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Problems And Solutions In Special Relativity And Electromagnetism 2017-07-27

field theory is an important topic in theoretical physics which is studied in the physical and physico mathematical departments of universities therefore lecturers are faced with the urgent task of not only providing students with information about the subject but also to help them master the material at a deep qualitative level by presenting the specific features of general approaches to the statement and the solution of problems in theoretical physics one of the ways to study field theory is the practical one where the students can deepen their knowledge of the theoretical material and develop problem solving skills this book includes a concise theoretical summary of the main branches of field theory and electrodynamics worked examples and some problems for the student to solve the book is written for students of theoretical and applied physics and corresponds to the curricula of the theoretical courses field theory and electrodynamics for physics undergraduates it can also be useful for students of other disciplines in particular those in which physics is one of the base subjects

Special Relativity 2010-05-17

writing a new book on the classic subject of special relativity on which numerous important physicists have contributed and many books have already been written can be like adding another epicycle to the ptolemaic cosmology furthermore it is our belief that if a book has no new elements but simply repeats what is written in the existing literature perhaps with a different style then this is not enough to justify its publication however after having spent a number of years both in class and research with relativity i have come to the conclusion that there exists a place for a new book since it appears that somewhere along the way mathematics may have obscured and prevailed to the degree that we tend to teach relativity and i believe theoretical physics simply using heavier mathematics without the inspiration and the mastery of the classic physicists of the last century moreover current trends encourage the application of techniques in producing quick results and not tedious conceptual approaches resulting in long lasting reasoning on the other hand physics cannot be done a la carte stripped from philosophy or to put it in a simple but dramatic context a building is not an accumulation of stones as a result of the above a major aim in the writing of this book has been the distinction between the mathematics of minkowski space and the physics of relativity

Special Relativity, Tensors, And Energy Tensor: With Worked Problems 2021-03-02

this book takes the reader from the preliminary ideas of the special theory of relativity straight to the doorsteps of the general theory of relativity the first part explains the main concepts in a layman's language including straight the lorentz transformation relativistic mechanics thereafter the concept of tensors is built up in detail especially maxwell's stress tensor with illustrative examples culminating in the energy momentum conservation in electromagnetic fields mathematical structure of minkowski's space time is constructed and explained graphically the equation of motion is formulated and then illustrated by the example of relativistic rocket the principle of covariance is explained with the covariant equations of classical electrodynamics finally the book constructs the energy tensor which constitutes the source term in einstein's field equation which clears the passage to the gtr in the book the concepts of tensors are developed carefully and a large number of numerical examples taken from atomic and nuclear physics the graphs of important equations are included this is suitable for studies in classical electrodynamics

Introduction to General Relativity 2017-06-16

it is important for every physicist today to have a working knowledge of einstein s theory of general relativity introduction to general relativity published in 2007 was aimed at first year graduate students or advanced undergraduates in physics only a basic understanding of classical lagrangian mechanics is assumed beyond that the reader should find the material to be self contained the mechanics problem of a point mass constrained to move without friction on a two dimensional surface of arbitrary shape serves as a paradigm for the development of the mathematics and physics of general relativity special relativity is reviewed the basic principles of general relativity are then presented and the most important applications are discussed the final special topics section takes the reader up to a few areas of current research an extensive set of accessible problems enhances and extends the coverage as a learning and teaching tool this current book provides solutions to those problems this text and solutions manual are meant to provide an introduction to the subject it is hoped that these books will allow the reader to approach the more advanced texts and monographs as well as the continual influx of fascinating new experimental results with a deeper understanding and sense of appreciation

Problem Book in Relativity and Gravitation 1975-12-21

the authors have attempted to convey a mode of approach to these kinds of problems revealing procedures that can reduce the labor of calculations while avoiding the pitfall of too much or too powerful formalism

Problems and Solutions on Solid State Physics, Relativity and Miscellaneous Topics 1995

crystal structures and properties 1001 1027 electron theory energy bands and semiconductors 1028 1051 electromagnetic properties optical properties and superconductivity 1052 1076 other topics 1077 1081 special relativity 2001 2007 general relativity 2008 2023 relativistic cosmology 2024 2028 history of physics and general questions 3001 3025 measurements estimations and errors 3026 3048 mathematical techniques 3049 3056

