Tensor Geometry The Geometric Viewpoint Its Uses

The Enigmatic Realm of **Tensor Geometry The Geometric Viewpoint Its Uses**: Unleashing the Language is Inner Magic

In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing short of extraordinary. Within the captivating pages of **Tensor Geometry The Geometric Viewpoint Its Uses** a literary masterpiece penned by a renowned author, readers set about a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book is core themes, assess its distinct writing style, and delve into its lasting impact on the hearts and minds of people who partake in its reading experience.

Manifolds and Differential Geometry Jeffrey M. Lee 2022-03-08 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 hypersurfaces 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.

Tensor Geometry C. T. J. Dodson 2013-04-17 This treatment of differential geometry and the mathematics required for general relativity makes the subject accessible, for the first time, to anyone familiar with elementary calculus in one variable and with some knowledge of vector algebra. The emphasis throughout is on the geometry of the mathematics, which is greatly enhanced by the many illustrations presenting figures of three and more dimensions as closely as the book form will allow.

Tensor Valuations and Their Applications in Stochastic Geometry and Imaging Eva B. Vedel Jensen 2017-06-10 The purpose of this volume is to give an up-to-date introduction to tensor valuations and their applications. Starting with classical results concerning scalar-valued

valuations on the families of convex bodies and convex polytopes, it proceeds to the modern theory of tensor valuations. Product and Fourier-type transforms are introduced and various integral formulae are derived. New and well-known results are presented, together with generalizations in several directions, including extensions to the non-Euclidean setting and to non-convex sets. A variety of applications of tensor valuations to models in stochastic geometry, to local stereology and to imaging are also discussed.

Tensor and Vector Analysis A.T. Fomenko 1998-11-26 Reflecting the significant contributions of Russian mathematicians to the field, this book contains a selection of papers on tensor and vector analysis. It is divided into three parts, covering Hamiltonian systems, Riemannian geometry and calculus of variations, and topology. The range of applications of these topics is very broad, as many modern geometrical problems recur across a wide range of fields, including mechanics and physics as well as mathematics. Many of the approaches to problems presented in this volume will be novel to the Western reader, although questions are of global interest. The main achievements of the Russian school are placed in the context of the development of each individual subject.

Basic Elements of Differential Geometry and Topology S.P. Novikov 2013-03-14 One service mathematics has rendered the 'Et moi ..., si j'avait su comment en revenir, je n'y serais point aile.' human race. It has put common sense back Jules Verne where it belongs, on the topmost shelf next to the dusty canister labelled 'discarded n- sense'. The series is divergent; therefore we may be able to do something with it. Eric T. Bell O. Heaviside Matht"natics is a tool for thought. A highly necessary tool in a world where both feedback and non linearities abound. Similarly, all kinds of parts of mathematics seNe as tools for other parts and for other sciences. Applying a simple rewriting rule to the quote on

the right above one finds such statements as: 'One service topology has rendered mathematical physics .. .'; 'One service logic has rendered com puter science .. .'; 'One service category theory has rendered mathematics .. .'. All arguably true. And all statements obtainable this way form part of the raison d'etre of this series

Theory and Computation of Complex Tensors and its Applications Maolin Che 2020-04-01 The book provides an introduction of very recent results about the tensors and mainly focuses on the authors' work and perspective. A systematic description about how to extend the numerical linear algebra to the numerical multi-linear algebra is also delivered in this book. The authors design the neural network model for the computation of the rank-one approximation of real tensors, a normalization algorithm to convert some nonnegative tensors to plane stochastic tensors and a probabilistic algorithm for locating a positive diagonal in a nonnegative tensors, adaptive randomized algorithms for computing the approximate tensor decompositions, and the QR type method for computing U-eigenpairs of complex tensors. This book could be used for the Graduate course, such as Introduction to Tensor. Researchers may also find it helpful as a reference in tensor research.

Cartesian Tensors G. Temple 2012-05-04 This undergraduate-level text provides an introduction to isotropic tensors and spinor analysis, with numerous examples that illustrate the general theory and indicate certain extensions and applications. 1960 edition.

Vector and Tensor Analysis Louis Brand 2020-04-15 An outstanding introduction to tensor analysis for physics and engineering students, this text admirably covers the expected topics in a careful step-by-step manor. In addition to the standard vector analysis of Gibbs, including dyadic or tensors of valence two, the treatment also supplies an introduction to the

algebra of motors. The entire theory is illustrated by many significant applications. Surface geometry and hydrodynamics are treated at length in separate chapters. Nearly all of the important results are formulated as theorems, in which the essential conditions are explicitly stated. Each chapter concludes with a selection of problems that develop students' technical skills and introduce new and important applications. The material may be adapted for short courses in either vector analysis or tensor analysis.

