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Theoretical Mechanics of Particles and Continua Courier Corporation This two-part text fills what has often been a void in the first-year graduate physics curriculum. Through its examination of particles and continua, it supplies a lucid and self-contained account of classical mechanics — which in turn provides a natural framework for introducing many of the advanced mathematical concepts in physics. The text opens with Newton's laws of motion and systematically develops the dynamics of classical particles, with chapters on basic principles, rotating coordinate systems, lagrangian formalism, small oscillations, dynamics of rigid bodies, and hamiltonian formalism, including a brief discussion of the transition to quantum mechanics. This part of the book also considers examples of the limiting behavior of many particles, facilitating the eventual transition to a continuous medium. The second part deals with classical continua, including chapters on string membranes, sound waves, surface waves on nonviscous fluids, heat conduction, viscous fluids, and elastic media. Each of these self-contained chapters provides the relevant physical background and develops the appropriate mathematical techniques, and problems of varying difficulty appear throughout the text. Topics in Modern Physics Theoretical Foundations World Scientific Publishing Company While the two previous books entitled Introduction to Modern Physics: Theoretical Foundations and Advanced Modern Physics: Theoretical Foundations exposed the reader to the foundations and frontiers of today's physics, the goal of this third volume is to cover in some detail several topics omitted in the essentially linear progression of the first two. This book is divided into three parts. Part 1 is on quantum mechanics. Analytic solutions to the Schrödinger equation are developed for some basic systems. The analysis is then formalized, concluding with a set of postulates for the theory. Part 2 is on applications of quantum mechanics: approximation methods for bound states, scattering theory, time-dependent perturbation theory, and electromagnetic radiation and quantum electrodynamics. Part 3 covers some selected topics in relativistic quantum field theory: discrete symmetries, the Heisenberg picture, and the Feynman rules for quantum chromodynamics. The three volumes in this series taken together provide a clear, logical, self-contained, and comprehensive base from which the very best students can learn modern physics. When finished, readers should have an elementary working knowledge in the principal areas of theoretical physics of the twentieth century. Topics in Modern Physics Solutions to Problems World Scientific Publishing Company Our understanding of the physical world was revolutionized in the twentieth century — the era of “modern physics”. Two books by the second author entitled Introduction to Modern Physics: Theoretical Foundations and Advanced Modern Physics: Theoretical Foundations, aimed at the very best students, present the foundations and frontiers of today's physics. Many problems are included in these texts. A previous book by the current authors provides solutions to the over 175 problems in the first volume. A third volume Topics in Modern Physics: Theoretical Foundations has recently appeared, which covers several subjects omitted in the essentially linear progression in the previous two. This book has three parts: part 1 is on quantum mechanics, part 2 is on applications of quantum mechanics, and part 3 covers some selected topics in relativistic quantum field theory. Parts 1 and 2 follow naturally from the initial volume. The present book provides solutions to the over 135 problems in this third volume. The three volumes in this series, together with the solutions manuals, provide a clear, logical, self-contained, and comprehensive base from which students can learn modern physics. When finished, readers should have an elementary working knowledge in the principal areas of theoretical physics of the twentieth century. Request Inspection Copy Theoretical Mechanics of Particles and Continua McGraw-Hill Science, Engineering & Mathematics Introduction to Statistical Mechanics Solutions to Problems World Scientific Publishing Company Statistical mechanics is concerned with defining the thermodynamic properties of a macroscopic sample in terms of the properties of the microscopic systems of which it is composed. The previous book Introduction to Statistical Mechanics provided a clear, logical, and self-contained treatment of equilibrium statistical mechanics starting from Boltzmann's two statistical assumptions, and presented a wide variety of applications to diverse physical assemblies. An appendix provided an introduction to non-equilibrium statistical mechanics through the Boltzmann equation and its extensions. The coverage in that book was enhanced and extended through the inclusion of many accessible problems. The current book provides solutions to those problems. These texts assume only introductory courses in classical and quantum mechanics, as well as familiarity with multi-variable calculus and the essentials of complex analysis. Some knowledge of thermodynamics is also assumed, although the analysis starts with an appropriate review of that topic. The targeted audience is first-year graduate students and advanced undergraduates, in physics, chemistry, and the related physical sciences. The goal of these texts is to help the reader obtain a clear working knowledge of the very useful and powerful methods of equilibrium statistical mechanics and to enhance the understanding and appreciation of the more advanced texts. Nonlinear Mechanics A Supplement to Theoretical Mechanics of Particles and Continua Courier Corporation In their prior Dover book, the authors provided a self-contained account of classical mechanics; this supplement/update offers a bridge to contemporary mechanics. Topics include nonlinear continuous systems. 