A Differential Geometric Approach To The Geometric Mean Of

CAMILLE EDDIE

A Differential Geometric Approach Springer
This book provides a general overview of several concepts of synchronization and brings together related approaches to secure communication in chaotic systems. This is achieved using a combination of analytic, algebraic, geometrical and asymptotical methods to tackle the dynamical feedback stabilization problem. In particular, differential-geometric and algebraic differential concepts reveal important structural properties of chaotic systems and serve as guide for the construction of design procedures for a wide variety of chaotic systems. The basic differential algebraic and geometric concepts are presented in the first few chapters in a novel way as design tools, together with selected experimental studies demonstrating their importance. The subsequent chapters treat recent applications. Written for graduate students in applied physical sciences, systems engineers, and applied mathematicians interested in synchronization of chaotic systems and in secure communications, this self-contained text requires only basic knowledge of integer ordinary and fractional ordinary differential equations. Design applications are illustrated with the help of several physical models of practical interest.

A Geometric Approach to Modeling and Analysis Springer Science & Business Media
This introductory text defines geometric structure by specifying parallel transport in an appropriate fiber bundle and focusing on simplest cases of linear parallel transport in a vector bundle. 1981 edition.

The Index Number Problem Springer
With its origins in the theories of continuous distributions of dislocations and ofmetalplasticity,inhomogeneitytheoryisarichandvibrant?eldofresearch. The recognition of the important role played by con?gurational or material forces in phenomena such as growth

and remodelling is perhaps its greatest present-day impetus. While some excellent comprehensive works approa- ing the subject from di?erent angles have been published, the objective of this monograph is to present a point of view that emphasizes the di?erenti- geometric aspects of inhomogeneity theory. In so doing, we follow the general lines of thought that we have propounded in many publications and presen- tions over the last two decades. Although based on these sources, this book is a stand-alone entity and contains some new results and perspectives. At the same time, it does not intend to present either a historical account of the - velopment of the subject or a comprehensive picture of the various schools of thought that can be encountered by perusing scholarly journals and attending specialized symposia. The book is divided into three parts, the ?rst of which is entirely devoted to the formulation of the theory in the absence of evolution. In other words, time is conspicuously absent from Part I. It opens with the geometric ch- acterization of material inhomogeneity within the context of simple bodies in Chapter 1, followed by extensions to second-grade and Cosserat media in Chapters 2 and 3.

A Differential Geometric Approach Courier Corporation

The problems investigated under this minigrant arose in the author's research on electromagnetic (EM) lens design. This research was concerned with an EM lens design technique developed by C.E. Baum for transitioning TEM waves between cylindrical and conical transmission lines.

Nonlinear Multivariate Control: a Differential Geometric Approach Open Dissertation Press

Free or moving boundary problems appear in many areas of analysis, geometry, and applied mathematics. A typical example is the evolving inter phase between a solid and liquid phase: if we know the initial configuration well enough, we should be able to reconstruct its evolution, in particular, the evolution of the inter phase. In this book, the authors present a series of ideas, methods, and techniques for treating the most basic issues of such a problem.In particular, they describe the very fundamental tools of geometry and real analysis that make this possible: properties of harmonic and caloric measures in Lipschitz domains, a relation between parallel surfaces and elliptic equations, monotonicity formulas and rigidity, etc. The tools and ideas presented here will serve as a basis for the study of more complex phenomena and problems. This book is useful for supplementary reading or will be a fine independent study text. It is suitable for graduate students and researchers interested in partial differential equations. Also available from the AMS by Luis Caffarelli is ""Fully Nonlinear Elliptic Equations"", as Volume 43 in the AMS series, Colloquium Publications.

Electrodynamics Springer Science & Business Media

Differential geometry is the study of the curvature and calculus of curves and surfaces. A New Approach to Differential Geometry using Clifford's Geometric Algebra simplifies the discussion to an accessible level of differential geometry by introducing Clifford algebra. This presentation is relevant because Clifford algebra is an effective tool for dealing with the rotations intrinsic to the study of curved space. Complete with chapter-by-chapter exercises, an overview of general relativity, and brief biographies of historical figures, this comprehensive textbook presents a valuable introduction to differential geometry. It will serve as a useful resource for upper-level undergraduates, beginning-level graduate students, and researchers in the algebra and physics communities.

A Differential Geometric Approach American Mathematical Soc.

This dissertation, "Height Functions on Elliptic Curves Over Function Fields: a Differential-geometric Approach" by Cangxiong, Chen, □□□, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. DOI: 10.5353/th_b4704841 Subjects: Curves, Elliptic Geometry, Differential

Dynamic Systems. A Differential Geometric Approach to Symmetry and Reduction Springer Spektrum

This text presents differential forms from a geometric perspective accessible at the undergraduate level. It begins with basic concepts such as partial differentiation and multiple integration and gently develops the entire machinery of differential forms. The subject is approached with the idea that complex concepts can be built up by analogy from simpler cases, which, being inherently geometric, often can be best understood visually. Each new concept is presented with a natural picture that students can easily grasp. Algebraic properties then follow. The book contains excellent motivation, numerous illustrations and solutions to selected problems.