Tensor Analysis and Elementary Differential Geometry for Physicists and Engineers Hung Nguyen-Schäfer 2016-08-16 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.

Tensor Categories Pavel Etingof 2016-08-05 Is there a vector space whose dimension is the golden ratio? Of course not—the golden ratio is not an integer! But this can happen for generalizations of vector spaces—objects of a tensor category. The theory of tensor categories is a relatively new field of mathematics that generalizes the theory of group representations. It has deep connections with many other fields, including representation theory, Hopf algebras, operator algebras, low-dimensional topology (in particular, knot theory), homotopy theory, quantum mechanics and field theory, quantum computation, theory of motives, etc. This book gives a systematic introduction to this theory and a review of its applications. While giving a detailed overview of general tensor categories, it focuses especially on the theory of finite tensor categories and fusion categories (in particular, braided and modular ones), and discusses the main results about them with proofs. In particular, it shows how the main properties of finite-dimensional Hopf algebras may be derived from the theory of tensor categories. Many important results are presented as a sequence of exercises, which makes the book valuable for students and suitable for graduate courses. Many applications, connections to other areas, additional results, and references are discussed at the end of each chapter.

Tensor Operators and Their Applications Arif Salimov 2013 The notion of derivation of tensor fields is one of the central concepts and tools of mathematics. The author believes that

differential geometric applications of tensor operators is a very fruitful research domain and provides many new problems in the study of modern differential geometry. This book is intended to provide a systematic introduction to the theory of tensor operators. This book is suitable for researchers, and will complement the Mathematics Research Developments Series, which will focus on research-level monographs. This book will also serve as a useful classroom resource for graduate students as well as final year undergraduate students on geometry, algebra, topology and physics.

Tensor Algebra and Tensor Analysis for Engineers Mikhail Itskov 2007-05-04 There is a large gap between engineering courses in tensor algebra on one hand, and the treatment of linear transformations within classical linear algebra on the other. This book addresses primarily engineering students with some initial knowledge of matrix algebra. Thereby, mathematical formalism is applied as far as it is absolutely necessary. Numerous exercises provided in the book are accompanied by solutions enabling autonomous study. The last chapters deal with modern developments in the theory of isotropic and anisotropic tensor functions and their applications to continuum mechanics and might therefore be of high interest for PhD-students and scientists working in this area.

Visualization and Processing of Tensors and Higher Order Descriptors for Multi-Valued Data Carl-Fredrik Westin 2014-07-17 Arising from the fourth Dagstuhl conference entitled Visualization and Processing of Tensors and Higher Order Descriptors for Multi-Valued Data (2011), this book offers a broad and vivid view of current work in this emerging field. Topics covered range from applications of the analysis of tensor fields to research on their mathematical and analytical properties. Part I, Tensor Data Visualization, surveys techniques for visualization of tensors and tensor fields in

engineering, discusses the current state of the art and challenges, and examines tensor invariants and glyph design, including an overview of common glyphs. The second Part, Representation and Processing of Higher-order Descriptors, describes a matrix representation of local phase, outlines mathematical morphological operations techniques, extended for use in vector images, and generalizes erosion to the space of diffusion weighted MRI. Part III, Higher Order Tensors and Riemannian-Finsler Geometry, offers powerful mathematical language to model and analyze large and complex diffusion data such as High Angular Resolution Diffusion Imaging (HARDI) and Diffusion Kurtosis Imaging (DKI). A Part entitled Tensor Signal Processing presents new methods for processing tensor-valued data, including a novel perspective on performing voxel-wise morphometry of diffusion tensor data using kernel-based approach, explores the free-water diffusion model, and reviews proposed approaches for computing fabric tensors, emphasizing trabecular bone research. The last Part, Applications of Tensor Processing, discusses metric and curvature tensors, two of the most studied tensors in geometry processing. Also covered is a technique for diagnostic prediction of first-episode schizophrenia patients based on brain diffusion MRI data. The last chapter presents an interactive system integrating the visual analysis of diffusion MRI tractography with data from electroencephalography.

