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An Introduction to Tensor Calculus
An Introduction to Tensor Calculus and Relativity
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An Introduction to Mathematical Relativity Tensors, Relativity, and Cosmology
A Mathematical Journey to Relativity
Introduction to Tensor Calculus, Relativity and Cosmology
Einstein in Matrix Form
Second Year Calculus
A Most Incomprehensible Thing
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Tensors, Relativity, and Cosmology
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Advanced Calculus and its Applications in Variational Quantum Mechanics and Relativity
Theory
Spacetime and Geometry
Advanced General Relativity
Spinors and Space-Time: Volume 1, Two-Spinor Calculus and Relativistic Fields
Explorations in Mathematical Physics
The Geometry of Spacetime
Tensor Calculus
Step by Step: from Dual Bases to General Relativity
Differential Geometry and Relativity Theory
The Special Theory Of Relativity
For Mathematics Students
Tensor Calculus for Physics
An Introduction to Tensor Calculus 2012-03-07 this elementary introduction pays special attention to aspects of
tensor calculus and relativity that students tend to find most difficult its use of relatively unsophisticated
mathematics in the early chapters allows readers to develop their confidence within the framework of cartesian
coordinates before undertaking the theory of tensors in curved spaces and its application to general relativity
theory topics include the special principle of relativity and lorentz transformations orthogonal transformations and
cartesian tensors special relativity mechanics and electrodynamics general tensor calculus and riemannian space
and the general theory of relativity including a focus on black holes and gravitational waves the text concludes with
a chapter offering a sound background in applying the principles of general relativity to cosmology numerous
exercises advance the theoretical developments of the main text thus enhancing this volume s appeal to students
of applied mathematics and physics at both undergraduate and postgraduate levels preface list of constants
references bibliography
An Introduction to Tensor Calculus and Relativity 1967 general relativity without calculus offers a compact but
mathematically correct introduction to the general theory of relativity assuming only a basic knowledge of high
school mathematics and physics targeted at first year undergraduates and advanced high school students who wish
to learn einstein s theory beyond popular science accounts it covers the basics of special relativity minkowski space
time non euclidean geometry newtonian gravity the schwarzschild solution black holes and cosmology the quick
paced style is balanced by over 75 exercises including full solutions allowing readers to test and consolidate their
understanding
An Introduction to Tensor Calculus and Relativity 1962 based on the ideas of einstein and minkowski this concise
treatment is derived from the author s many years of teaching the mathematics of relativity at the university of
michigan geared toward advanced undergraduates and graduate students of physics the text covers old physics
new geometry special relativity curved space and general relativity beginning with a discussion of the inverse
square law in terms of simple calculus the treatment gradually introduces increasingly complicated situations and
more sophisticated mathematical tools changes in fundamental concepts which characterize relativity theory and
the refinements of mathematical technique are incorporated as necessary the presentation thus offers an easier
approach without sacrifice of rigor dover 2014 republication of the edition published by john wiley sons new york
1950 see every dover book in print at doverpublications com
General Relativity Without Calculus 2011-08-01 this concise textbook introduces the reader to advanced
mathematical aspects of general relativity covering topics like penrose diagrams causality theory singularity
theorems the cauchy problem for the einstein equations the positive mass theorem and the laws of black hole
thermodynamics it emerged from lecture notes originally conceived for a one semester course in mathematical
relativity which has been taught at the instituto superior técnico university of lisbon portugal since 2010 to masters
and doctorate students in mathematics and physics mostly self contained and mathematically rigorous this book
can be appealing to graduate students in mathematics or physics seeking specialization in general relativity
geometry or partial differential equations prerequisites include proficiency in differential geometry and the basic
principles of relativity readers who are familiar with special relativity and have taken a course either in riemannian
geometry or in general relativity for those in physics can benefit from this book
An Introduction to Tensor Calculus and Relativity 2013-08 this book combines relativity astrophysics and
cosmology in a single volume providing an introduction to each subject that enables students to understand more
detailed treatises as well as the current literature the section on general relativity gives the case for a curved space
time presents the mathematical background tensor calculus riemannian geometry discusses the einstein equation
and its solutions including black holes penrose processes and similar topics and considers the energy momentum
tensor for various solutions the next section on relativistic astrophysics discusses stellar contraction and collapse
neutron stars and their equations of state black holes and accretion onto collapsed objects mostly the section on
cosmology discusses various cosmological models observational tests and scenarios for the early universe clearly
combines relativity astrophysics and cosmology in a single volume so students can understand more detailed
treatises and current literature extensive introductions to each section are followed by relevant examples and
numerous exercises provides an easy to understand approach to this advanced field of mathematics and modern
physics by providing highly detailed derivations of all equations and results
Mathematics of Relativity 2014-11-19 this book opens with an axiomatic description of euclidean and non euclidean
geometries euclidean geometry is the starting point to understand all other geometries and it is the cornerstone for
our basic intuition of vector spaces the generalization to non euclidean geometry is the following step to develop
the language of special and general relativity these theories are discussed starting from a full geometric point of view differential geometry is presented in the simplest way and it is applied to describe the physical world the final result of this construction is deriving the einstein field equations for gravitation and spacetime dynamics possible solutions and their physical implications are also discussed the schwarzschild metric the relativistic trajectory of planets the deflection of light the black holes the cosmological solutions like de sitter friedmann lemaître robertson walker and gödel ones some current problems like dark energy are also sketched the book is self contained and includes details of all proofs it provides solutions or tips to solve problems and exercises it is designed for undergraduate students and for all readers who want a first geometric approach to special and general relativity

