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Starting from an undergraduate level, this book systematically develops the basics of • Calculus on manifolds, vector bundles, vector fields and differential forms, • Lie groups and Lie group actions, • Linear symplectic algebra and symplectic geometry, • Hamiltonian systems, symmetries and reduction, integrable systems and Hamilton-Jacobi theory. The topics listed under the first item are relevant for virtually all areas of mathematical physics. The second and third items constitute the link between abstract calculus and the theory of Hamiltonian systems. The last item provides an introduction to various aspects of this theory, including Morse families, the Maslov class and caustics. The book guides the reader from elementary differential geometry to advanced topics in the theory of Hamiltonian systems with the aim of making current research literature accessible. The style is that of a mathematical textbook,with full proofs given in the text or as exercises. The material is illustrated by numerous detailed examples, some of which are taken up several times for demonstrating how the methods evolve and interact. Information Systems and Data Compression presents a uniform approach and methodology for designing intelligent information systems. A framework for information concepts is introduced for various types of information systems such as communication systems, information storage systems and systems for simplifying structured information. The book introduces several new concepts and presents a novel interpretation of a wide range of topics in communications, information storage, and information compression. Numerous illustrations for designing information systems for compression of digital data and images are used throughout the book. In the earlier monograph Pseudo-reductive Groups, Brian Conrad, Ofer Gabber, and Gopal Prasad explored the general structure of pseudo-reductive groups. In this new book, Classification of Pseudo-reductive Groups, Conrad and Prasad go further to study the classification over an arbitrary field. An isomorphism theorem proved here determines the automorphism schemes of these groups. The book also gives a Tits-Witt type classification of isotropic groups and displays a cohomological obstruction to the existence of pseudo-split forms. Constructions based on regular degenerate quadratic forms and new techniques with central extensions provide insight into new phenomena in characteristic 2, which also leads to simplifications of the earlier work. A generalized standard construction is shown to account for all possibilities up to mild central extensions. The results and methods developed in Classification of Pseudo-reductive Groups will interest mathematicians and graduate students who work with algebraic groups in number theory and algebraic geometry in positive characteristic. Many different mathematical methods and concepts are used in classical mechanics: differential equations and phase ftows, smooth mappings and manifolds, Lie groups and Lie algebras, symplectic geometry and ergodic theory. Many modern mathematical theories arose from problems in mechanics and only later acquired that axiomatic-abstract form which makes them so hard to study. In this book we construct the mathematical apparatus of classical mechanics from the very beginning; thus, the reader is not assumed to have any previous knowledge beyond standard courses in analysis (differential and integral calculus, differential equations), geometry (vector spaces, vectors) and linear algebra (linear operators, quadratic forms). With the help of this apparatus, we examine all the basic problems in dynamics, including the theory of oscillations, the theory of rigid body motion, and the hamiltonian formalism. The author has tried to show the geometric, qualitative aspect of phenomena. In this respect the book is closer to courses in theoretical mechanics for theoretical physicists than to traditional courses in theoretical mechanics as taught by mathematicians. The outcome of a close collaboration between mathematicians and mathematical physicists, these lecture notes present the foundations of A. Connes noncommutative geometry as well as its applications in particular to the field of theoretical particle physics. The coherent and systematic approach makes this book useful for experienced researchers and postgraduate students alike. This book aims to provide an overview of several topics in advanced differential geometry and Lie group theory, all of them stemming from mathematical problems in supersymmetric physical theories. It presents a mathematical illustration of the main development in geometry and symmetry theory that occurred under the fertilizing influence of supersymmetry/supergravity. The contents are mainly of mathematical nature, but each topic is introduced by historical information and enriched with motivations from high energy physics, which help the reader in getting a deeper comprehension of the subject. An application of differential forms for the study of some local and global aspects of the differential geometry of surfaces. Differential forms are introduced in a simple way that will make them attractive to "users" of mathematics. A brief and elementary introduction to differentiable manifolds is given so that the main theorem, namely Stokes' theorem, can be presented in its natural setting. The applications consist in developing the method of moving frames expounded by E. Cartan to study the local differential geometry of immersed surfaces in R3 as well as the intrinsic geometry of surfaces. This is then collated in the last chapter to present Chern's proof of the Gauss-Bonnet theorem for compact surfaces. Volume 2 of two - also available