A Geometric Approach to Free Boundary Problems Springer Science & Business Media

We present a new approach toward robust signal detection which is based on techniques rooted in differential geometry. These methods, as opposed to the commonly employed classical saddlepoint criteria, readily admit the quantitive measure of the degree of robustness over very general classes of admissible noise distributions. Our approach thus is seen to make possible investigations of the quantative tradeoff between optimal performance and robustness, and we illustrate the application of this differential geometric approach via various specific examples. (Author).

Dynamical Systems Springer

This book provides an accessible introduction to the variational formulation of Lagrangian and Hamiltonian mechanics, with a novel emphasis on global descriptions of the dynamics, which is a significant conceptual departure from more traditional approaches based on the use of local coordinates on the configuration manifold. In particular, we introduce a general methodology for obtaining globally valid equations of motion on configuration manifolds that are Lie groups, homogeneous spaces, and embedded manifolds, thereby avoiding the difficulties associated with coordinate singularities. The material is presented in an approachable fashion by considering concrete configuration manifolds of increasing complexity, which then motivates and naturally leads to the more general formulation that follows. Understanding of the material is enhanced by numerous in-depth examples throughout the book, culminating in non-trivial applications involving multi-body systems. This book is written for a general audience of mathematicians, engineers, and physicists with a basic knowledge of mechanics. Some basic background in differential geometry is helpful, but not essential, as the relevant concepts are introduced in the book, thereby making the material accessible to a broad audience, and suitable for either self-study or as the basis for a graduate course in applied mathematics, engineering, or physics.

Synchronization of Integral and Fractional Order Chaotic Systems John Wiley & Sons Incorporated

This textbook is suitable for a one semester lecture course on differential geometry for students of mathematics or STEM disciplines with a working knowledge of analysis, linear algebra, complex analysis, and point set topology. The book treats the subject both from an extrinsic and an intrinsic view point. The first chapters give a historical overview of the field and contain

an introduction to basic concepts such as manifolds and smooth maps, vector fields and flows, and Lie groups, leading up to the theorem of Frobenius. Subsequent chapters deal with the Levi-Civita connection, geodesics, the Riemann curvature tensor, a proof of the Cartan-Ambrose-Hicks theorem, as well as applications to flat spaces, symmetric spaces, and constant curvature manifolds. Also included are sections about manifolds with nonpositive sectional curvature, the Ricci tensor, the scalar curvature, and the Weyl tensor. An additional chapter goes beyond the scope of a one semester lecture course and deals with subjects such as conjugate points and the Morse index, the injectivity radius, the group of isometries and the Myers-Steenrod theorem, and Donaldson's differential geometric approach to Lie algebra theory.

Robust Estimation and Detection with a Differential Geometric Approach Springer Science & Business Media

This book explains and helps readers to develop geometric intuition as it relates to differential forms. It includes over 250 figures to aid understanding and enable readers to visualize the concepts being discussed. The author gradually builds up to the basic ideas and concepts so that definitions, when made, do not appear out of nowhere, and both the importance and role that theorems play is evident as or before they are presented. With a clear writing style and easy-to- understand motivations for each topic, this book is primarily aimed at second- or third-year undergraduate math and physics students with a basic knowledge of vector calculus and linear algebra.

A Differential Geometric Approach to Electromagnetic Lens Design Springer Science & Business Media

The emphasis in this text is on classical electromagnetic theory and electrodynamics, that is, dynamical solutions to the Lorentz-force and Maxwell's equations. The natural appearance of the Minkowski spacetime metric in the paravector space of Clifford's geometric algebra is used to formulate a covariant treatment in special relativity that seamlessly connects spacetime concepts to the spatial vector treatments common in undergraduate texts. Baylis' geometrical interpretation, using such powerful tools as spinors and projectors, essentially allows a component-free notation and avoids the clutter of indices required in tensorial treatments. The exposition is clear and progresses systematically - from a discussion of electromagnetic units and an explanation of how the SI system can be readily converted to the Gaussian or natural Heaviside-Lorentz systems, to an introduction of geometric algebra and the paravector model of spacetime, and finally, special relativity. Other topics include Maxwell's equation(s), the Lorentz-force law, the Fresnel equations, electromagnetic waves and polarization, wave guides, radiation from accelerating charges and time-dependent currents, the Liénard-Wiechert potentials, and radiation reaction, all of which benefit from the modern relativistic approach. Numerous worked examples and exercises dispersed throughout the text help the reader understand new concepts and facilitate self-study of the material. Each chapter concludes with a set of problems, many with answers. Complete solutions are also available. An excellent feature is the integration of Maple into the text, thereby facilitating difficult calculations. To download accompanying Maple worksheets, please visit http://www.cs.uwindsor.ca/users/b/baylis

