The Mathematical Theory Of Special And General Relativity

Einstein's Space-TimeDifferential Geometry and General RelativityFUNDAMENTALS OF SPECIAL AND GENERAL RELATIVITY, Revised EditionSpecial and General RelativityGravitation and CosmologyElements of General RelativityGeneral RelativityThe Geometry of SpacetimeGeneral RelativityA First Course in General RelativityEinstein, Hilbert, and The Theory of GravitationRelativitySpecial & General Relativity (Concise Edition)General Relativity and CosmologySpecial and General RelativityGeneral RelativityThe Perfect TheoryThe Physical and Mathematical Foundations of the Theory of RelativityRelativityRelativity The Special and General Theory: The Special Theory Rafael Ferraro Canbin Liang KRORI, K. D. Norman K. Glendenning Steven Weinberg Piotr T. Chruściel Robert M. Wald James J. Callahan M. P. Hobson Bernard F. Schutz Jagdish Mehra Albert Einstein Albert Einstein SUSHIL KUMAR SRIVASTAVA Rainer Dick Norbert Straumann Pedro G. Ferreira Antonio Romano Albert Einstein Albert Einstein

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this excellent textbook offers a unique take on relativity theory setting it in its historical context ideal for those interested in relativity and the history of physics the book contains a complete account of special relativity that begins with the historical analysis of the reasons that led to a change in our view of space and time its aim is to foster a deep understanding of relativistic spacetime and its consequences for dynamics

this book the first in a three volume set explains general relativity using the mathematical tool of differential geometry the book consists of ten chapters the first five of which introduce differential geometry which is widely applicable even outside the field of relativity chapter 6 analyzes special relativity using geometric language in turn the last four chapters introduce readers to the fundamentals of general relativity intended for beginners this volume includes numerous exercises and worked out example in each chapter to facilitate the learning experience chiefly written for graduate level courses the book s content will also benefit upper level undergraduate students and can be used as a reference guide for practicing theoretical physicists

relativity apart from quantum mechanics is the greatest wonder in science unfolded single handedly in the 20th century by albert einstein the scientist developed general relativity as a logical sequel to special relativity this comprehensive book presents explication of the conceptual evolution and mathematical derivations of the theories of special and general relativity the book follows an einsteinian approach while explaining the concepts and the theories of relativity divided into 14 chapters the revised edition of the book covers elementary concepts of special relativity as well as the advanced studies on general relativity the recent theories like kerr geometry sagnac effect vaidya geometry raychaudhuri equation and gravitation physics vis à vis quantum physics are presented in easy to understand language and simple style in addition to it the book gives an in depth analysis on the applications of advanced theories like vaidya krori barua solution from author s own research works apart from that the book also discusses some of the isotropic and anisotropic cosmological models in detail the salient topics discussed in the revised edition of the book are extrinsic curvature detection of gravitational waves early universe evolution of a dead star into a white dwarf or a neutron star or a black hole dark matter and dark energy this

book is intended for the undergraduate and postgraduate students of physics and mathematics key features step by step derivation of equations easy demagogic approach review questions to widen the analytical understanding of the students

special and general relativity are concisely developed together with essential aspects of nuclear and particle physics problem sets are provided for many chapters making the book ideal for a course on the physics of white dwarf and neutron star interiors norman k glendenning is senior scientist emeritus at the nuclear science division institute for nuclear and particle astrophysics lawrence berkeley national laboratory at the university of california berkeley he is the author of numerous books

a leading physicist delves into relativity and experimental applications gravitation and cosmology principles and applications of the general theory of relativity offers a nobel laureate s perspectives on the wealth of data technological developments have brought to expand upon einstein s theory unique in basing relativity on the principle of equivalence of gravitation and inertia over riemannian geometry this book explores relativity experiments and observational cosmology to provide a sound foundation upon which analyses can be made covering special and general relativity tensor analysis gravitation curvature and more this book provides an engaging insightful introduction to the forces that shape the universe

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 geometry 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