Particular Problems of Special Relativity Theory 2002

this book provides a thorough discussion of the concepts and main consequences of special relativity treated in detail are the lorentz transformations their kinematical consequences the so called paradoxes relativistic mechanics electrodynamics as an example of a relativistic field theory and the principal features of relativistic hydrodynamics the book offers a logical development of special relativity from einstein s principle of relativity alone arrives at the essential statements of the theory by a direct approach this emphasis is different from that of most books and offers a concise introduction to tensor calculus as needed in special relativity a selection of problems and documentation of the experimental tests of special relativity are given

Special Relativity 1990-01-01

this textbook offers a concise but thorough treatment of the theory of special relativity for advanced undergraduate and beginning graduate students assuming no prior knowledge of relativity the author elaborates the underlying logic and describes the subtleties and apparent paradoxes the text also contains a large number of problems which cover the basic modes of thinking and calculating in special relativity emphasis is placed on developing the student's intuitive understanding of space time geometry along with the necessary methods of four tensor calculus though three dimensional methods are also described this updated new edition contains additional examples and problems and the chapter on relativistic mechanics of continua has been substantially rewritten

Problem Book in Relativity and Gravitation 1975

a textbook neutral problems and solutions book that complements any relativity textbook at advanced undergraduate or masters level

Unsolved Problems in Special and General Relativity 2013

in order to equip hopeful graduate students with the knowledge necessary to pass the qualifying examination the authors have assembled and solved standard and original problems from major american universities boston university university of chicago university of colorado at boulder columbia university of maryland university of michigan michigan state michigan tech mit princeton rutgers stanford stony brook university of wisconsin at madison and moscow institute of physics and technology a wide range of material is covered and comparisons are made between similar problems of different schools to provide the student with enough information to feel comfortable and confident at the exam guide to physics problems is published in two volumes this book part 1 covers mechanics relativity and electrodynamics part 2 covers thermodynamics statistical mechanics and quantum mechanics praise for a guide to physics problems part 1 mechanics relativity and electrodynamics sidney cahn and boris nadgorny have energetically collected and presented solutions to about 140 problems from the exams at many universities in the united states and one university in russia the moscow institute of physics and technology some of the problems are quite easy others are quite tough some are routine others ingenious from the foreword by c n yang nobelist in physics 1957 generations of graduate students will be grateful for its existence as they prepare for this major hurdle in their careers r shankar yale university the publication of the volume should be of great help to future candidates who must pass this type of exam j robert schrieffer nobelist in physics 1972 i was positively impressed the book will be useful to students who are studying for their examinations and to faculty who are searching for appropriate problems m l cohen university of california at berkeley if a student understands how to solve these problems they have gone a long way toward mastering the subject matter martin olsson university of wisconsin at madison this book will become a necessary study guide for graduate students while they prepare for their ph d examination it will become equally useful for the faculty who write the questions g d mahan university of tennessee at knoxville

Introduction to Special Relativity 1982

general relativity is a theory proposed by einstein in 1915 as a unified theory of space time and gravitation it is based on and extends newton's theory of gravitation as well as newton's equations of motion it is thus fundamentally rooted in classical mechanics the theory can be seen as a development of

riemannian geometry itself an extension of gauss intrinsic theory of curved surfaces in euclidean space the domain of application of the theory is astronomical systems one of the mathematical methods analyzed and exploited in the present volume is an extension of noether's fundamental principle connecting symmetries to conserved quantities this is involved at a most elementary level in the very definition of the notion of hyperbolicity for an euler lagrange system of partial differential equations another method the study and systematic use of foliations by characteristic null hypersurfaces is in the spirit of roger penrose's approach in his incompleteness theorem the methods have applications beyond general relativity to problems in fluid mechanics and more generally to the mechanics and electrodynamics of continuous media the book is intended for advanced students and researchers seeking an introduction to the methods and applications of general relativity

300 Problems in Special and General Relativity 2021-12-09

this collection contains survey articles dealing with the following topics the mach principle and its role in the general theory of relativity the modern conception of the vacuum new methods in the theory of lie group representations the coherent state method and its application to physical problems and the newman penrose method and its application to problems in general relativity theory