2006 edition. The Worldwide List of Alternative Theories and Critics Editions d Assailly This list (only available in english language) includes scientists involved in scientific fields. The 2021 issue of this directory includes the scientists found in the Internet. The scientists of the directory are only those involved in physics (natural philosophy). The list includes about 10 000 names of scientists (doctors or diploma engineers for more than 70%). Their position is shortly presented together with their proposed alternative theory when applicable. There are more than 2500 authors of such theories, all amazingly very different from one another. Ce répertoire, exclusivement disponible en langue anglaise, inclut les scientifiques, exclusivement dans le domaine de la physique. L'édition 2021 de cette liste comporte près de 10 000 noms de scientifiques, (docteurs ou ingénieurs à plus de 70%). Elle précise leur position de manière succincte et expose, le cas échéant, les lignes directrices de la solution alternative qu'ils proposent. Il y a ainsi plus de 2500 auteurs de telles théories, toutes remarquablement différentes. Introduction to Modern Physics Solutions to Problems World Scientific Publishing Company Our understanding of the physical world was revolutionized in the twentieth century — the era of “modern physics”. The book Introduction to Modern Physics: Theoretical Foundations, aimed at the very best students, presents the foundations and frontiers of today's physics. Typically, students have to wade through several courses to see many of these topics. The goal is to give them some idea of where they are going, and how things fit together, as they go along. The book focuses on the following topics: quantum mechanics; applications in atomic, nuclear, particle, and condensed-matter physics; special relativity; relativistic quantum mechanics, including the Dirac equation and Feynman diagrams; quantum fields; and general relativity. The aim is to cover these topics in sufficient depth that things “make sense” to students, and they achieve an elementary working knowledge of them. The book assumes a one-year, calculus-based freshman physics course, along with a one-year course in calculus. Several appendices bring the reader up to speed on any additional required mathematics. Many problems are included, a great number of which take dedicated readers just as far as they want to go in modern physics. The present book provides solutions to the over 175 problems in Introduction to Modern Physics: Theoretical Foundations in what we believe to be a clear and concise fashion. Rays, Waves, and Scattering Topics in Classical Mathematical Physics Princeton University Press This one-of-a-kind book presents many of the mathematical concepts, structures, and techniques used in the study of rays, waves, and scattering. Panoramic in scope, it includes discussions of how ocean waves are refracted around islands and underwater ridges, how seismic waves are refracted in the earth's interior, how atmospheric waves are scattered by mountains and ridges, how the scattering of light waves produces the blue sky, and meteorological phenomena such as rainbows and coronas. Rays, Waves, and Scattering is a valuable resource for practitioners, graduate students, and advanced undergraduates in applied mathematics, theoretical physics, and engineering. Bridging the gap between advanced treatments of the subject written for specialists and less mathematical books aimed at beginners, this unique mathematical compendium features problems and exercises throughout that are geared to various levels of sophistication, covering everything from Ptolemy's theorem to Airy integrals (as well as more technical material), and several informative appendixes. Provides a panoramic look at wave motion in many different contexts Features problems and exercises throughout Includes numerous appendixes, some on topics not often covered An ideal reference book for practitioners Can also serve as a supplemental text in classical applied mathematics, particularly wave theory and mathematical methods in physics and engineering Accessible to anyone with a strong background in ordinary differential equations, partial differential equations, and functions of a complex variable Solved Problems in Classical Mechanics Analytical and Numerical Solutions with Comments Oxford University Press simulated motion on a computer screen, and to study the effects of changing parameters. -- Wave Momentum and Quasi-Particles in Physical Acoustics World Scientific This unique volume presents an original approach to physical acoustics with additional emphasis on the most useful surface acoustic waves on solids. The study is based on foundational work of Léon Brillouin, and application of the celebrated invariance theorem of Emmy Noether to an element of volume that is representative of the wave motion. This approach provides an easy interpretation of typical wave motions of physical acoustics in bulk, at surfaces, and across interfaces, in the form of the motion of associated quasi-particles. This type of motion, Newtonian or not, depends on the wave motion considered, and on the original modeling of the continuum that supports it. After a thoughtful review of Brillouin's fundamental ideas related to radiative stresses, wave momentum and action, and the necessary reminder on modern nonlinear continuum thermomechanics, invariance theory and techniques of asymptotics, a variety of situations and models illustrates the power and richness of the approach and its strong potential in applications. Elasticity, piezoelectricity and new models of continua with nonlinearity, viscosity and some generalized features (microstructure, weak or strong nonlocality) or unusual situations (bounding surface with energy, elastic thin film glued on a surface waveguide), are considered, exhibiting thus the versatility of the approach. This original book offers an innovative vision and treatment of the problems of wave propagation in deformable solids. It opens up new horizons in the theoretical and applied facets of physical acoustics. Contents:Pro;egomena: Wave Momentum and Radiative Stresses in 1D in the Line of BrillouinElements of Continuum ThermomechanicsPseudomomentum and Eshelby StressAction, Phonons and Wave MechanicsTransmission-Reflection ProblemsApplication to Dynamic MaterialsElastic Surface Waves in Terms of Quasi-ParticlesElectroelastic Surface Waves in Terms of Quasi-ParticlesWaves Generalized Elastic ContinuaExamples of Solitonic Systems Readership: Graduate students and researchers in applied physics and mathematics, as well as accousticians. Key Features:Originality of approach to physical acousticsInnovative vision of the problem of wave propagation in deformable solidsEnriching interaction between mathematical physics and wave theoryKeywords:Waves;Physical