Tensor and Vector Analysis C. E. Springer 2013-09-26 Assuming only a knowledge of basic calculus, this text's elementary development of tensor theory focuses on concepts related to vector analysis. The book also forms an introduction to metric differential geometry. 1962 edition.

Introduction to Differential Geometry with Tensor Applications Dipankar De 2022-04-29 INTRODUCTION TO DIFFERENTIAL

GEOMETRY WITH TENSOR APPLICATIONS
This is the only volume of its kind to explain, in precise and easy-to-understand language, the fundamentals of tensors and their applications in differential geometry and analytical mechanics with examples for practical applications and questions for use in a course setting. Introduction to Differential Geometry with Tensor Applications discusses the theory of tensors, curves and surfaces and their applications in Newtonian mechanics. Since tensor analysis deals with entities and properties that are independent of the choice of reference frames, it forms an ideal tool for the study of differential geometry and also of classical and celestial mechanics. This book provides a profound introduction to the basic theory of differential geometry: curves and surfaces and analytical mechanics with tensor applications. The author has tried to keep the treatment of the advanced material as lucid and comprehensive as possible, mainly by including utmost detailed calculations, numerous illustrative examples, and a wealth of complementing exercises with complete solutions making the book easily accessible even to beginners in the field. Groundbreaking and thought-provoking, this volume is an outstanding primer for modern differential geometry and is a basic source for a profound introductory course or as a valuable reference. It can even be used for self-study, by students or by practicing engineers interested in the subject. Whether for the student or the veteran engineer or scientist, Introduction to Differential Geometry with Tensor Applications is a must-have for any library. This outstanding new volume: Presents a unique perspective on the theories in the field not available anywhere else Explains the basic concepts of tensors and matrices and their applications in differential geometry and analytical mechanics Is filled with hundreds of examples and unworked problems, useful not just for the student, but also for the engineer in the field Is a valuable reference for

the professional engineer or a textbook for the engineering student

Tensor Analysis and Elementary Differential Geometry for Physicists and Engineers Hung Nguyen-Schafer 2014-07-31

Tensor Analysis on Manifolds Richard L. Bishop 2012-04-26 DIVProceeds from general to special, including chapters on vector analysis on manifolds and integration theory. /div

Tensors: Asymptotic Geometry and Developments 2016–2018 J.M. Landsberg 2019-07-05 Tensors are used throughout the sciences, especially in solid state physics and quantum information theory. This book brings a geometric perspective to the use of tensors in these areas. It begins with an introduction to the geometry of tensors and provides geometric expositions of the basics of quantum information theory, Strassen's laser method for matrix multiplication, and moment maps in algebraic geometry. It also details several exciting recent developments regarding tensors in general. In particular, it discusses and explains the following material previously only available in the original research papers: (1) Shitov's 2017 refutation of longstanding conjectures of Strassen on rank additivity and Common on symmetric rank; (2) The 2017 Christandl-Vrana-Zuiddam quantum spectral points that bring together quantum information theory, the asymptotic geometry of tensors, matrix multiplication complexity, and moment polytopes in geometric invariant theory; (3) the use of representation theory in quantum information theory, including the solution of the quantum marginal problem; (4) the use of tensor network states in solid state physics, and (5) recent geometric paths towards upper bounds for the complexity of matrix multiplication. Numerous open problems appropriate for graduate students and post-docs are included throughout.

Tensors: Geometry and Applications Joseph M. Landsberg 2012

Tensors and Manifolds Robert H. Wasserman

2004 The book sets forth the basic principles of tensors and manifolds, describing how the mathematics underlies elegant geometrical models of classical mechanics, relativity and elementary particle physics."--BOOK JACKET.
Tensor Geometry C. T. J. Dodson 1977
Modern Differential Geometry in Gauge Theories Anastasios Mallios 2006-07-27 This is original, well-written work of interest Presents for the first time (physical) field theories written in sheaf-theoretic language Contains a wealth of minutely detailed, rigorous computations, ususally absent from standard physical treatments Author's mastery of the subject and the rigorous treatment of this text make it invaluable
Vector Analysis and Cartesian Tensors Krishnamurty Karamcheti 1967
Concepts from Tensor Analysis and Differential Geometry Tracy Yerkes Thomas 2013-08
Tensor Geometry C. T. J. Dodson 1979
Applications of Differential Geometry to Econometrics Paul Marriott 2000-08-31 Although geometry has always aided intuition in econometrics, more recently differential geometry has become a standard tool in the analysis of statistical models, offering a deeper appreciation of existing methodologies and highlighting the essential issues which can be hidden in an algebraic development of a problem. Originally published in 2000, this volume was an early example of the application of these techniques to econometrics. An introductory chapter provides a brief tutorial for those unfamiliar with the tools of Differential Geometry. The topics covered in the following chapters demonstrate the power of the geometric method to provide practical solutions and insight into problems of econometric inference.
Tensor Calculus for Engineers and Physicists Emil de Souza Sánchez Filho 2016-05-20 This textbook provides a rigorous approach to tensor manifolds in several aspects