A Guide to Physics Problems 1994-08-31

this book provides a calculus based perspective on classical mechanics and the theory of relativity unlike most conventional textbooks the discussion on theory is pared down to a minimum in favor of detailed guided solutions of problems illustrating salient points subtleties and principles by working through the 900 carefully selected problems the serious learner will hence be stimulated challenged and enlightened great emphasis is placed on the pedagogical value of solving problems in a number of ways on the careful and detailed analysis of problems on dimensional considerations and on basic principles underlying every topic treated the book is aimed at first year undergraduate students in physics and engineering advanced placement students in high schools will also find this book rewarding and challenging instructors too will be able to recharge their batteries and refresh their reservoir of problems for recitation classes or delve into it for their own amusement and edification

Mathematical Problems of General Relativity I 2008

the aim of this textbook is to present in a comprehensive way several advanced topics of general relativity including gravitational waves tests of general relativity time delay spinors in curved spacetime hawking radiation and geodetic precession to mention a few these are all important topics in today's research activities from both a theoretical and experimental point of view this textbook is designed for advanced undergraduate and graduate students to strengthen the knowledge acquired during the core courses on general relativity the author developed the book from a series of yearly lectures with the intention of offering a gentle introduction to the field this book helps understanding the more specialized literature and can be used as a first reading to get quickly into the field when starting research chapter end exercises complete the learning material to master key concepts

Problems in the General Theory of Relativity and Theory of

Group Representations 2012-12-06

this volume is a comprehensive compilation of carefully selected questions at the phd qualifying exam level including many actual questions from columbia university university of chicago mit state university of new york at buffalo princeton university university of wisconsin and the university of california at berkeley over a twenty year period featuring a division into the three parts which form the title topics covered in this book include the crystal structure superconductivity general relativity special relativity and measurements among many others this latest edition has been updated new problems and solutions have been added while the original problems are modernized excluding outdated questions and emphasizing those that rely on calculations the problems range from fundamental to advanced in a wide range of topics easily enhancing the student's knowledge through workable exercises simple to solve problems play a useful role as a first check of the student's level of knowledge whereas difficult problems will challenge the student's capacity on finding solutions

Classical And Relativistic Mechanics 2009-06-30

in most undergraduate physics classes special relativity is taught from a simplistic point of view using newtonian concepts rather than the relativistic way of thinking this results in students often finding it difficult to understand properly the new approach new ideas and consequently to solve relativistic problems furthermore a number of books treat the theory using advanced mathematics which is not necessary for the first approach to the theory this book is intended to serve two roles a to treat a student in a systematic constructive way to the basic structure of the theory and b to provide a large number of solved in detail problems in the kinematics and dynamics of special relativity concerning the first aim the book introduces the basics of four dimensional mathematics i e lorentz metric relativistic tensors and prepares through working examples the transition to general relativity which requires besides the relativistic concepts the use of differential geometry and tensor analysis the presentation is concise and does not replace a book on special relativity concerning the second intention the large number of problems provides the necessary material which can be used in order to familiarize the student with the relativistic world these problems can be used in the class by the teachers either as working examples or as problem sheets it will be our pleasure if the book will be useful to both students and teachers

Applications of General Relativity 2022-03-11

this book gives an excellent introduction to the theory of special relativity professor resnick presents a fundamental and unified development of the subject with unusually clear discussions of the aspects that usually trouble beginners he includes for example a section on the common sense of relativity his presentation is lively and interspersed with historical philosophical and special topics such as the twin paradox that will arouse and hold the reader's interest you'll find many unique features that help you grasp the material such as worked out examples summary tables thought questions and a wealth of excellent problems the emphasis throughout the book is physical the experimental background experimental confirmation of predictions and the physical interpretation of principles are stressed the book treats relativistic kinematics relativistic dynamics and relativity and electromagnetism and contains special appendices on the geometric representation of space time and on general relativity its organization permits an instructor to vary the length and depth of his treatment and to use the book either with or following classical physics these features make it an ideal companion for introductory courses

Problems And Solutions On Solid State Physics, Relativity And Miscellaneous Topics (Second Edition) 2024-03-14

the book opens with a description of the smooth transition from newtonian to einsteinian behaviour from electrons as their energy is progressively increased and this leads directly to the relativistic expressions for mass momentum and energy of a particle

