the stress and strain tensors, and consider some problems of crystallophysics. The last chapter introduces the elements of tensor analysis.All notions introduced in the book, and also the obtained results, are illustrated with numerous examples discussed in the text. Each section of the book presents problems (a total over 300 problems are given). Examples and problems are intended to illustrate, reinforce and deepen the presented material. There are answers to most of the problems, as well as hints and solutions to selected problems at the end of the book.
Tensor Calculus Springer
The purpose of this book is to give a simple, lucid, rigorous and comprehensive account of fundamental notions of Differential Geometry and Tensors. The book is self-contained and divided in two parts. Section A deals with Differential Geometry and Section B is devoted to the study of Tensors. Section A deals with: " Theory of curves, envelopes and developables. " Curves on surfaces and fundamental magnitudes, curvature of surfaces and lines of curvature. " Fundamental equations of surface theory. " Geodesics. Section B deals with: " Tensor algebra. " Tensor calculus. " Christoffel symbols and their properties. " Riemann symbols and Einstein space, and their properties. " Physical components of contravariant and covariant vectors. " Geodesics and Parallelism of vectors. " Differentiable manifolds, charts, atlases.
An Introduction to Differential Geometry with Use of the Tensor Calculus, by Luther Pfahler Eisenhart, ... Courier Corporation
This book is based on the experience of teaching the subject by the author in Russia, France, South Africa and Sweden. The author provides students and teachers with an easy to follow textbook spanning a variety of topics on tensors, Riemannian geometry and geometric approach to partial differential equations. Application of approximate transformation groups to the equations of general relativity in the de Sitter space simplifies the subject significantly.
Differential Geometry Read Books Ltd
The purpose of this book is to bridge the gap between differential geometry of Euclidean space of three dimensions and the more advanced work on differential geometry of generalised space. The subject is treated with the aid of the Tensor Calculus, which is associated with the names of Ricci and Levi-Civita; and the book provides an introduction both to this calculus and to Riemannian geometry. The geometry of subspaces has been considerably simplified by use of the generalized covariant differentiation introduced by Mayer in 1930, and successfully applied by other mathematicians.
Tensors, Differential Forms, and Variational Principles Courier Corporation
Incisive, self-contained account of tensor analysis and the calculus of exterior differential forms, interaction between the concept of invariance and the calculus of variations. Emphasis is on analytical techniques. Includes problems.
An Introduction to Differential Geometry Whith Use of the Tensor Calculus JHU Press
Differential and Riemannian Geometry focuses on the methodologies, calculations, applications, and approaches involved in differential and Riemannian geometry. The book first offers information on local differential geometry of space curves and surfaces and tensor calculus and Riemannian geometry. Discussions focus on tensor algebra and analysis, concept of a differentiable manifold, geometry of a space with affine connection, intrinsic geometry of surfaces, curvature of surfaces, and surfaces and curves on surfaces. The manuscript then examines further development and applications of Riemannian geometry and selections from differential geometry in the large, including curves and surfaces in the large, spaces of constant curvature and non-Euclidean geometry, Riemannian spaces and analytical dynamics, and metric differential geometry and characterizations of Riemannian geometry. The publication elaborates on prerequisite theorems of analysis, as well as the existence and uniqueness theorem for ordinary first-order differential equations and systems of equations and integrability theory for systems of first-order partial differential equations. The book is a valuable reference for researchers interested in differential and Riemannian geometry.
Tensor Calculus Maugham Press
Topics in Differential Geometry is a collection of papers related to the work of Evan Tom Davies in differential geometry. Some papers discuss projective differential geometry, the neutrino energy-momentum tensor, and the divergence-free third order concomitants of the metric tensor in three dimensions. Other papers explain generalized Clebsch representations on manifolds, locally symmetric vector fields in a Riemannian space, mean curvature of immersed manifolds, and differential geometry of totally real submanifolds. One paper considers the symmetry of the first and second order for a vector field in a Riemannnian space to arrive at conditions the vector field satisfies. Another paper examines the concept of a smooth manifold-tensor and the three types of connections on the tangent bundle TM, their properties, and their inter-relationships. The paper explains some clarification on the relationship between several related known concepts in the differential geometry of TM, such as the system of general paths of Douglas, the nonlinear connections of Barthel, ano and Ishihara, as well as the nonhomogeneous connection of Grifone. The collection is suitable for mathematicians, geometricians, physicists, and academicians interested in differential geometry.
Topics in Differential Geometry Allied Publishers
An introductory textbook on the differential geometry of curves and surfaces in 3-dimensional Euclidean space, presented in its simplest, most essential form. With problems and solutions. Includes 99 illustrations.
Lectures on tensor calculus and differential geometry PHI Learning Pvt. Ltd.
This text employs vector methods to explore the classical theory of curves and surfaces. Topics include basic theory of tensor algebra, tensor calculus, calculus of differential forms, and elements of Riemannian geometry. 1959 edition.
Tensor Geometry Cambridge University Press
Book 3 in the Princeton Mathematical Series. Originally published in 1950. 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.
Textbook of Tensor Calculus & Differential Geometry and Their Applications Courier Corporation
This book is intended to serve as a Textbook for Undergraduate and Post - graduate students of Mathematics. It will be useful to the researchers working in the