relevant for Engineers and Physicists working in industry or academia. With a thorough, comprehensive, and unified presentation, this book offers insights into several topics of tensor analysis, which covers all aspects of n-dimensional spaces. The main purpose of this book is to give a self-contained yet simple, correct and comprehensive mathematical explanation of tensor calculus for undergraduate and graduate students and for professionals. In addition to many worked problems, this book features a selection of examples, solved step by step. Although no emphasis is placed on special and particular problems of Engineering or Physics, the text covers the fundamentals of these fields of science. The book makes a brief introduction into the basic concept of the tensorial formalism so as to allow the reader to make a quick and easy review of the essential topics that enable having the grounds for the subsequent themes, without needing to resort to other bibliographical sources on tensors.

Chapter 1 deals with Fundamental Concepts about tensors and chapter 2 is devoted to the study of covariant, absolute and contravariant derivatives. The chapters 3 and 4 are dedicated to the Integral Theorems and Differential Operators, respectively. Chapter 5 deals with Riemann Spaces, and finally the chapter 6 presents a concise study of the Parallelism of Vectors. It also shows how to solve various problems of several particular manifolds. *Tensors: Geometry and Applications* J. M. Landsberg 2011-12-14 Tensors are ubiquitous in the sciences. The geometry of tensors is both a powerful tool for extracting information from data sets, and a beautiful subject in its own right. This book has three intended uses: a classroom textbook, a reference work for researchers in the sciences, and an account of classical and modern results in (aspects of) the theory that will be of interest to researchers in geometry. For classroom use, there is a modern introduction to multilinear algebra and to the

geometry and representation theory needed to study tensors, including a large number of exercises. For researchers in the sciences, there is information on tensors in table format for easy reference and a summary of the state of the art in elementary language. This is the first book containing many classical results regarding tensors. Particular applications treated in the book include the complexity of matrix multiplication, P versus NP, signal processing, phylogenetics, and algebraic statistics. For geometers, there is material on secant varieties, G-varieties, spaces with finitely many orbits and how these objects arise in applications, discussions of numerous open questions in geometry arising in applications, and expositions of advanced topics such as the proof of the Alexander-Hirschowitz theorem and of the Weyman-Kempf method for computing syzygies.

Tensor Analysis Edward Nelson 2015-12-08 These notes are based on a course of lectures given by Professor Nelson at Princeton during the spring term of 1966. The subject of Brownian motion has long been of interest in mathematical probability. In these lectures, Professor Nelson traces the history of earlier work in Brownian motion, both the mathematical theory, and the natural phenomenon with its physical interpretations. He continues through recent dynamical theories of Brownian motion, and concludes with a discussion of the relevance of these theories to quantum field theory and quantum statistical mechanics. Originally published in 1967. 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.

Concepts from Tensor Analysis and Differential Geometry Tracy Y. Thomas 2016-06-03 Concepts from Tensor Analysis and Differential Geometry discusses coordinate manifolds, scalars, vectors, and tensors. The book explains some interesting formal properties of a skew-symmetric tensor and the curl of a vector in a coordinate manifold of three dimensions. It also explains Riemann spaces, affinely connected spaces, normal coordinates, and the general theory of extension. The book explores differential invariants, transformation groups, Euclidean metric space, and the Frenet formulae. The text describes curves in space, surfaces in space, mixed surfaces, space tensors, including the formulae of Gaus and Weingarten. It presents the equations of two scalars K and Q which can be defined over a regular surface S in a three dimensional Riemannian space R. In the equation, the scalar K, which is an intrinsic differential invariant of the surface S, is known as the total or Gaussian curvature and the scalar U is the mean curvature of the surface. The book also tackles families of parallel surfaces, developable surfaces, asymptotic lines, and orthogonal ennuples. The text is intended for a one-semester course for graduate students of pure mathematics, of applied mathematics covering subjects such as the theory of relativity, fluid mechanics, elasticity, and plasticity theory.