Solved Problems and Systematic Introduction to Special Relativity 2023-07-30

this book first appearing in german in 2004 under the title spezielle relativitätstheorie für studienanfänger offers access to the special theory of relativity for readers with a background in mathematics and physics comparable to a high school honors degree all mathematical and physical competence required beyond that level is gradually developed through the book as more advanced topics are introduced the full tensor formalism however is dispensed with as it would only be a burden for the problems to be dealt with eventually a substantial and comprehensive treatise on special relativity emerges which with its gray shaded formulary is an invaluable reference manual for students and scientists alike some crucial results are derived more than once with different approaches the lorentz transformation in one spatial direction three times the doppler formula four times the lorentz transformation in two directions twice also twice the unification of electric and magnetic forces the velocity addition formula as well as the aberration formula beginners will be grateful to find several routes to the goal moreover for a theory like relativity it is of fundamental importance to demonstrate that it is self contained and without contradictions author s website relativity ch

Introduction to Special Relativity 1991-01-16

this book is intended for undergraduate and graduate students in physics engineering astronomy applied mathematics and for researchers working in related subjects it is an excellent study tool for those students who would like to work independently on more electrodynamics problems in order to deepen their understanding and problem solving skills the book discusses main concepts and techniques related to maxwell s equations potentials and fields including liénard wiechert potentials electromagnetic waves and the interaction and dynamics of charged point particles it also includes content on magnetohydrodynamics and plasma radiation and antennas special relativity relativistic kinematics relativistic dynamics and relativistic covariant dynamics and general theory of relativity it contains a wide range of problems ranging from electrostatics and magnetostatics to the study of the stability of dynamical systems field theories and black hole orbiting the book even contains interdisciplinary problems from the fields of electronics elementary particle theory antenna design detailed step by step calculations are presented meeting the need for a thorough understanding of the reasoning and steps of the calculations by all students regardless of their level of training additionally numerical solutions are also proposed and accompanied by adjacent graphical representations and even multiple methods of solving the same problem it is structured in a coherent and unified way having a deep didactic character being thus oriented towards a university environment where the transmission of knowledge in a logical unified and coherent way is essential it teaches students how to think about and how to approach solving electrodynamics problems contains a wide range of problems and applications from the fields of electrodynamics and the theory of special relativity presents numerical solutions to problems involving nonlinearities details command lines specific to mathematica software dedicated to both analytical and

numerical calculations which allows readers to obtain the numerical solutions as well as the related graphical representations

Special Relativity 2017-07-12

proceedings of the nato advanced research workshop toulouse france november 7 11 1983

Special Relativity For Beginners: A Textbook For Undergraduates 2008-04-07

lorentz transformations and invariants choice of a system of units some practical examples for the use of invariants the lorentz transformation to the rest system of an arbitrary particle the transformation of differential cross sections jacobian determinants variables and coordinate systems frequently used in elastic scattering phase space considerations short considerations on relativistic notation precession of a polarization of spin 1 2 particles moving in an electromagnetic field

Solved Problems in Classical Electrodynamics and Theory of Relativity 2023-11-23

the general theory of relativity a mathematical exposition will serve readers as a modern mathematical introduction to the general theory of relativity throughout the book examples worked out problems and exercises with hints and solutions are furnished topics in this book include but are not limited to tensor analysis the special theory of relativity the general theory of relativity and einstein's field equations spherically symmetric solutions and experimental confirmations static and stationary space time domains black holes cosmological models algebraic classifications and the newman penrose equations the coupled einstein maxwell klein gordon equations appendices covering mathematical supplements and special topics mathematical rigor yet very clear presentation of the topics make this book a unique text for both university students and research scholars anadijiban das has taught courses on relativity theory at the university college of dublin ireland jadavpur university india carnegie mellon university usa and simon fraser university canada his major areas of research include among diverse topics the mathematical aspects of general relativity theory andrew debenedictis has taught courses in theoretical physics at simon fraser university canada and is also a member of the pacific institute for the mathematical sciences his research interests include quantum gravity classical gravity and semi classical gravity

Problems of Collapse and Numerical Relativity 2012-12-06

intended for advanced undergraduates and beginning graduate students this text is based on the highly successful course given by walter greiner at the university of frankfurt germany the two volumes on classical mechanics provide not only a complete survey of the topic but also an enormous number of worked examples and problems to show students clearly how to apply the abstract principles to realistic problems