**An Introduction to Mathematical Relativity** 2021-03-24 this book is an introduction to the theories of special and general relativity the target audience are physicists engineers and applied scientists who are looking for an understandable introduction to the topic without too much new mathematics the fundamental equations of einstein's theory of special and general relativity are derived using matrix calculus without the help of tensors this feature makes the book special and a valuable tool for scientists and engineers with no experience in the field of tensor calculus in part i the foundations of special relativity are developed part ii describes the structure and principle of general relativity part iii explains the schwarzschild solution of spherical body gravity and examines the black hole phenomenon any necessary mathematical tools are user friendly provided either directly in the text or in the appendices

**Tensors, Relativity, and Cosmology** 2005-03-21 second year calculus from celestial mechanics to special relativity covers multi variable and vector calculus emphasizing the historical physical problems which gave rise to the concepts of calculus the book guides us from the birth of the mechanized view of the world in isaac newton's mathematical principles of natural philosophy in which mathematics becomes the ultimate tool for modelling physical reality to the dawn of a radically new and often counter intuitive age in albert einstein's special theory of relativity in which it is the mathematical model which suggests new aspects of that reality the development of this process is discussed from the modern viewpoint of differential forms using this concept the student learns to compute orbits and rocket trajectories model flows and force fields and derive the laws of electricity and magnetism these exercises and observations of mathematical symmetry enable the student to better understand the interaction of physics and mathematics