Introduction to Differential Geometry with Tensor Applications Dipankar De 2022-05-24 INTRODUCTION TO DIFFERENTIAL GEOMETRY WITH TENSOR APPLICATIONS This is the only volume of its kind to explain, in precise and easy-to-understand language, the fundamentals of tensors and their applications in differential geometry and analytical mechanics with examples for practical applications and questions for use in a course setting. Introduction to Differential Geometry with Tensor Applications discusses the theory of

tensors, curves and surfaces and their applications in Newtonian mechanics. Since tensor analysis deals with entities and properties that are independent of the choice of reference frames, it forms an ideal tool for the study of differential geometry and also of classical and celestial mechanics. This book provides a profound introduction to the basic theory of differential geometry: curves and surfaces and analytical mechanics with tensor applications. The author has tried to keep the treatment of the advanced material as lucid and comprehensive as possible, mainly by including utmost detailed calculations, numerous illustrative examples, and a wealth of complementing exercises with complete solutions making the book easily accessible even to beginners in the field. Groundbreaking and thought-provoking, this volume is an outstanding primer for modern differential geometry and is a basic source for a profound introductory course or as a valuable reference. It can even be used for self-study, by students or by practicing engineers interested in the subject. Whether for the student or the veteran engineer or scientist, Introduction to Differential Geometry with Tensor Applications is a must-have for any library. This outstanding new volume: Presents a unique perspective on the theories in the field not available anywhere else Explains the basic concepts of tensors and matrices and their applications in differential geometry and analytical mechanics Is filled with hundreds of examples and unworked problems, useful not just for the student, but also for the engineer in the field Is a valuable reference for the professional engineer or a textbook for the engineering student

Tensor Analysis with Applications in Mechanics L. P. Lebedev 2010 The tensorial nature of a quantity permits us to formulate transformation rules for its components under a change of basis. These rules are relatively simple and easily grasped by any engineering student familiar with matrix operators in linear algebra.

More complex problems arise when one considers the tensor fields that describe continuum bodies. In this case general curvilinear coordinates become necessary. The principal basis of a curvilinear system is constructed as a set of vectors tangent to the coordinate lines. Another basis, called the dual basis, is also constructed in a special manner. The existence of these two bases is responsible for the mysterious covariant and contravariant terminology encountered in tensor discussions. A tensor field is a tensor-valued function of position in space. The use of tensor fields allows us to present physical laws in a clear, compact form. A byproduct is a set of simple and clear rules for the representation of vector differential operators such as gradient, divergence, and Laplacian in curvilinear coordinate systems. This book is a clear, concise, and self-contained treatment of tensors, tensor fields, and their applications. The book contains practically all the material on tensors needed for applications. It shows how this material is applied in mechanics, covering the foundations of the linear theories of elasticity and elastic shells. The main results are all presented in the first four chapters. The remainder of the book shows how one can apply these results to differential geometry and the study of various types of objects in continuum mechanics such as elastic bodies, plates, and shells. Each chapter of this new edition is supplied with exercises and problems most with solutions, hints, or answers to help the reader progress. An extended appendix serves as a handbook-style summary of all important formulas contained in the book.
Differential Geometry from a Singularity Theory Viewpoint Shyuichi Izumiya 2015-10-29 Differential Geometry from a Singularity Theory Viewpoint provides a new look at the fascinating and classical subject of the differential geometry of surfaces in Euclidean spaces. The book uses singularity theory to capture some key geometric features of surfaces. It describes the

theory of contact and its link with the theory of caustics and wavefronts. It then uses the powerful techniques of these theories to deduce geometric information about surfaces embedded in 3, 4 and 5-dimensional Euclidean spaces. The book also includes recent work of the authors and their collaborators on the geometry of sub-manifolds in Minkowski spaces. Contents:The Case for the Singularity Theory ApproachSubmanifolds of the Euclidean SpaceSingularities of Germs of Smooth MappingsContact Between Submanifolds of ℝnLagrangian and Legendrian SingularitiesSurfaces in the Euclidean 3-SpaceSurfaces in the Euclidean 4-SpaceSurfaces in the Euclidean 5-SpaceSpacelike Surfaces in the Minkowski Space-TimeGlobal Viewpoint Readership: Advanced undergraduates and post-graduate students, and researchers in the fields of differential geometry and singularity theory. Key Features:The book is unique in its nature. It provides a coherent approach for studying the geometry of sub-manifolds of various ambient spaces from the singularity theory point of viewThe book informs the reader about the progress in the field of extrinsic differential geometry and singularity theory. The information is new and has not been treated in previous textbooksThe book gathers scattered work from various research articles, most of which are recent, and describes techniques that could be used to tackle problems in other areas of mathematicsKeywords:Contact;Extrinsic Geometry;Genericity;Caustics;Singularities;Surfaces;Transversality;Wave Fronts