Relativistic Kinematics 1963

the general theory of relativity is a theory of manifolds equipped with lorentz metrics and fields which describe the matter content einstein's equations equate the einstein tensor a curvature quantity associated with the lorentz metric with the stress energy tensor an object constructed using the matter fields in addition there are equations describing the evolution of the matter using symmetry as a guiding principle one is naturally led to the schwarzschild and friedmann lemaître robertson walker solutions modelling an isolated system and the entire universe respectively in a different approach formulating einstein's equations as an initial value problem allows a closer study of their solutions this book first provides a definition of the concept of initial data and a proof of the correspondence between initial data and development it turns out that some initial data allow non isometric maximal developments complicating the uniqueness issue the second half of the book is concerned with this and related problems such as strong cosmic censorship the book presents complete proofs of several classical results that play a central role in mathematical relativity but are not easily accessible to those without prior background in the subject prerequisites are a good knowledge of basic measure and integration theory as well as the fundamentals of lorentz geometry the necessary background from the theory of partial differential equations and lorentz geometry is included

The General Theory of Relativity 2012-06-26

the main goal of this work is to revisit the proof of the global stability of minkowski space by d christodoulou and s klainerman ch ki we provide a new self contained proof of the main part of that result which concerns the full solution of the radiation problem in vacuum for arbitrary asymptotically flat initial data sets this can also be interpreted as a proof of the global stability of the external region of schwarzschild spacetime the proof which is a significant modification of the arguments in ch kl is based on a double null foliation of spacetime instead of the mixed null maximal foliation used in ch kl this approach is more naturally adapted to the radiation features of the einstein equations and leads to important technical simplifications in the first chapter we review some basic notions of differential geometry that are systematically used in all the remaining chapters we then introduce the einstein equations and the initial data sets and discuss some of the basic features of the initial value problem in general relativity we shall review without proofs well established results concerning local and global existence and uniqueness and formulate our main result the second chapter provides the technical motivation for the proof of our main theorem

Classical Mechanics 2003-12-04

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

The Cauchy Problem in General Relativity 2009

the main goal of this work is to revisit the proof of the global stability of minkowski space by d christodoulou and s klainerman ch ki we provide a new self contained proof of the main part of that result which concerns the full solution of the radiation problem in vacuum for arbitrary asymptotically flat initial data sets this can also be interpreted as a proof of the global stability of the external region of schwarzschild spacetime the proof which is a significant modification of the arguments in ch kl is based on a double null foliation of spacetime instead of the mixed null maximal foliation used in ch kl this approach is more naturally adapted to the radiation features of the einstein equations and leads to important technical simplifications in the first chapter we review some basic notions of differential geometry that are systematically used in all the remaining chapters we then introduce the einstein equations and the initial data sets and discuss some of the basic features of the initial value problem in general relativity we shall review without proofs well established results concerning local and global existence and uniqueness and formulate our main result the second chapter provides the technical motivation for the proof of our main theorem

The Evolution Problem in General Relativity 2012-12-06

relativistic cosmology has in recent years become one of the most active and exciting branches of research often considered to be today where particle physics was forty years ago with major discoveries just waiting to happen consequently the part most affected by this second edition is the last part on cosmology but there are additions improvements and new exercises throughout the book s basic purpose is unchanged it is to make relativity come alive conceptually and to display the grand theoretical edifice that it is with consequences in many branches of physics the emphasis is on the foundations on the logical subtleties and on presenting the necessary mathematics including differential geometry and tensors but always as late and in as palatable a form as possible aided by over 300 exercises the book seeks to promote an in depth understanding and the confidence to tackle any basic problem in relativity

A Mathematical Journey to Relativity 2020-06-01

this volume presents a collection of problems and solutions in differential geometry with applications both introductory and advanced topics are introduced in an easy to digest manner with the materials of the volume being self contained in particular curves surfaces riemannian and pseudo riemannian manifolds hodge duality operator vector fields and lie series differential forms matrix valued differential forms maurer cartan form and the lie derivative are covered readers will find useful applications to special and general relativity yang mills theory hydrodynamics and field theory besides the solved problems each chapter contains stimulating supplementary problems and software implementations are also included the volume will not only benefit students in mathematics applied mathematics and theoretical physics but also researchers in the field of differential geometry request inspection copy

The Evolution Problem in General Relativity 2002-12-13

university physics is a three volume collection that meets the scope and sequence requirements for two and three semester calculus based physics courses volume 1 covers mechanics sound oscillations and waves this textbook emphasizes connections between theory and application making physics concepts

interesting and accessible to students while maintaining the mathematical rigor inherent in the subject frequent strong examples focus on how to approach a problem how to work with the equations and how to check and generalize the result open textbook library