**A Mathematical Journey to Relativity** 2020-06-01 a straightforward enjoyable guide to the mathematics of einstein's relativity to really understand einstein's theory of relativity one of the cornerstones of modern physics you have to get to grips with the underlying mathematics this self study guide is aimed at the general reader who is motivated to tackle that not insignificant challenge with a user friendly style clear step by step mathematical derivations many fully solved problems and numerous diagrams this book provides a comprehensive introduction to a fascinating but complex subject for those with minimal mathematical background the first chapter gives a crash course in foundation mathematics the reader is then taken gently by the hand and guided through a wide range of fundamental topics including newtonian mechanics the lorentz transformations tensor calculus the einstein field equations the schwarzschild solution which gives a good approximation of the spacetime of our solar system simple black holes relativistic cosmology and gravitational waves special relativity helps explain a huge range of non gravitational physical phenomena and has some strangely counter intuitive consequences these include time dilation length contraction the relativity of simultaneity mass energy equivalence and an absolute speed limit general relativity the leading theory of gravity is at the heart of our understanding of cosmology and black holes i must observe that the theory of relativity resembles a building consisting of two separate stories the special theory and the general theory the special theory on which the general theory rests applies to all physical phenomena with the exception of gravitation the general theory provides the law of gravitation and its relations to the other forces of nature albert einstein 1919 understand even the basics of einstein's amazing theory and the world will never seem the same again contents preface introduction 1 foundation mathematics 2 newtonian mechanics 3 special relativity 4 introducing the manifold 5 scalars vectors one forms and tensors 6 more on curvature 7 general relativity 8 the newtonian limit 9 the schwarzschild metric 10 schwarzschild black holes 11 cosmology 12 gravitational waves appendix the riemann curvature tensor bibliography acknowledgements january 2019 this third edition has been revised to make the material even more accessible to the enthusiastic general reader who seeks to understand the mathematics of relativity

**Introduction to Tensor Calculus, Relativity and Cosmology** 2002 here is a modern introduction to the theory of tensor algebra and tensor analysis it discusses tensor algebra and introduces differential manifold coverage also
details tensor analysis differential forms connection forms and curvature tensor in addition the book investigates
riemannian and pseudo riemannian manifolds in great detail throughout examples and problems are furnished from
the theory of relativity and continuum mechanics
Einstein in Matrix Form 2013-06-12 tensors relativity and cosmology second edition combines relativity astrophysics
and cosmology in a single volume providing a simplified introduction to each subject that is followed by detailed
mathematical derivations the book includes a section on general relativity that gives the case for a curved space
time presents the mathematical background tensor calculus riemannian geometry discusses the einstein equation
and its solutions including black holes and penrose processes and considers the energy momentum tensor for
various solutions in addition a section on relativistic astrophysics discusses stellar contraction and collapse neutron
stars and their equations of state black holes and accretion onto collapsed objects with a final section on cosmology
discussing cosmological models observational tests and scenarios for the early universe this fully revised and
updated second edition includes new material on relativistic effects such as the behavior of clocks and measuring
rods in motion relativistic addition of velocities and the twin paradox as well as new material on gravitational waves
amongst other topics clearly combines relativity astrophysics and cosmology in a single volume extensive
introductions to each section are followed by relevant examples and numerous exercises presents topics of interest
to those researching and studying tensor calculus the theory of relativity gravitation cosmology quantum
cosmology robertson walker metrics curvature tensors kinematics black holes and more fully revised and updated
with 80 pages of new material on relativistic effects such as relativity of simultaneity and relativity of the concept of
distance amongst other topics provides an easy to understand approach to this advanced field of mathematics and
modern physics by providing highly detailed derivations of all equations and results
Second Year Calculus 2012-12-06 this book systematically develops the mathematical foundations of the theory of
relativity and links them to physical relations for this purpose differential geometry on manifolds is introduced first
including differentiation and integration and special relativity is presented as tensor calculus on tangential spaces
using einstein s field equations relating curvature to matter the relativistic effects in the solar system including
black holes are discussed in detail the text is aimed at students of physics and mathematics and assumes only
basic knowledge of classical differential and integral calculus and linear algebra
A Most Incomprehensible Thing 2017-04-01 wald s book is clearly the first textbook on general relativity with a
totally modern point of view and it succeeds very well where others are only partially successful the book includes
full discussions of many problems of current interest which are not treated in any extant book and all these matters
are considered with perception and understanding s chandrasekhar a tour de force lucid straightforward
mathematically rigorous exacting in the analysis of the theory in its physical aspect l p hughston times higher
education supplement truly excellent a sophisticated text of manageable size that will probably be read by every
student of relativity astrophysics and field theory for years to come james w york physics today
Tensors 2007-10-05 these notes have been taken by the author during a lecture given by the late dr g bertram
the polytechnical institute in hannover several decades ago they contain the necessary tools for understanding e g
general relativity such a s gauss riemann surface theory andricci calculus in order to be faithful to the source the
original notations like gothic letters for vectors have been preserved clearly these notes cannot replace a textbook
and some familiarity with the subject is therefore required for the reader
Tensors, Relativity, and Cosmology 2015-07-08 the mathematics of relativity for the rest of us is intended to give
the generally educated reader a thorough and factual understanding of einstein s theory of relativity including the
difficult mathematical concepts even if the reader is not trained in higher mathematics
The Geometry of Spacetime 2023-04-21 part i rigorous presentation of tensor calculus as a development of vector
analysis part ii important applications of tensor calculus concluding section field equations of general relativity
theory 1962 edition
General Relativity 2010-05-15 this is a book about physics written for mathematicians the readers we have in
mind can be roughly described as those who i are mathematics graduate students with some knowledge of global
differential geometry 2 have had the equivalent of freshman physics and find popular accounts of astrophysics and
cosmology interesting 3 appreciate mathematical clarity but are willing to accept physical motivations for the
mathematics in place of mathematical ones 4 are willing to spend time and effort mastering certain technical
details such as those in section 1 1 each book disappoints some readers this one will disappoint 1 physicists who
want to use this book as a first course on differential geometry 2 mathematicians who think lorentzian manifolds
are wholly similar to riemannian ones or that given a sufficiently good mathematical background the essentials of a
subject ike cosmology can be learned without so me hard work on boring detaiis 3 those who believe vague philosophical arguments have more than historical and heuristic significance that general relativity should somehow be proved or that axiomatization of this subject is useful 4 those who want an encyclopedic treatment the books by hawking ellis 1 penrose 1 weinberg 1 and misner thorne wheeler i go further into the subject than we do see also the survey article sachs wu 15 mathematicians who want to learn quantum physics or unified field theory unfortunately quantum physics texts all seem either to be for physicists or merely concerned with formal mathematics