Acoustics; Surface Waves; Quasi-Particles; Elasticity; Invariance Theorems Computational Physics Problem Solving with Python John Wiley & Sons The use of computation and simulation has become an essential part of the scientific process. Being able to transform a theory into an algorithm requires significant theoretical insight, detailed physical and mathematical understanding, and a working level of competency in programming. This upper-division text provides an unusually broad survey of the topics of modern computational physics from a multidisciplinary, computational science point of view. Its philosophy is rooted in learning by doing (assisted by many model programs), with new scientific materials as well as with the Python programming language. Python has become very popular, particularly for physics education and large scientific projects. It is probably the easiest programming language to learn for beginners, yet is also used for mainstream scientific computing, and has packages for excellent graphics and even symbolic manipulations. The text is designed for an upper-level undergraduate or beginning graduate course and provides the reader with the essential knowledge to understand computational tools and mathematical methods well enough to be successful. As part of the teaching of using computers to solve scientific problems, the reader is encouraged to work through a sample problem stated at the beginning of each chapter or unit, which involves studying the text, writing, debugging and running programs, visualizing the results, and the expressing in words what has been done and what can be concluded. Then there are exercises and problems at the end of each chapter for the reader to work on their own (with model programs given for that purpose).

Differential Geometrical Theory of Statistics MDPI This book is a printed edition of the Special Issue "Differential Geometrical Theory of Statistics" that was published in Entropy Geometric Mechanics and Symmetry From Finite to Infinite Dimensions Oxford University Press Geometric Mechanics and Symmetry is a friendly and fast-paced introduction to the geometric approach to classical mechanics, suitable for a one- or two- semester course for beginning graduate students or advanced undergraduates. It fills a gap between traditional classical mechanics texts and advanced modern mathematical treatments of the subject. The modern geometric approach illuminates and unifies many seemingly disparate mechanical problems from several areas of science and engineering. In particular, the book concentrates on the similarities between finite-dimensional rigid body motion and infinite-dimensional systems such as fluid flow. The illustrations and examples, together with a large number of exercises, both solved and unsolved, make the book particularly useful.