Computational Information Geometry Frank Nielsen 2016-11-24 This book focuses on the application and development of information geometric methods in the analysis, classification and retrieval of images and signals. It provides introductory chapters to help those new to information geometry and applies the theory to several applications. This area has developed rapidly over recent years, propelled by the major

theoretical developments in information geometry, efficient data and image acquisition and the desire to process and interpret large databases of digital information. The book addresses both the transfer of methodology to practitioners involved in database analysis and in its efficient computational implementation.
Advances on Tensor Analysis and their Applications Francisco Bulnes 2020-09-09 This book brings together recent advances in tensor analysis and studies of its invariants such as twistors, spinors, kinematic tensors and others belonging to tensor algebras with extended structures to Lie algebras, Kac-Moody algebras, and enveloping algebras, among others. Chapters cover such topics as classical tensors and bilinear forms, tensors for exploring space–time, tensor applications in geometry and continuum media, and advanced topics in tensor analysis such as invariant theory, derived categories, hypercohomologies, k-modules, extensions of kinematic tensors, infinite dimensional operators, and more.
Tensor Geometry C. T. J. Dodson 2014-01-15
Theory and Practice of Geometric Modeling Wolfgang Straßer 2012-12-06 This book is a result of the lectures and discussions during the conference "Theory and Practice of Geometric Modeling". The event has been organized by the Wilhelm-Schickard-Institut fiir Informatik, Universitat Tiibingen and took place at the Heinrich-Fabri-Institut in Blaubeuren from October 3 to 7, 1988. The conference brought together leading experts from academic and industrial research institutions, CAD system developers and experien ced users to exchange their ideas and to discuss new concepts and future directions in geometric modeling. The main intention has been to bridge the gap between theoretical results, performance of existing CAD systems and the real problems of users. The contents is structured in five parts: A Algorithmic Aspects B Surface Intersection, Blending, Ray Tracing C Geometric Tools D

Different Representation Schemes in Solid Modeling E Product Modeling in High Level Specifications The material presented in this book reflects the current state of the art in geometric modeling and should therefore be of interest not only to university and industry researchers, but also to system developers and practitioners who wish to keep up to date on recent advances and new concepts in this rapidly expanding field. The editors express their sincere appreciation to the contributing authors, and to the members of the program committee, W. Boehm, J. Hoschek, A. Massabo, H. Nowacki, M. Pratt, J. Rossignac, T. Sederberg and W. Tiller, for their close cooperation and their time and effort that made the conference and this book a success.

Tensor Analysis with Applications in Mechanics

Differential Geometry and Lie Groups Jean Gallier 2020-08-18 This textbook explores advanced topics in differential geometry, chosen for their particular relevance to modern geometry processing. Analytic and algebraic perspectives augment core topics, with the authors taking care to motivate each new concept. Whether working toward theoretical or applied questions, readers will appreciate this accessible exploration of the mathematical concepts behind many modern applications. Beginning with an in-depth study of tensors and differential forms, the authors go on to explore a selection of topics that showcase these tools. An analytic theme unites the early chapters, which cover distributions, integration on manifolds and Lie groups, spherical harmonics, and operators on Riemannian manifolds. An exploration of bundles follows, from definitions to connections and curvature in vector bundles, culminating in a glimpse of Pontrjagin and Chern classes. The final chapter on Clifford algebras and Clifford groups draws the book to an algebraic conclusion, which can be seen as a generalized viewpoint of the quaternions. Differential Geometry and Lie Groups: A Second Course

captures the mathematical theory needed for advanced study in differential geometry with a view to furthering geometry processing capabilities. Suited to classroom use or independent study, the text will appeal to students and professionals alike. A first course in differential geometry is assumed; the authors' companion volume Differential Geometry and Lie Groups: A Computational Perspective provides the ideal preparation.

Vector and Tensor Analysis with Applications A. I. Borisenko 2012-08-28 Concise, readable text ranges from definition of vectors and discussion of algebraic operations on vectors to the concept of tensor and algebraic operations on tensors. Worked-out problems and solutions. 1968 edition.

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