in a set of both volumes. This elegant book is sure to become the standard introduction to synthetic differential geometry. It deals with some classical spaces in differential geometry, namely 'prolongation spaces' or neighborhoods of the diagonal. These spaces enable a natural description of some of the basic constructions in local differential geometry and, in fact, form an inviting gateway to differential geometry, and also to some differential-geometric notions that exist in algebraic geometry. The presentation conveys the real strength of this approach to differential geometry. Concepts are clarified, proofs are streamlined, and the focus on infinitesimal spaces motivates the discussion well. Some of the specific differential-geometric theories dealt with are connection theory (notably affine connections), geometric distributions, differential forms, jet bundles, differentiable groupoids, differential operators, Riemannian metrics, and harmonic maps. Ideal for graduate students and researchers wishing to familiarize themselves with the field. Discusses the equivalence between Cartan connections and underlying structures, including a complete proof of Kostant's version of the Bott - Borel - Weil theorem, which is used as an important tool. This book provides a description of the geometry and its basic invariants. This volume contains seventeen of the best papers delivered at the SIGMAP Workshop 2014, representing the most recent advances in the field of symmetries of discrete objects and structures, with a particular emphasis on connections between maps, Riemann surfaces and dessins d'enfant.Providing the global community of researchers in the field with the opportunity to gather, converse and present their newest findings and advances, the Symmetries In Graphs, Maps, and Polytopes Workshop 2014 was the fifth in a series of workshops. The initial workshop, organized by Steve Wilson in Flagstaff, Arizona, in 1998, was followed in 2002 and 2006 by two meetings held in Aveiro, Portugal, organized by Antonio Breda d'Azevedo, and a fourth workshop held in Oaxaca, Mexico, organized by Isabel Hubard in 2010.This book should appeal to both specialists and those seeking a broad overview of what is happening in the area of symmetries of discrete objects and structures.iv> This book offers a concise yet thorough introduction to the notion of moduli spaces of complex algebraic curves. Over the last few decades, this notion has become central not only in algebraic geometry, but in mathematical physics, including string theory, as well. The book begins by studying individual smooth algebraic curves, including the most beautiful ones, before addressing families of curves. Studying families of algebraic curves often proves to be more efficient than studying individual curves: these families and their total spaces can still be smooth, even if there are singular curves among their members. A major discovery of the 20th century, attributed to P. Deligne and D. Mumford, was that curves with only mild singularities form smooth compact moduli spaces. An unexpected byproduct of this discovery was the realization that the analysis of more complex curve singularities is not a necessary step in understanding the geometry of the moduli spaces. The book does not use the sophisticated machinery of modern algebraic geometry, and most classical objects related to curves – such as Jacobian, space of holomorphic differentials, the Riemann-Roch theorem, and Weierstrass points – are treated at a basic level that does not require a profound command of algebraic geometry, but which is sufficient for extending them to vector bundles and other geometric objects associated to moduli spaces. Nevertheless, it offers clear information on the construction of the moduli spaces, and provides readers with tools for practical operations with this notion. Based on several lecture courses given by the authors at the Independent University of Moscow and Higher School of Economics, the book also includes a wealth of problems, making it suitable not only for individual research, but also as a textbook for undergraduate and graduate coursework Celebrating the work of Professor W. Kuperberg, this reference explores packing and covering theory, tilings, combinatorial and computational geometry, and convexity, featuring an extensive collection of problems compiled at the Discrete Geometry Special Session of the American Mathematical Society in New Orleans, Louisiana. Discrete Geometry analyzes packings and coverings with congruent convex bodies , arrangements on the sphere, line transversals, Euclidean and spherical tilings, geometric graphs, polygons and polyhedra, and fixing systems for convex figures. This text also offers research and contributions from more than 50 esteemed international authorities, making it a valuable addition to any mathematical library. In this volume, the geometry of spherical space form groups is studied using the eta invariant. The author reviews the analytical properties of the eta invariant of Atiyah-Patodi-Singer and describes how the eta invariant gives rise to torsion invariants in both K-theory and equivariant bordism. The eta invariant is used to compute the K-theory of spherical space forms, and to study the equivariant unitary bordism of spherical space forms and the Pinc and Spinc equivariant bordism groups for spherical space form groups. This leads to a complete structure theorem for these bordism and K-theory groups.There is a deep relationship between topology and analysis with differential geometry serving as the bridge. This book is intended to serve as an introduction to this subject for people from different research backgrounds.This book is intended as a research monograph for people who are not experts