The Cellular Automaton Interpretation of Quantum Mechanics Springer This book presents the deterministic view of quantum mechanics developed by Nobel Laureate Gerard 't Hooft. Dissatisfied with the uncomfortable gaps in the way conventional quantum mechanics meshes with the classical world, 't Hooft has revived the old hidden variable ideas, but now in a much more systematic way than usual. In this, quantum mechanics is viewed as a tool rather than a theory. The author gives examples of models that are classical in essence, but can be analysed by the use of quantum techniques, and argues that even the Standard Model, together with gravitational interactions, might be viewed as a quantum mechanical approach to analysing a system that could be classical at its core. He shows how this approach, even though it is based on hidden variables, can be plausibly reconciled with Bell's theorem, and how the usual objections voiced against the idea of 'superdeterminism' can be overcome, at least in principle. This framework elegantly explains - and automatically cures - the problems of the wave function collapse and the measurement problem. Even the existence of an "arrow of time" can perhaps be explained in a more elegant way than usual. As well as reviewing the author's earlier work in the field, the book also contains many new observations and calculations. It provides stimulating reading for all physicists working on the foundations of quantum theory.

Classical Mechanics Guidelines for Open Pit Slope Design CSIRO PUBLISHING Guidelines for Open Pit Slope Design is a comprehensive account of the open pit slope design process. Created as an outcome of the Large Open Pit (LOP) project, an international research and technology transfer project on rock slope stability in open pit mines, this book provides an up-to-date compendium of knowledge of the slope design processes that should be followed and the tools that are available to aid slope design practitioners. This book links innovative mining geomechanics research into the strength of closely jointed rock masses with the most recent advances in numerical modelling, creating more effective ways for predicting rock slope stability and reliability in open pit mines. It sets out the key elements of slope design, the required levels of effort and the acceptance criteria that are needed to satisfy best practice with respect to pit slope investigation, design, implementation and performance monitoring. Guidelines for Open Pit Slope Design comprises 14 chapters that directly follow the life of mine sequence from project commencement through to closure. It includes: information on gathering all of the field data that is required to create a 3D model of the geotechnical conditions at a mine site; how data is collated and used to design the walls of the open pit; how the design is implemented; up-to-date procedures for wall control and performance assessment, including limits blasting, scaling, slope support and slope monitoring; and how formal risk management procedures can be applied to each stage of the process. This book will assist in meeting stakeholder requirements for pit slopes that are stable, in regards to safety, ore recovery and financial return, for the required life of the mine.

Hamilton's Principle in Continuum Mechanics Springer Nature This revised, updated edition provides a comprehensive and rigorous description of the application of Hamilton's principle to continuous media. To introduce terminology and initial concepts, it begins with what is called the first problem of the calculus of variations. For both historical and pedagogical reasons, it first discusses the application of the principle to systems of particles, including conservative and non-conservative systems and systems with constraints. The foundations of mechanics of continua are introduced in the context of inner product spaces. With this basis, the application of Hamilton's principle to the classical theories of fluid and solid mechanics are covered. Then recent developments are described, including materials with microstructure, mixtures, and continua with singular surfaces.

Smooth Particle Applied Mechanics The State of the Art A Student's Guide to Lagrangians and Hamiltonians Cambridge University Press A concise treatment of variational techniques, focussing on Lagrangian and Hamiltonian systems, ideal for physics, engineering and mathematics students.

Thermal Physics and Thermal Analysis From Macro to Micro, Highlighting Thermodynamics, Kinetics and Nanomaterials Springer Features twenty-five chapter contributions from an international array of distinguished academics based in Asia, Eastern and Western Europe, Russia, and the USA. This multi-author contributed volume provides an up-to-date and authoritative overview of cutting-edge themes involving the thermal analysis, applied solid-state physics, micro- and nano-crystallinity of selected solids and their macro- and microscopic thermal properties. Distinctive chapters featured in the book include, among others, calorimetry time scales from days to microseconds, glass transition phenomena, kinetics of non-isothermal processes, thermal inertia and temperature gradients, thermodynamics of nanomaterials, self-organization, significance of temperature and entropy.

Advanced undergraduates, postgraduates and researchers working in the field of thermal analysis, thermophysical measurements and calorimetry will find this contributed volume invaluable. This is the third volume of the triptych volumes on thermal behaviour of materials; the previous two receiving thousand of downloads guaranteeing their worldwide impact.