**Geometrical Foundations of Tensor Calculus and Relativity Lecture Notes** 2019-05-13 this book provides an introduction to the theory of relativity and the mathematics used in its processes three elements of the book make it stand apart from previously published books on the theory of relativity first the book starts at a lower mathematical level than standard books with tensor calculus of sufficient maturity to make it possible to give detailed calculations of relativistic predictions of practical experiments self contained introductions are given for example vector calculus differential calculus and integrations second in between calculations have been included making it possible for the non technical reader to follow step by step calculations thirdly the conceptual development is gradual and rigorous in order to provide the inexperienced reader with a philosophically satisfying understanding of the theory the goal of this book is to provide the reader with a sound conceptual understanding of both the special and general theories of relativity and gain an insight into how the mathematics of the theory can be utilized to calculate relativistic effects

**The Mathematics of Relativity for the Rest of Us** 2001 based on a course taught for years at oxford this book offers a concise exposition of the central ideas of general relativity the focus is on the chain of reasoning that leads to the relativistic theory from the analysis of distance and time measurements in the presence of gravity rather than on the underlying mathematical structure includes links to recent developments including theoretical work and observational evidence to encourage further study

**Elements of Tensor Calculus** 2016-06-20 this unique textbook offers a mathematically rigorous presentation of the theory of relativity emphasizing the need for a critical analysis of the foundations of general relativity in order to best study the theory and its implications the transitions from classical mechanics to special relativity and then to general relativity are explored in detail as well helping readers to gain a more profound and nuanced understanding of the theory as a whole after reviewing the fundamentals of differential geometry and classical mechanics the text introduces special relativity first using the physical approach proposed by einstein and then via minkowski’s mathematical model the authors then address the relativistic thermodynamics of continua and electromagnetic fields in matter topics which are normally covered only very briefly in other treatments in the next two chapters the text then turns to a discussion of general relativity by means of the authors unique critical approach underlining the difficulty of recognizing the physical meaning of some statements such as the physical meaning of coordinates and the derivation of physical quantities from those of space time chapters in this section cover the model of space time proposed by schwarzschild black holes the friedman equations and the different cosmological models they describe and the fermi walker derivative well suited for graduate students in physics and mathematics who have a strong foundation in real analysis classical mechanics and general physics this textbook is appropriate for a variety of graduate level courses that cover topics in relativity additionally it will interest physicists and other researchers who wish to further study the subtleties of these theories and understand the contemporary scholarly discussions surrounding them