A Differential Geometric Approach to Hyperbolic First Order Systems in Two Independent Variables Springer Science & Business Media

This book presents the classical theory of curves in the plane and three-dimensional space, and the classical theory of surfaces in three-dimensional space. It pays particular attention to the historical development of the theory and the preliminary approaches that support contemporary geometrical notions. It includes a chapter that lists a very wide scope of plane curves and their properties. The book approaches the threshold of algebraic topology, providing an integrated presentation fully accessible to undergraduate-level students. At the end of the 17th century, Newton and Leibniz developed differential calculus, thus making available the very wide range of differentiable functions, not just those constructed from polynomials. During the 18th century, Euler applied these ideas to establish what is still today the classical theory of most general curves and surfaces, largely used in engineering. Enter this fascinating world through amazing theorems and a wide supply of surprising examples. Reach the doors of algebraic topology by discovering just how an integer (= the Euler-Poincaré characteristics) associated with a surface gives you a lot of interesting information on the shape of the surface. And penetrate the intriguing world of Riemannian geometry, the geometry that underlies the theory of relativity. The book is of interest to all those who teach classical differential geometry up to quite an advanced level. The chapter on Riemannian geometry is of great interest to those who have to “intuitively” introduce students to the highly technical nature of this branch of mathematics, in particular when preparing students for courses on relativity.

Material Inhomogeneities and their Evolution Springer Science & Business Media

From the reviews: "In this Lecture Note volume the author describes his differential-geometric approach to parametrical statistical problems summarizing the results he had published in a series of papers in the last five years. The author provides a geometric framework for a special class of test and estimation procedures for curved exponential families. ... ... The material and ideas presented in this volume are important and it is recommended to everybody interested in the connection between statistics and geometry ..." #Metrika#1 "More than hundred references are given showing the growing interest in differential geometry with respect to statistics. The book can only strongly be recommended to a geodesist since it offers many new insights into statistics on a familiar ground." #Manuscripta Geodaetica#2

A Differential Geometric Approach to GIT and Stability CRC Press

In their discussion of the subject of classical mechanics, the authors of this book use a new and stimulating approach which involves looking at dynamical systems from the viewpoint of differential geometry.

A Differential Approach to Geometry A Geometric Approach to Differential Forms

Modeling and Control in Vibrational and Structural Dynamics: A Differential Geometric Approach describes the control behavior of mechanical objects, such as wave equations, plates, and shells. It shows how the differential geometric approach is used when the coefficients of partial differential equations (PDEs) are variable in space (waves/plates),

A Geometric Approach to Differential Forms Springer Science & Business Media

Nonholonomic Motion Planning grew out of the workshop that took place at the 1991 IEEE International Conference on Robotics and Automation. It consists of contributed chapters representing new developments in this area. Contributors to the book include robotics engineers, nonlinear control experts, differential geometers and applied mathematicians. Nonholonomic Motion Planning is arranged into three chapter groups: Controllability: one of the key mathematical tools needed to study nonholonomic motion. Motion Planning for Mobile Robots: in this section the papers are focused on problems with nonholonomic velocity constraints as well as constraints on the generalized coordinates.

Falling Cats, Space Robots and Gauge Theory: there are numerous connections to be made between symplectic geometry techniques for the study of holonomies in mechanics, gauge theory and control. In this section these connections are discussed using the backdrop of examples drawn from space robots and falling cats reorienting themselves. Nonholonomic Motion Planning can be used either as a reference for researchers working in the areas of robotics, nonlinear control and differential geometry, or as a textbook for a graduate level robotics or nonlinear control course.

A Differential Geometric Approach Using Orientation Fields for Shape from Shading

Advances in science and technology necessitate the use of increasingly-complicated dynamic control processes. Undoubtedly, sophisticated mathematical models are also concurrently elaborated for these processes. In particular, linear dynamic control systems iJ = Ay + Bu, y E M C]Rn, U E]RT, (1) where A and B are constants, are often abandoned in favor of nonlinear dynamic control systems (2) which, in addition, contain a large number of equations. The solution of problems for multidimensional nonlinear control systems en counters serious difficulties, which are both mathematical and technical in nature. Therefore it is imperative to develop methods of reduction of nonlinear systems to a simpler form, for example, decomposition into systems of lesser dimension. Approaches to reduction are diverse, in particular, techniques based on approxi mation methods. In this monograph, we elaborate the most natural and obvious (in our opinion) approach, which is essentially inherent in any theory of math ematical entities, for instance, in the theory of linear spaces, theory of groups, etc. Reduction in our interpretation is based on assigning to the initial object an isomorphic object, a quotient object, and a subobject. In the theory of linear spaces, for instance, reduction consists in reducing to an isomorphic linear space, quotient space, and subspace. Strictly speaking, the exposition of any mathemat ical theory essentially begins with the introduction of these reduced objects and determination of their basic properties in relation to the initial object.

A Differential Geometric Approach to Optimal Control

A Geometric Approach to Differential FormsSpringer Science & Business Media

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