Fluid Mechanics Landau and Lifshitz: Course of Theoretical Physics Elsevier Fluid Mechanics, Second Edition deals with fluid mechanics, that is, the theory of the motion of liquids and gases. Topics covered range from ideal fluids and viscous fluids to turbulence, boundary layers, thermal conduction, and diffusion. Surface phenomena, sound, and shock waves are also discussed, along with gas flow, combustion, superfluids, and relativistic fluid dynamics. This book is comprised of 16 chapters and begins with an overview of the fundamental equations of fluid dynamics, including Euler's equation and Bernoulli's equation. The reader is then introduced to the equations of motion of a viscous fluid; energy dissipation in an incompressible fluid; damping of gravity waves; and the mechanism whereby turbulence occurs. The following chapters explore the laminar boundary layer; thermal conduction in fluids; dynamics of diffusion of a mixture of fluids; and the phenomena that occur near the surface separating two continuous media. The energy and momentum of sound waves; the direction of variation of quantities in a shock wave; one- and two-dimensional gas flow; and the intersection of surfaces of discontinuity are also considered. This monograph will be of interest to theoretical physicists.

Introduction to the Mechanics of a Continuous Medium Quantum Field Theory Cambridge University Press Quantum field theory is the basic mathematical framework that is used to describe elementary particles. This textbook provides a complete and essential introduction to the subject. Assuming only an undergraduate knowledge of quantum mechanics and special relativity, this book is ideal for graduate students beginning the study of elementary particles. The step-by-step presentation begins with basic concepts illustrated by simple examples, and proceeds through historically important results to thorough treatments of modern topics such as the renormalization group, spinor-helicity methods for quark and gluon scattering, magnetic monopoles, instantons, supersymmetry, and the unification of forces. The book is written in a modular format, with each chapter as self-contained as possible, and with the necessary prerequisite material clearly identified. It is based on a year-long course given by the author and contains extensive problems, with password protected solutions available to lecturers at www.cambridge.org/9780521864497.

Thermodynamics And Statistical Mechanics World Scientific This book provides a comprehensive exposition of the theory of equilibrium thermodynamics and statistical mechanics at a level suitable for well-prepared undergraduate students. The fundamental message of the book is that all results in equilibrium thermodynamics and statistical mechanics follow from a single unprovable axiom — namely, the principle of equal a priori probabilities — combined with elementary probability theory, elementary classical mechanics, and elementary quantum mechanics.

Continuum Mechanics and Thermodynamics From Fundamental Concepts to Governing Equations Cambridge University Press Treats subjects directly related to nonlinear materials modeling for graduate students and researchers in physics, materials science, chemistry and engineering.

The Non-Linear Field Theories of Mechanics Springer Science & Business Media Non-Linear Field Theories of Mechanics has become a classic treatise in the field of continuum mechanics. Originally published nearly forty years ago, it probably has influenced practically all subsequent monographs on the subject. Its main parts are: - The General Theory of Material Behavior - Elasticity - Fluidity This third edition includes the corrections made by the late C. Truesdell in his personal copy. It is annotated by W. Noll and by S. Antman who describe the monograph's genesis and the impact it has made on the modern development of mechanics. Originally published as Volume III/3 of the famous Encyclopedia of Physics in 1965, this book describes and summarizes "everything that was both known and worth knowing in the field at the time." It also greatly contributed to the unification and standardization of the concepts, terms and notations in the field.

New Science Theory and On The Magnet Lulu.com The first book is basically the New-Science-Theory.com site as on 24 April 2017, for changes since then visit the website with its Sitemap noting updates. It is especially good for those interested in physics theory, concentrating chiefly on the four great physicists William Gilbert, Rene Descartes, Isaac Newton and Albert Einstein - and also having fine sections on Galileo, Kepler, History of Science, Gravity, Light, String Theory, Standard Model Physics, Probability Science, Philosophy of Science and General Image Theory Science. The second book is a new improved English translation of William Gilbert's banned Latin 1600 'De Magnete' or 'On The Magnet'. This is rather easier to read than its two earlier translations, and significantly helps to clarify Gilbert's 'attraction' physics which Newton put as one of the two mathematized physics options and which he is believed to have privately favoured. It is basically a novel signal-response or remote-control physics that may still have relevance.