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

in 1905 albert einstein offered a revolutionary theory special relativity to explain some of the most troubling problems in current physics concerning electromagnetism and motion soon afterwards hermann minkowski recast special relativity essentially as a new geometric structure for spacetime these ideas are the subject of the first part of the book the second part develops the main implications of einstein s general relativity as a theory of gravity rooted in the differential geometry of surfaces the author explores the way an individual observer views the world and how a pair of observers collaborates to gain objective knowledge of the world he has tried to encompass both the general and special theory by using the geometry of spacetime as the unifying theme of the book to read it one needs only a first course in linear algebra and multivariable calculus and familiarity with the physical applications of calculus

general relativity an introduction for physicists provides a clear mathematical introduction to einstein s theory of general relativity it presents a wide range of applications of the theory concentrating on its physical consequences after reviewing the basic concepts the authors present a clear and intuitive discussion of the mathematical background including the necessary tools of tensor calculus and differential geometry these tools are then used to develop the topic of special relativity and to discuss electromagnetism in minkowski spacetime gravitation as spacetime curvature is then introduced and the field equations of general relativity derived after applying the theory to a wide range of physical situations the book concludes with a brief discussion of classical field theory and the derivation of general relativity from a variational principle written for advanced undergraduate and graduate

students this approachable textbook contains over 300 exercises to illuminate and extend the discussion in the text

this textbook develops general relativity and its associated mathematics from a minimum of prerequisites leading to a physical understanding of the theory in some depth

some time ago i published a small piece dealing with a charming little essay on the state of ether in magnetic fields which the sixteen year old einstein had written while he was awaiting admission to the e t h in zurich this paper sought to trace the continuity between einstein s early interest in electrodynamics and his later work on the special and general relativity theories on reading this paper professor eugene wigner asked me whether david hilbert had not independently discovered the field equations of gravitation his impression from his stay in gottingen where wigner had been hilbert s assistant for one year in the late nineteen twenties was that hilbert had indeed done so and he asked me if it was true i replied to professor wigner about hilbert s contribution to the theory of gravitation t he kindly encouraged me to expand my account to deal with the intricate and exciting details of the early years in the formulation of the general relativity theory of gravitation this is what i have sought to do in this study albert einstein created the general relativity theory of gravitation and dominated its development through the rest of his life his early work on the theory of gravitation from 1912 to 1916 had the drama of high adventure it culminated in the establishment of its foundations which have remained unassailed by the theoretical and experimental work of succeeding decades

the nobel prize winning physicist presents his views on the special and general theory of relativity and the universe as a whole in an accessible introduction to his seminal theories written for the non scientist

einstein s pioneering work helped shape the cultural landscape of the world today now in a digestible pocket format for the modern reader a new popular edition with a clear introduction special general relativity by albert einstein contains his core paper relativity the special the general theory a popular exposition which established his reputation as one of the greatest thinkers of our and perhaps any age also included are two of the princeton university lectures he gave to explain his findings in more detail on the meaning of relativity as well as the early paper which led to his famous equation e mc2 the flame tree foundations series features core publications which together have shaped the cultural landscape of the modern world with cutting edge research distilled into pocket guides designed to be both accessible and informative

the general theory of relativity and its applications to cosmology requires very deep understanding of mathematics and physics keeping this in mind this self contained textbook is written which addresses to general relativity and cosmology in this book the attempts have been made to explain mathematicians notions in the language of a physicist primarily intended for the postgraduate students of mathematics and physics it gives equal importance to mathematical and physical aspects and thus sharpens understanding of the theory the text covers many modern concepts and current developments in gravity and cosmology including brans dicke theory higher derivative gravity kaluza klein theory with extension to higher dimensions besides pg students this book would also be useful for research scholars key features highlights special features of general relativity and cosmology discusses structure formation in the universe inflationary models and dark energy models with special focus on basic concepts provides problems at the end of each chapter to stimulate thinking reveals interconnections between required mathematical concepts explains how to apply mathematical concepts to physical problems discusses lagrangian formulation of the field theory and action principle as it provides a powerful tool to derive field equations and energy momentum tensor components