in all the areas discussed. It is written for topologists wishing to understand some of the analytic details and for analysists wishing to understand some of the topological ideas. It is also intended as an introduction to the field for graduate students. This volume of proceedings consists of 14 invited papers. It aims to understand the geometric and analytical aspects in recent research of dynamical systems. It deals with topics such as complex dynamical systems, electric circuits, reconstruction of bifurcation diagrams, integrable systems, quantum chaos, ergodic theory, foliation, zeta functions, etc. This book provides a self-contained introduction to diagram geometry. Tight connections with group theory are shown. It treats thin geometries (related to Coxeter groups) and thick buildings from a diagrammatic perspective. Projective and affine geometry are main examples. Polar geometry is motivated by polarities on diagram geometries and the complete classification of those polar geometries whose projective planes are Desarguesian is given. It differs from Tits' comprehensive treatment in that it uses Veldkamp's embeddings. The book intends to be a basic reference for those who study diagram geometry. Group theorists will find examples of the use of diagram geometry. Light on matroid theory is shed from the point of view of geometry with linear diagrams. Those interested in Coxeter groups and those interested in buildings will find brief but self-contained introductions into these topics from the diagrammatic perspective. Graph theorists will find many highly regular graphs. The text is written so graduate students will be able to follow the arguments without needing recourse to further literature. A strong point of the book is the density of examples. This book is a product of the understanding I developed of stress analysis applied to plastics, while at work at L. J. Broutman and Associates (UBA) and as a lecturer in the seminars on this topic co-sponsored by UBA and Society of Plastics Engineers. I believe that by its extent and level of treatment, this book would serve as an easy-to-read desktop reference for professionals, as well as a text book at the junior or senior level in undergraduate programs. The main theme of this book is what to do with computed stress. To approach the theme effectively, I have taken the "stress category ap proach" to stress analysis. Such an approach is being successfully used in the nuclear power field. In plastics, this approach helps in the prediction of long term behavior of structures. To maintain interest I have limited derivations and proofs to a minimum, and provided them, if at all, as flow charts. In this way, I believe that one can see better the connection between the variables, assumptions, and mathematics. The final third of the book applies the mathematical ideas to important areas of physics: Hamiltonian mechanics, statistical mechanics, and electrodynamics." "There are many classroom-tested exercises and examples with excellent figures throughout. The book is ideal as a text for a first course in differential geometry, suitable for advanced undergraduates or graduate students in mathematics or physics."--BOOK JACKET. A comprehensive presentation of abstract algebra and an in-depth treatment of the applications of algebraic techniques and the relationship of algebra to other disciplines, such as number theory, combinatorics, geometry, topology, differential equations, and Markov chains. An important question in geometry and analysis is to know when two k-forms f and g are equivalent through a change of variables. The problem is therefore to find a map φ so that it satisfies the pullback equation: $\varphi^*(g) = f$. In more physical terms, the question under consideration can be seen as a problem of mass transportation. The problem has received considerable attention in the cases $k = 2$ and $k = n$, but much less when $3 \leq k \leq n-1$. The present monograph provides the first comprehensive study of the equation. The work begins by recounting various properties of exterior forms and differential forms that prove useful throughout the book. From there it goes on to present the classical Hodge–Morrey decomposition and to give several versions of the Poincaré lemma. The core of the book discusses the case $k = n$, and then the case $1\leq k \leq n-1$ with special attention on the case $k = 2$, which is fundamental in symplectic geometry. Special emphasis is given to optimal regularity, global results and boundary data. The last part of the work discusses Hölder spaces in detail; all the results presented here are essentially classical, but cannot be found in a single book. This section may serve as a reference on Hölder spaces and therefore will be useful to mathematicians well beyond those who are only interested in the pullback equation. The Pullback Equation for Differential Forms is a self-contained and concise monograph intended for both geometers and analysts. The book may serve as a valuable reference for researchers or a supplemental text for graduate courses or seminars. This book provides an introduction to topology, differential topology, and differential geometry. It is based on manuscripts refined through use in a variety of lecture courses. The first chapter covers elementary results and concepts from point-set topology. An exception is the Jordan Curve Theorem, which is proved for polygonal paths and is intended to give students a first glimpse into the nature of deeper topological problems. The second chapter of the book introduces manifolds and Lie groups, and examines a wide assortment of examples. Further discussion explores tangent bundles, vector bundles, differentials, vector fields, and Lie brackets of vector fields. This