field of Differential geometry and its applications to general theory of relativity and other applied areas. It will also be helpful in preparing for the competitive examinations like IAS, IES, NET, PCS, and UP Higher Education exams. The text starts with a chapter on Preliminaries discussing basic concepts and results which would be taken for general later in the subsequent chapters of this book. This is followed by the Study of the Tensors Algebra and its operations and types, Christoffel's symbols and its properties, the concept of covariant differentiation and its properties, Riemann's symbols and its properties, and application of tensor in different areas in part – I and the study of the Theory of Curves in Space, Concepts of a Surface and Fundamental forms, Envelopes and Developables, Curvature of Surface and Lines of Curvature, Fundamental Equations of Surface Theory, Theory of Geodesics, Differentiable Manifolds and Riemannian Manifold and Application of Differential Geometry in Part –II. KEY FEATURES: Provides basic Concepts in an easy to understand style; Presentation of the subject in a natural way; Includes a large number of solved examples and illuminating illustrations; Exercise questions at the end of the topic and at the end of each chapter; Proof of the theorems are given in an easy to understand style; Neat and clean figures are given at appropriate places; Notes and remarks are given at appropriate places.

With Applications to Differential Equations PHI Learning Pvt. Ltd.

A compact exposition of the theory of tensors, this text also illustrates the power of the tensor technique by its applications to differential geometry, elasticity, and relativity. Explores tensor algebra, the line element, covariant differentiation, geodesics and parallelism, and curvature tensor. Also covers Euclidean 3-dimensional differential geometry, Cartesian tensors and elasticity, and the theory of relativity. 1960 edition.

An Introduction to Riemannian Geometry and the Tensor Calculus I. K. International Pvt Ltd

DIVProceeds from general to special, including chapters on vector analysis on manifolds and integration theory. /div

MATHEMATICS OF DIFFERENTIAL GEOMETRY AND RELATIVITY Lulu.com

Curves and surfaces are objects that everyone can see, and many of the questions that can be asked about them are natural and easily understood. Differential geometry is concerned with the precise mathematical formulation of some of these questions, while trying to answer them using calculus techniques. The geometry of differentiable manifolds with structures is one of the most important branches of modern differential geometry. This well-written book discusses the theory of differential and Riemannian manifolds to help students understand the basic structures and consequent developments. While introducing concepts such as bundles, exterior algebra and calculus, Lie group and its algebra and calculus, Riemannian geometry, submanifolds and hypersurfaces, almost complex manifolds, etc., enough care has been taken to provide necessary details which enable the reader to grasp them easily. The material of this book has been successfully tried in classroom teaching. The book is designed for the postgraduate students of Mathematics. It will also be useful to the researchers working in the field of differential geometry and its applications to general theory of relativity and cosmology, and other applied areas. KEY FEATURES Provides basic concepts in an easy-to-understand style. Presents the subject in a natural way. Follows a coordinate-free approach. Includes a large number of solved examples and illuminating illustrations. Gives notes and remarks at appropriate places.

With Applications to Differential Geometry Cambridge University Press

Many of the earliest books, particularly those dating back to the 1900s and before, are now extremely scarce and increasingly expensive. We are republishing these classic works in affordable, high quality, modern editions, using the original text and artwork.

Tensor Calculus With Applications Springer Science & Business Media

The principal aim of analysis of tensors is to investigate those relations which remain valid when we change from one coordinate system to another. This book on Tensors requires only a knowledge of elementary calculus, differential equations and classical mechanics as pre-requisites. It provides the readers with all the information about the tensors along with the derivation of all the tensorial relations/equations in a simple manner. The book also deals in detail with topics of importance to the study of special and general relativity and the geometry of differentiable manifolds with a crystal clear exposition. The concepts dealt within the book are well supported by a number of solved examples. A carefully selected set of unsolved problems is also given at the end of each chapter, and the answers and hints for the solution of these problems are given at the end of the book. The applications of tensors to the fields of differential geometry, relativity, cosmology and electromagnetism is another attraction of the present book. This book is intended to serve as text for postgraduate students of mathematics, physics and engineering. It is ideally suited for both students and teachers who are engaged in research in General Theory of Relativity and Differential Geometry.