**General Relativity for Mathematicians** 2012-12-06 the book aims to expound the general theory of relativity with a mathematical point of view catering to the needs of postgraduate students and researchers in the field of astrophysics and mathematical physics it offers the readers a comprehensive understanding of the advanced topics of the subject matter it specifically discusses the mathematical foundation of tensor calculus gives a background of geodesics einstein’s field equations linearised gravity spacetime of spherically symmetric distribution of matter and black holes and particle and photon orbits in spacetime apart from the formulation of general relativity lie derivatives and its applications and causality of spacetime are also discussed in detail certain preliminary concepts of extrinsic curvature lagrangian formalism of general theory of relativity and 3 1 decomposition of space time are covered and are provided in the book as appendices

**Einstein’s Theory** 2011-08-30 to mark the 100th anniversary of einstein’s general relativity the minkowski institute press publishes the first english translation of a very rare book on general relativity its only russian publication was in 1924 which turned out to be the last book by a a friedmann co authored with v k frederiks this is
the first and the only published volume of a five volume book project on the foundations of the theory of relativity
brutally terminated by the untimely and tragic death of friedmann on 16 september 1925 despite the fact that this
book was published in 1924 and despite the presence of some unconventional notions and notations in it this is still
a valuable book because it is written by two deep thinkers particularly friedmann who in 1922 had the deepest
understanding of the cosmological implications of einstein's general relativity when he first showed that the
universe may expand which was later discovered by hubble what also makes this book valuable is that frederiks
and friedmann develop the formalism of tensor calculus from a physical point of view by showing why the ideas of
general relativity need that formalism in this sense the book can be even used for self study
General Relativity 2007-03-06 suitable for a one semester course in general relativity for senior undergraduates or
beginning graduate students this text clarifies the mathematical aspects of einstein's theory of relativity without
sacrificing physical understanding
The Physical and Mathematical Foundations of the Theory of Relativity 2019-09-25 this unique book presents a
particularly beautiful way of looking at special relativity the author encourages students to see beyond the formulas
to the deeper structure the unification of space and time introduced by einstein's special theory of relativity is one
of the cornerstones of the modern scientific description of the universe yet the unification is counterintuitive
because we perceive time very differently from space even in relativity time is not just another dimension it is one
with different properties the book treats the geometry of hyperbolas as the key to understanding special relativity
the author simplifies the formulas and emphasizes their geometric content many important relations including the
famous relativistic addition formula for velocities then follow directly from the appropriate hyperbolic trigonometric
addition formulas prior mastery of ordinary trigonometry is sufficient for most of the material presented although
occasional use is made of elementary differential calculus and the chapter on electromagnetism assumes some
more advanced knowledge changes to the second edition the treatment of minkowski space and spacetime
diagrams has been expanded several new topics have been added including a geometric derivation of lorentz
transformations a discussion of three dimensional spacetime diagrams and a brief geometric description of area
and how it can be used to measure time and distance minor notational changes were made to avoid conflict with
existing usage in the literature table of contents preface 1 introduction 2 the physics of special relativity 3 circle
graphy 4 hyperbola geometry 5 the geometry of special relativity 6 applications 7 problems iii 8 paradoxes 9
relativistic mechanics 10 problems ii 11 relativistic electromagnetism 12 problems iii 13 beyond special relativity 14
three dimensional spacetime diagrams 15 minkowski area via light boxes 16 hyperbolic geometry 17 calculus
bibliography author biography tevian dray is a professor of mathematics at oregon state university his research lies
at the interface between mathematics and physics involving differential geometry and general relativity as well as
nonassociative algebra and particle physics he also studies student understanding of middle division mathematics
and physics content educated at mit and berkeley he held postdoctoral positions in both mathematics and physics
in several countries prior to coming to osu in 1988 professor dray is a fellow of the american physical society for his
work in relativity and an award winning teacher
The General Theory of Relativity 2021-09-30 this book provides an introduction to the mathematics and physics of
general relativity its basic physical concepts its observational implications and the new insights obtained into the
nature of space time and the structure of the universe it introduces some of the most striking aspects of einstein's
theory of gravitation black holes gravitational waves stellar models and cosmology it contains a self contained
introduction to tensor calculus and riemannian geometry using in parallel the language of modern differential
graphy and the coordinate notation more familiar to physicists the author has strived to achieve mathematical
rigour with all notions given careful mathematical meaning while trying to maintain the formalism to the minimum
fit for purpose familiarity with special relativity is assumed the overall aim is to convey some of the main physical
and geometrical properties of einstein's theory of gravitation providing a solid entry point to further studies of the
mathematics and physics of einstein equations
Foundations of the Theory of Relativity 2015-12-21 more emphasis is placed on an intuitive grasp of the subject and
calculational facility than on rigorous exposition in this introduction to general relativity for mathematics
undergraduates or graduate physicists
A Short Course in General Relativity 2010-04-30 the first part of this book reviews some key topics on multi
variable advanced calculus the approach presented includes detailed and rigorous studies on surfaces in rn which
comprises items such as differential forms and an abstract version of the stokes theorem in rn the conclusion
section introduces readers to riemannian geometry which is used in the subsequent chapters the second part
reviews applications specifically in variational quantum mechanics and relativity theory topics such as a variational formulation for the relativistic klein gordon equation the derivation of a variational formulation for relativistic mechanics firstly through semi riemannian geometry are covered the second part has a more general context it includes fundamentals of differential geometry the later chapters describe a new interpretation for the bohr atomic model through a semi classical approach the book concludes with a classical description of the radiating cavity model in quantum mechanics