Dynamics, Strength of Materials and Durability in Multiscale Mechanics Springer Nature This book reviews the mathematical modeling and experimental study of systems involving two or more different length scales. The effects of phenomena occurring at the lower length scales on the behavior at higher scales are of intrinsic scientific interest, but can also be very effectively used to determine the behavior at higher length scales or at the macro-level. Efforts to exploit this micro- and macro-coupling are, naturally, being pursued with regard to every aspect of mechanical phenomena. This book focuses on the changes imposed on the dynamics, strength of materials and durability of mechanical systems by related multiscale phenomena. In particular, it addresses: 1: the impacts of effective dissipation due to kinetic energy trapped at lower scales 2: wave propagation in generalized continua 3: nonlinear phenomena in metamaterials 4: the formalization of more general models to describe the exotic behavior of meta-materials 5: the design and study of microstructures aimed at increasing the toughness and durability of novel materials

Classical Theory of Gauge Fields Princeton University Press Based on a highly regarded lecture course at Moscow State University, this is a clear and systematic introduction to gauge field theory. It is unique in providing the means to master gauge field theory prior to the advanced study of quantum mechanics. Though gauge field theory is typically included in

courses on quantum field theory, many of its ideas and results can be understood at the classical or semi-classical level. Accordingly, this book is organized so that its early chapters require no special knowledge of quantum mechanics. Aspects of gauge field theory relying on quantum mechanics are introduced only later and in a graduated fashion--making the text ideal for students studying gauge field theory and quantum mechanics simultaneously. The book begins with the basic concepts on which gauge field theory is built. It introduces gauge-invariant Lagrangians and describes the spectra of linear perturbations, including perturbations above nontrivial ground states. The second part focuses on the construction and interpretation of classical solutions that exist entirely due to the nonlinearity of field equations: solitons, bounces, instantons, and sphalerons. The third section considers some of the interesting effects that appear due to interactions of fermions with topological scalar and gauge fields. Mathematical digressions and numerous problems are included throughout. An appendix sketches the role of instantons as saddle points of Euclidean functional integral and related topics. Perfectly suited as an advanced undergraduate or beginning graduate text, this book is an excellent starting point for anyone seeking to understand gauge fields. *Advanced Methods of Continuum Mechanics for Materials and Structures* Springer This volume presents a collection of contributions on advanced approaches of continuum mechanics, which were written to celebrate the 60th birthday of Prof. Holm Altenbach. The contributions are on topics related to the theoretical foundations for the analysis of rods, shells and three-dimensional solids, formulation of constitutive models for advanced materials, as well as development of new approaches to the modeling of damage and fractures. *Fundamental Principles of Classical Mechanics A Geometrical Perspective* World Scientific Publishing Company This book is written with the belief that classical mechanics, as a theoretical discipline, possesses an inherent beauty, depth, and richness that far transcends its immediate applications in mechanical systems. These properties are manifested, by and large, through the coherence and elegance of the mathematical structure underlying the discipline, and are eminently worthy of being communicated to physics students at the earliest stage possible. This volume is therefore addressed mainly to advanced undergraduate and beginning graduate physics students who are interested in the application of modern mathematical methods in classical mechanics, in particular, those derived from the fields of topology and differential geometry, and also to the occasional mathematics student who is interested in important physics applications of these areas of mathematics. Its main purpose is to offer an introductory and broad glimpse of the majestic edifice of the mathematical theory of classical dynamics, not only in the time-honored analytical tradition of Newton, Laplace, Lagrange, Hamilton, Jacobi, and Whittaker, but also the more topological/geometrical one established by Poincare, and enriched by Birkhoff, Lyapunov, Smale, Siegel, Kolmogorov, Arnold, and Moser (as well as many others). *Mathematical Foundations of Elasticity* Courier Corporation Graduate-level study approaches mathematical foundations of three-dimensional elasticity using modern differential geometry and functional analysis. It presents a classical subject in a modern setting, with examples of newer mathematical contributions. 