discussion is deepened and expanded in the third chapter, which introduces the de Rham cohomology and the oriented integral and gives proofs of the Brouwer Fixed-Point Theorem, the Jordan-Brouwer Separation Theorem, and Stokes's integral formula. The fourth and final chapter is devoted to the fundamentals of differential geometry and traces the development of ideas from curves to submanifolds of Euclidean spaces. Along the way, the book discusses connections and curvature--the central concepts of differential geometry. The discussion culminates with the Gauß equations and the version of Gauß's theorema egregium for submanifolds of arbitrary dimension and codimension. This book is primarily aimed at advanced undergraduates in mathematics and physics and is intended as the template for a one- or two-semester bachelor's course. This volume focuses on discussing the interplay between the analysis, as exemplified by the eta invariant and other spectral invariants, the number theory, as exemplified by the relevant Dedekind sums and Rademacher reciprocity, the algebraic topology, as exemplified by the equivariant bordism groups, K-theory groups, and connective K-theory groups, and the geometry of spherical space forms, as exemplified by the Smith homomorphism. These are used to study the existence of metrics of positive scalar curvature on spin manifolds of dimension at least 5 whose fundamental group is a spherical space form group. This volume is a completely rewritten revision of the first edition. The underlying organization is modified to provide a better organized and more coherent treatment of the material involved. In addition, approximately 100 pages have been added to study the existence of metrics of positive scalar curvature on spin manifolds of dimension at least 5 whose fundamental group is a spherical space form group. We have chosen to focus on the geometric aspect of the theory rather than more abstract algebraic constructions (like the assembly map) and to restrict our attention to spherical space forms rather than more general and more complicated geometrical examples to avoid losing contact with the fundamental geometry which is involved. Contents: Partial Differential OperatorsK Theory and CohomologyEquivariant BordismPositive Scalar CurvatureAuxiliary Materials Readership: Graduate students and researchers interested in global analysis, geometry, and topology. Keywords: Dedekind Sums and Rademacher Reciprocity;K-Theory;Eta Invariant;Spherical Space Form;Lens Space;Quaternion Spherical Space Form;Iterated Jet Bundle;Equivariant Bordism;Smith Homomorphism;Connective K-Theory;Manifolds with Positive Scalar Curvature;Spin Bordism;Unitary Bordism;Spin-C Bordism;Pin-C BordismReview: Key Features: The is a complete revision of the first edition and includes substantial amounts of new material applying the basic material of the book to the examination of metrics of positive scalar curvature on spin manifolds of dimension at least 5 whose fundamental group is a spherical space form groupTo ensure that the book is accessible to wide an audience as possible, there is a review of vector bundle theory, of Clifford module theory, of the Atiyah–Singer index theorem, and of the index theorem with boundaryThere are also tables, which have been simplified and the organization improved from the first edition, giving various K-theory and equivariant bordism groups An instant New York Times Bestseller! “Unreasonably entertaining . . . reveals how geometric thinking can allow for everything from fairer American elections to better pandemic planning.” —The New York Times From the New York Times-bestselling author of How Not to Be Wrong—himself a world-class geometer—a far-ranging exploration of the power of geometry, which turns out to help us think better about practically everything. How should a democracy choose its representatives? How can you stop a pandemic from sweeping the world? How do computers learn to play Go, and why is learning Go so much easier for them than learning to read a sentence? Can ancient Greek proportions predict the stock market? (Sorry, no.) What should your kids learn in school if they really want to learn to think? All these are questions about geometry. For real. If you're like most people, geometry is a sterile and dimly remembered exercise you gladly left behind in the dust of ninth grade, along with your braces and active romantic interest in pop singers. If you recall any of it, it's plodding through a series of miniscule steps only to prove some fact about triangles that was obvious to you in the first place. That's not geometry. Okay, it is geometry, but only a tiny part, which has as much to do with geometry in all its flush modern richness as conjugating a verb has to do with a great novel. Shape reveals the geometry underneath some of the most important scientific, political, and philosophical problems we face. Geometry asks: Where are things? Which things are near each other? How can you get from one thing to another thing? Those are important questions. The word "geometry"comes from the Greek for "measuring the world." If anything, that's an undersell. Geometry doesn't just measure the world—it explains it. Shape shows us how. A study of topology and geometry, beginning with a comprehensible account of the extraordinary and rather mysterious impact of mathematical physics, and especially gauge theory, on the study of the geometry and topology of manifolds. The focus of the book is the Yang-Mills-Higgs field and some considerable effort is expended to make clear its origin and significance in physics. Much of the mathematics developed here to study these fields is standard, but the treatment always keeps one eye on the physics and sacrifices generality in favor of