2023-09-06

The Geometry of Special Relativity 2021-06-10 an accessible introductory textbook on general relativity covering the theory s foundations mathematical formalism and major applications

Elements of General Relativity 2020-03-19 a self contained introduction to advanced general relativity

An Introduction to General Relativity 1990 this volume introduces and systematically develops the calculus of 2 spinors this is the first detailed exposition of this technique which leads not only to a deeper understanding of the structure of space time but also provides shortcuts to some very tedious calculations many results are given here for the first time

Advanced Calculus and its Applications in Variational Quantum Mechanics and Relativity Theory 2021-07-13 have you ever wondered why the language of modern physics centres on geometry or how quantum operators and dirac brackets work what a convolution really is what tensors are all about or what field theory and lagrangians are and why gravity is described as curvature this book takes you on a tour of the main ideas forming the language of modern mathematical physics here you will meet novel approaches to concepts such as determinants and geometry wave function evolution statistics signal processing and three dimensional rotations you will see how the accelerated frames of special relativity tell us about gravity on the journey you will discover how tensor notation relates to vector calculus how differential geometry is built on intuitive concepts and how variational calculus leads to field theory you will meet quantum measurement theory along with green functions and the art of complex integration and finally general relativity and cosmology the book takes a fresh approach to tensor analysis built solely on the metric and vectors with no need for one forms this gives a much more geometrical and intuitive insight into vector and tensor calculus together with general relativity than do traditional more abstract methods don koks is a physicist at the defence science and technology organisation in adelaide australia his doctorate in quantum cosmology was obtained from the department of physics and mathematical physics at adelaide university prior work at the university of auckland specialised in applied accelerator physics along with pure and applied mathematics

Spacetime and Geometry 2019-08-08 hermann minkowski recast special relativity as essentially a new geometric structure for spacetime this book looks at the ideas of both einstein and minkowski and then introduces the theory of frames surfaces and intrinsic geometry developing the main implications of einstein s general relativity theory