1983 edition. *The Special Theory of Relativity Einstein's World in New Axiomatics* Springer Nature This book discusses in detail the special theory of relativity without including all the instruments of theoretical physics, enabling readers who are not budding theoretical physicists to develop competence in the field. An arbitrary but fixed inertial system is chosen, where the known velocity of light is measured. With respect to this system a moving clock loses time and a moving length contracts. The book then presents a definition of simultaneity for the other inertial frames without using the velocity of light. To do so it employs the known reciprocity principle, which in this context serves to provide a definition of simultaneity in the other inertial frames. As a consequence, the Lorentz transformation is deduced and the universal constancy of light is established. With the help of a lattice model of the special theory of relativity the book provides a deeper understanding of the relativistic effects. Further, it discusses the key STR experiments and formulates and solves 54 problems in detail. *Cosserat Continuum Mechanics With Applications to Granular Media* Springer This textbook explores the theory of Cosserat continuum mechanics, and covers fundamental tools, general laws and major models, as well as applications to the mechanics of granular media. While classical continuum mechanics is based on the axiom that the stress tensor is symmetric, theories such as that expressed in the seminal work of the brothers Eugène and François Cosserat are characterized by a non-symmetric stress tensor. The use of von Mises motor mechanics is introduced, for the compact mathematical description of the mechanics and statics of Cosserat continua, as the Cosserat continuum is a manifold of oriented "rigid particles" with 3 dofs of displacement and 3 dofs of rotation, rather than a manifold of points with 3 dofs of displacement. Here, the analysis is restricted to infinitesimal particle displacements and rotations. This book is intended as a valuable supplement to standard Continuum Mechanics courses, and graduate students as well as researchers in mechanics and applied mathematics will benefit from its self-contained text, which is enriched by numerous examples and exercises. *Classical Dynamics of Particles and Systems* Academic Press Classical Dynamics of Particles and Systems presents a modern and reasonably complete account of the classical mechanics of particles, systems of particles, and rigid bodies for physics students at the advanced undergraduate level. The book aims to present a modern treatment of classical mechanical systems in such a way that the transition to the quantum theory of physics can be made with the least possible difficulty; to acquaint the student with new mathematical techniques and provide sufficient practice in solving problems; and to impart to the student some degree of sophistication in handling both the formalism of the theory and the operational technique of problem solving. Vector methods are developed in the first two chapters and are used throughout the book. Other chapters cover the fundamentals of Newtonian mechanics, the special theory of relativity, gravitational attraction and potentials, oscillatory motion, Lagrangian and Hamiltonian dynamics, central-force motion, two-particle collisions, and the wave equation. *Hamilton's Principle in Continuum Mechanics* Springer This revised, updated edition provides a comprehensive and rigorous description of the application of Hamilton's principle to continuous media. To introduce terminology and initial concepts, it begins with what is called the first problem of the calculus of variations. For both historical and pedagogical reasons, it first discusses the application of the principle to systems of particles, including conservative and non-conservative systems and systems with constraints. The foundations of mechanics of continua are introduced in the context of inner product spaces. With this basis, the application of Hamilton's principle to the classical theories of fluid and solid mechanics are covered. Then recent developments are described, including materials with microstructure, mixtures, and continua with singular surfaces. *Foundations of Complex-system Theories In Economics, Evolutionary Biology, and Statistical Physics* Cambridge University Press Analyzes approaches to the study of complexity in the physical, biological, and social sciences. *Computational Statistical Mechanics* Elsevier Computational Statistical Mechanics describes the use of fast computers to simulate the equilibrium and nonequilibrium properties of gases, liquids, and solids at, and away from equilibrium. The underlying theory is developed from basic principles and illustrated by applying it to the simplest possible examples. Thermodynamics, based on the ideal gas thermometer, is related to Gibb's statistical mechanics through the use of Nosé-Hoover heat reservoirs. These reservoirs use integral feedback to control temperature. The same approach is carried through to the simulation and analysis of nonequilibrium mass, momentum, and energy flows. Such a unified approach makes possible consistent mechanical definitions of temperature, stress, and heat flux which lead to a microscopic demonstration of the Second Law of Thermodynamics directly from mechanics. The intimate connection linking Lyapunov-unstable microscopic motions to macroscopic dissipative flows through multifractal phase-space structures is illustrated with many examples from the recent literature. The book is well-suited for undergraduate courses in advanced thermodynamics, statistical mechanics and transport theory, and graduate courses in physics and chemistry. *Advances in Applied Mechanics* Academic Press *Advances in Applied Mechanics* draws together recent significant advances in various topics in applied mechanics. Published since 1948, *Advances in Applied Mechanics* aims to provide authoritative review articles on topics in the mechanical sciences, primarily of interest to scientists and engineers working in the various branches of mechanics, but also of interest to the many who use the results of investigations in mechanics in various application areas, such as aerospace, chemical, civil, environmental, mechanical and nuclear engineering. Covers all fields of the mechanical sciences Highlights classical and modern areas of mechanics that are ready for review Provides comprehensive coverage of the field in question