clarity. The author brings readers up the level of physics and mathematics needed to conclude with a brief discussion of the Seiberg-Witten invariants. A large number of exercises are included to encourage active participation on the part of the reader. Dr Theodore Nicholas ran the High Cycle Fatigue Program for the US Air Force between 1995 and 2003 at Wright-Patterson Air Force Base, and is one of the world’s leading authorities on the subject, having authored over 250 papers in leading archival journals and books. Bringing his plethora of expertise to this book, Dr Nicholas discusses the subject of high cycle fatigue (HCF) from an engineering viewpoint in response to a series of HCF failures in the USAF and the concurrent realization that HCF failures in general were taking place universally in both civilian and military engines. Topic covered include: Constant life diagrams Fatigue limits under combined LCF and HCF Notch fatigue under HCF conditions Foreign object damage (FOD) Brings years of the Author's US Air Force experience in high cycle fatigue together in one text Discusses HCF in the context of recent international military and civilian engine failures This book is an outgrowth of the activities of the Center for Geometry and Mathematical Physics (CGMP) at Penn State from 1996 to 1998. The Center was created in the Mathematics Department at Penn State in the fall of 1996 for the purpose of promoting and supporting the activities of researchers and students in and around geometry and physics at the university. The CGMP brings many visitors to Penn State and has ties with other research groups; it organizes weekly seminars as well as annual workshops The book contains 17 contributed articles on current research topics in a variety of fields: symplectic geometry, quantization, quantum groups, algebraic geometry, algebraic groups and invariant theory, and character istic classes. Most of the 20 authors have talked at Penn State about their research. Their articles present new results or discuss interesting perspec tives on recent work. All the articles have been refereed in the regular fashion of excellent scientific journals. Symplectic geometry, quantization and quantum groups is one main theme of the book. Several authors study deformation quantization. As tashkevich generalizes Karabegov's deformation quantization of Kahler manifolds to symplectic manifolds admitting two transverse polarizations, and studies the moment map in the case of semisimple coadjoint orbits. Bieliavsky constructs an explicit star-product on holonomy reducible sym metric coadjoint orbits of a simple Lie group, and he shows how to con struct a star-representation which has interesting holomorphic properties. Fracture Mechanics of Rock This book is intended as an introductory text on the subject of Lie groups and algebras and their role in various fields of mathematics and physics. It is written by and for researchers who are primarily analysts or physicists, not algebraists or geometers. Not that we have eschewed the algebraic and geo metric developments. But we wanted to present them in a concrete way and to show how the subject interacted with physics, geometry, and mechanics. These interactions are, of course, manifold; we have discussed many of them here-in particular, Riemannian geometry, elementary particle physics, sym metries of differential equations, completely integrable Hamiltonian systems, and spontaneous symmetry breaking. Much ofthe material we have treated is standard and widely available; but we have tried to steer a course between the descriptive approach such as found in Gilmore and Wybourne, and the abstract mathematical approach of Helgason or Jacobson. Gilmore and Wybourne address themselves to the physics community whereas Helgason and Jacobson address themselves to the mathematical community. This book is an attempt to synthesize the two points of view and address both audiences simultaneously. We wanted to present the subject in a way which is at once intuitive, geometric, applications oriented, mathematically rigorous, and accessible to students and researchers without an extensive background in physics, algebra, or geometry. Quantum groups and quantum algebras as well as non-commutative differential geometry are important in mathematics and considered to be useful tools for model building in statistical and quantum physics. This book, addressing scientists and postgraduates, contains a detailed and rather complete presentation of the algebraic framework. Introductory chapters deal with background material such as Lie and Hopf superalgebras, Lie super-bialgebras, or formal power series. Great care was taken to present a reliable collection of formulae and to unify the notation, making this volume a useful work of reference for mathematicians and mathematical physicists. Differential forms are a powerful mathematical technique to help students, researchers, and engineers solve problems in geometry and analysis, and their applications. They both unify and simplify results in concrete settings, and allow them to be clearly and effectively generalized to more abstract settings. Differential Forms has gained high recognition in the mathematical and scientific community as a powerful computational tool in solving research problems and simplifying very abstract problems. Differential Forms, 2nd Edition, is a solid resource for students and professionals needing a general understanding of the mathematical theory and to be able to apply that theory into practice. Provides a solid theoretical basis of how to develop and apply differential forms to real research problems Includes computational methods to enable the reader to effectively use differential forms Introduces theoretical concepts in an accessible