Advanced General Relativity 1993-11-26 the objective of this book is to give the reader a new horizon on a wide range of fundamental topics in mathematics and their application especially in physics and engineering sciences it is the result of several years of teaching students of different scientific and technical disciplines tensor calculus an object that makes even the best of students shudder is a fundamental and unique language to manipulate physical entities with extreme utility transparency and elegance in fact tensor calculus is indispensable to students in all scientific and technical fields this particular textbook is intended for students in science classes and engineering schools at the undergraduate graduate and advanced levels we hope that it will be of great help to them in their effort to understand this branch of physics this book progresses slowly but surely consolidating the foundations as it goes along and leading the students step by step with lucidity ease and absolute rigor to use tensors and to acquire this magnificent tool that is the index notation and to master this universal language common to scientists whatever their specialities although there are a multitude of textbooks on the subject each treating tensors in its own way this course stands out from its peers in the ease with which the essentials are covered it starts from preliminary notions of vector calculus to advanced notions based on differential geometry and multilinear algebra all chapters include many equations all of which are derived in detail in a coherent and rigorous manner and accompanied by explicit figures and illustrations and direct and immediate examples and applications followed by review exercises at the end of each chapter the definition of a tensor appears only at a late stage so as not to arouse the reader s horror of the word and to prepare him to accept it without resistance or apprehension this book is particularly concise in offering a very short path from the dual bases to general relativity avoiding abstract mathematical language and reducing the use of mathematics to the bare essentials concentrating on the essential and the concrete appealing to the reader s geometrical imagination concerning fundamental concepts such as
Euclidean space length, surface, and volume in order to understand the style of this book and to be able to understand the spirit, the strategy, the vision, and the goal of its author, the reader is asked to revise a little bit of linear algebra and to have a pen in hand and a piece of paper in order to be able to follow the course from the first page to the last one without interruption and without having to face any problem. In this way, he will be able to repeat the different proofs, master the indispensable calculus tools that we had forged as needed, and assimilate the various examples and applications.

**Spinors and Space-Time: Volume 1, Two-Spinor Calculus and Relativistic Fields**

1984-10-18 differential geometry and relativity theory. An introduction approaches relativity as a geometric theory of space and time in which gravity is a manifestation of space-time curvature rather than a force uniting differential geometry and both special and general relativity. In a single source, this easy-to-understand text opens the general theory of relativity to mathematics majors having a background only in multivariable calculus and linear algebra. The book offers a broad overview of the physical foundations and mathematical details of relativity and presents concrete physical interpretations of numerous abstract concepts in Riemannian geometry. The work is profusely illustrated with diagrams aiding in the understanding of proofs and explanations. Appendices feature important material on vector analysis and hyperbolic functions. Differential geometry and relativity theory. An introduction serves as the ideal text for high-level undergraduate courses in mathematics and physics and includes a solutions manual augmenting classroom study. It is an invaluable reference for mathematicians interested in differential and Riemannian geometry or the special and general theories of relativity.

**Explorations in Mathematical Physics**

2006-11-30 one of the problems facing mathematics and physics is that mathematicians and physicists speak languages that the others find hard to understand. These notes take a fundamental part of physics, the special theory of relativity, and describe it in terms that can be understood by mathematics students who have studied the two basic undergraduate topics linear algebra and multivariable calculus. It gives a full description of the geometry of space-time and the foundations of the theory of electromagnetism in terms that they are familiar with.

**The Geometry of Spacetime**

2013-03-09 it is an ideal companion for courses such as mathematical methods of physics, classical mechanics, electricity and magnetism, and relativity. Gary White, editor of the Physics Teacher, American Journal of Physics.

**Tensor Calculus Step by Step: from Dual Bases to General Relativity**

2021-09-17

**Differential Geometry and Relativity Theory**

2017-10-19

**The Special Theory Of Relativity For Mathematics Students**

1990-07-05

**Tensor Calculus for Physics**

2015