Relativity 2006-04-07

this textbook expounds the major topics in the special theory of relativity it provides a detailed examination of the mathematical foundation of the special theory of relativity relativistic mass relativistic mechanics and relativistic electrodynamics as well as covariant formulation of relativistic mechanics and electrodynamics the text discusses the relativistic effect on photons a new chapter on electromagnetic waves as well as several new problems and examples have been included in the second edition of the book using the mathematical approach the text offers graduate students a clear concise view of the special theory of relativity organized into 15 chapters and two appendices the content is presented in a logical order and every topic has been dealt with in a simple and lucid manner to aid understanding of the subject the text provides numerous relevant worked out examples in every chapter the mathematical approach of the text helps students in their independent study and motivates them to research the topic further

Problems and Solutions in Differential Geometry, Lie Series, Differential Forms, Relativity and Applications 2017-10-20

introducing general relativity an accessible and engaging introduction to general relativity for undergraduates in introducing general relativity the authors deliver a structured introduction to the core concepts and applications of general relativity the book leads readers from the basic ideas of relativity including the equivalence principle and curved space time to more advanced topics like solar system tests and gravitational wave detection each chapter contains practice problems designed to engage undergraduate students of mechanics electrodynamics and special relativity a wide range of classical and modern topics are covered in detail from exploring observational successes and astrophysical implications to explaining many popular principles like space time redshift black holes gravitational waves and cosmology advanced topic sections introduce the reader to more detailed mathematical approaches and complex ideas and prepare them for the exploration of more specialized and sophisticated texts introducing general relativity also offers structured outlines to the concepts of general relativity and a wide variety of its applications comprehensive explorations of foundational ideas in general relativity including space time curvature and tensor calculus practical discussions of classical and modern topics in relativity from space time to redshift gravity black holes and gravitational waves optional in depth sections covering the mathematical approaches to more advanced ideas perfect for undergraduate physics students who have studied mechanics dynamics and special relativity introducing general relativity is an essential resource for those seeking an intermediate level discussion of general relativity placed between the more qualitative books and graduate level textbooks

University Physics 2016-09-29

this book covers basic concepts in relativity quantum theory using a large varied set of worked examples questions and problems to illustrate key concepts relevant historical philosophical and biographical information is included

The Special Theory of Relativity 2022-04-10

this is a remarkable book arthur yaghjian is by training and profession an electrical engineer but he has a deep interest in fundamental questions usually reserved for physicists working largely in isolation he has studied the relevant papers of an enormous literature accumulated over a century the result is a fresh and novel approach to old problems and to their solution physicists since lorentz have looked at the problem of the equations of motion of a charged object primarily as a problem for the description of a fundamental particle typically an electron yaghjian considers a macroscopic object a spherical insulator with a surface charge was therefore not tempted to take the point limit and he thus avoided the pitfalls that have misguided research in this field since dirac's famous paper of 1938 perhaps the author's greatest achievement was the discovery that one does not need to invoke quantum mechanics and the correspondence principle in order to exclude the unphysical solutions runaway and preacceleration solutions rather as he discovered the derivation of the classical equations of motion from the maxwell lorentz equations is invalid when the time rate of change of the dynamical variables too large even in the relativistic case therefore solutions that show such behavior are inconsistent consequences the classical theory thus shown to be physically consistent by itself it embarrassing to say the least that this observation had not been made before

Introducing General Relativity 2022-04-14

special relativity a heuristic approach provides a qualitative exposition of relativity theory on the basis of the constancy of the speed of light using einstein's signal velocity as the defining idea for the notion of simultaneity and the fact that the speed of light is independent of the motion of its source chapters delve into a qualitative exposition of the relativity of time and length discuss the time dilation formula using the standard light clock explore the minkowski four dimensional space time distance based on how the time dilation formula is derived and define the components of the two dimensional space time velocity amongst other topics provides a heuristic derivation of the minkowski distance formula uses relativistic photography to see lorentz transformation and vector algebra manipulation in action includes worked examples to elucidate and complement the topic being discussed written in a very accessible style

Ideas of the Theory of Relativity 1974

Basic Concepts in Relativity and Early Quantum Theory 1992

Relativistic Dynamics of a Charged Sphere 2010-10-19

Special Relativity 2017-05-09

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