this book provides a concise introduction to both the special theory of relativity and the general theory of relativity the format is chosen to provide the basis for a single semester course which can take the students all the way from the foundations of special relativity to the core results of general relativity the einstein equation and the equations of motion for particles and light in curved spacetime to facilitate access to the topics of special and general relativity for science and engineering students without prior training in relativity or geometry the relevant geometric notions are also introduced and developed from the ground up students in physics mathematics or engineering with an interest to learn einstein s theories of relativity should be able to use this book already in the second semester of their third year

the book could also be used as the basis of a graduate level introduction to relativity for students who did not learn relativity as part of their undergraduate training

the foundations are thoroughly developed together with the required mathematical background from differential geometry developed in part iii the author also discusses the tests of general relativity in detail including binary pulsars with much space is devoted to the study of compact objects especially to neutron stars and to the basic laws of black hole physics this well structured text and reference enables readers to easily navigate through the various sections as best matches their backgrounds and perspectives whether mathematical physical or astronomical very applications oriented the text includes very recent results such as the supermassive black hole in our galaxy and first double pulsar system

one of the best popular accounts of how einstein and his followers have been trying to explain the universe for decades kirkus reviews starred review physicists have been exploring debating and questioning the general theory of relativity ever since albert einstein first presented it in 1915 this has driven their work to unveil the universe s surprising secrets even further and many believe more wonders remain hidden within the theory s tangle of equations waiting to be exposed in this sweeping narrative of science and culture an astrophysicist brings general relativity to life through the story of the brilliant physicists mathematicians and astronomers who have taken up its challenge for these scientists the theory has been both a treasure trove and an enigma einstein s theory which explains the relationships among gravity space and time is possibly the most perfect intellectual achievement of modern physics yet studying it has always been a controversial endeavor relativists were the target of persecution in hitler s germany hounded in stalin s russia and disdained in 1950s america even today phd students are warned that specializing in general relativity will make them unemployable still general relativity has flourished delivering key insights into our understanding of the origin of time and the evolution of all the stars and galaxies in the cosmos its adherents have revealed what lies at the farthest reaches of the universe shed light on the smallest scales of existence and explained how the fabric of reality emerges dark matter dark energy black holes and string theory are all progeny of einstein s theory in the midst of a momentous transformation in modern physics as scientists look farther and more clearly into space than ever before the perfect theory exposes the greater relevance of general relativity showing us where it started where it has led and where it can still take us

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

relativity the special and general theory this is an introduction to einstein s space bending time stretching theory of relativity written by the master himself special and general relativity explain the structure of space time and provide a theory of gravitation respectively einstein s theories shocked the world with their counterintuitive results including the dissolution of absolute time in this book he brings a simplified form of his profound understanding of the subject to the layperson in the words of einstein the present book is intended as far as possible to give an exact insight into the theory of relativity to those readers who from a general scientific and philosophical point of view are interested in the theory but who are not conversant with the mathematical apparatus of theoretical physics the book is challenging at

times but when approached patiently proves itself one of the most lucid explanations of relativity to be found anywhere

that s relativity dealing with the theory of relativity special relativity and general relativity and the considerations of the universe as a whole this book gives an insight into the scientific theory about the relationship between space and time the theory of gravitation and the universe a nobel laureate einstein s research and theories changed the world first published in 1916 relativity the special and the general theory is regarded as the most significant work in modern physics it continues to remain popular and highly influential selected stories of honoré de balzac by honoré de balzac in this collection honoré de balzac presents a selection of his acclaimed short stories showcasing his incredible talent for vivid storytelling and character development with its rich language and engaging narratives this book is a must read for fans of classical literature key aspects of the book selected stories of honoré de balzac collection of short stories the book features a collection of acclaimed short stories by honoré de balzac vivid storytelling and character development the stories showcase balzac s incredible talent for vivid storytelling and character development useful for literature enthusiasts the book is useful for fans of classical literature and those interested in the works of balzac honoré de balzac was a french novelist and playwright who is regarded as one of the greatest writers of western literature his book selected stories of honoré de balzac is highly regarded for its captivating storytelling and rich language

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