manner There have been many wonderful developments in the theory of minimal surfaces and geometric measure theory in the past 25 to 30 years. Many of the researchers who have produced these excellent results were inspired by this little book - or by Fred Almgren himself. The book is indeed a delightful invitation to the world of variational geometry. A central topic is Plateau's Problem, which is concerned with surfaces that model the behavior of soap films.When trying to resolve the problem, however, one soon finds that smooth surfaces are insufficient: Varifolds are needed. With varifolds, one can obtain geometrically meaningful solutions without having to know in advance all their possible singularities. This new tool makes possible much exciting new analysis and many new results. Plateau's problem and varifolds live in the world of geometric measure theory, where differential geometry and measure theory combine to solve problems which have variational aspects. The author's hope in writing this book was to encourage young mathematicians to study this fascinating subject further. Judging from the success of his students, it achieves this exceedingly well. From the reviews of the second edition: "The new methods of complex manifold theory are very useful tools for investigations in algebraic geometry, complex function theory, differential operators and so on. The differential geometrical methods of this theory were developed essentially under the influence of Professor S.-S. Chern's works. The present book is a second edition... It can serve as an introduction to, and a survey of, this theory and is based on the author's lectures held at the University of California and at a summer seminar of the Canadian Mathematical Congress.... The text is illustrated by many examples... The book is warmly recommended to everyone interested in complex differential geometry." #Acta Scientiarum Mathematicarum, 41, 3-4# There already exist a number of excellent graduate textbooks on the theory of differential forms as well as a handful of very good undergraduate textbooks on multivariable calculus in which this subject is briefly touched upon but not elaborated on enough.The goal of this textbook is to be readable and usable for undergraduates. It is entirely devoted to the subject of differential forms and explores a lot of its important ramifications.In particular, our book provides a detailed and lucid account of a fundamental result in the theory of differential forms which is, as a rule, not touched upon in undergraduate texts: the isomorphism between the Čech cohomology groups of a differential manifold and its de Rham cohomology groups. Since the times of Gauss, Riemann, and Poincare, one of the principal goals of the study of manifolds has been to relate local analytic properties of a manifold with its global topological properties. Among the high points on this route are the Gauss-Bonnet formula, the de Rham complex, and the Hodge theorem; these results show, in particular, that the central tool in reaching the main goal of global analysis is the theory of differential forms. The book by Morita is a comprehensive introduction to differential forms. It begins with a quick introduction to the notion of differentiable manifolds and then develops basic properties of differential forms as well as fundamental results concerning them, such as the de Rham and Frobenius theorems. The second half of the book is devoted to more advanced material, including Laplacians and harmonic forms on manifolds, the concepts of vector bundles and fiber bundles, and the theory of characteristic classes. Among the less traditional topics treated is a detailed description of the Chern-Weil theory. The book can serve as a textbook for undergraduate students and for graduate students in geometry. Among the many differences between classical and p-adic objects, those related to differential equations occupy a special place. For example, a closed p-adic analytic one-form defined on a simply-connected domain does not necessarily have a primitive in the class of analytic functions. In the early 1980s, Robert Coleman discovered a way to construct primitives of analytic one-forms on certain smooth p-adic analytic curves in a bigger class of functions. Since then, there have been several attempts to generalize his ideas to smooth p-adic analytic spaces of higher dimension, but the spaces considered were invariably associated with algebraic varieties. This book aims to show that every smooth p-adic analytic space is provided with a sheaf of functions that includes all analytic ones and satisfies a uniqueness property. It also contains local primitives of all closed one-forms with coefficients in the sheaf that, in the case considered by Coleman, coincide with those he constructed. In consequence, one constructs a parallel transport of local solutions of a unipotent differential equation and an integral of a closed one-form along a path so that both depend nontrivially on the homotopy class of the path. Both the author's previous results on geometric properties of smooth p-adic analytic spaces and the theory of isocrystals are further developed in this book, which is aimed at graduate students and mathematicians working in the areas of non-Archimedean analytic geometry, number theory, and algebraic geometry. 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.

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- Life Science Globe Fearon Chapter Answers
- Were You Born On The Wrong Continent How European Model Can Help Get A Life Thomas Geoghegan
- Tarascon Internal Medicine Critical Care Pocketbook By Robert J Lederman
- Theory And Computation Of Electromagnetic Fields Solution Manual
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