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The book's Web site, www.probablistic-robotics.org, has additional material. The book is relevant for anyone involved in robotic software development and scientific research. It will also be of interest to applied statisticians and engineers dealing with real-world sensor data. Engineering Mechanics Problems and Solutions Cambridge University Press This comprehensive and self-contained textbook will help students in acquiring an understanding of fundamental concepts and applications of engineering mechanics. With basic prior knowledge, the readers are guided through important concepts of engineering mechanics such as free body diagrams, principles of the transmissibility of forces, Coulomb's law of friction, analysis of forces in members of truss and rectilinear motion in horizontal direction. Important theorems including Lami's theorem, Varignon's theorem, parallel axis theorem and perpendicular axis theorem are discussed in a step-by-step manner for better clarity. 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Shankar, a well-known physicist and contagiously enthusiastic educator, explains the essential concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Now in an expanded edition—complete with problem sets and answers for course use or self-study—this work provides an ideal introduction for college-level students of physics, chemistry, and engineering; for AP Physics students; and for general readers interested in advances in the sciences. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics. 3D Math Primer for Graphics and Game Development, 2nd Edition CRC Press This engaging book presents the essential mathematics needed to describe, simulate, and render a 3D world. Reflecting both academic and in-the-trenches practical experience, the authors teach you how to describe objects and their positions, orientations, and trajectories in 3D using mathematics. The text provides an introduction to mathematics for game designers, including the fundamentals of coordinate spaces, vectors, and matrices. It also covers orientation in three dimensions, calculus and dynamics, graphics, and parametric curves. Quantum Computation and Quantum Information Cambridge University Press First-ever comprehensive introduction to the major new subject of quantum computing and quantum information. Introduction to Applied Linear Algebra Vectors, Matrices, and Least Squares Cambridge University Press A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples. Multiple View Geometry in Computer Vision Cambridge University Press A basic problem in computer vision is to understand the structure of a real world scene given several images of it. Techniques for solving this problem are taken from projective geometry and photogrammetry. Here, the authors cover the geometric principles and their algebraic representation in terms of camera projection matrices, the fundamental matrix and the trifocal tensor. The theory and methods of computation of these entities are discussed with real examples, as is their use in the reconstruction of scenes from multiple images. The new edition features an extended introduction covering the key ideas in the book (which itself has been updated with additional examples and appendices) and significant new results which have appeared since the first edition. Comprehensive background material is provided, so readers familiar with linear algebra and basic numerical methods can understand the projective geometry and estimation algorithms presented, and implement the algorithms directly from the book. Probability Theory and Examples Cambridge University Press This classic introduction to probability theory for beginning graduate students covers laws of large numbers, central limit theorems, random walks, martingales, Markov chains, ergodic theorems, and Brownian motion. It is a comprehensive treatment concentrating on the results that are the most useful for applications. Its philosophy is that the best way to learn probability is to see it in action, so there are 200 examples and 450 problems. The fourth edition begins with a short chapter on measure theory to orient readers new to the subject. Handbook of Marine Craft Hydrodynamics and Motion Control John Wiley & Sons Handbook of MARINE CRAFT HYDRODYNAMICS AND MOTION CONTROL The latest tools for analysis and design of advanced GNC systems Handbook of Marine Craft Hydrodynamics and Motion Control is an extensive study of the latest research in hydrodynamics, guidance, navigation, and control

systems for marine craft. The text establishes how the implementation of mathematical models and modern control theory can be used for simulation and verification of control systems, decision-support systems, and situational awareness systems. Coverage includes hydrodynamic models for marine craft, models for wind, waves and ocean currents, dynamics and stability of marine craft, advanced guidance principles, sensor fusion, and inertial navigation. This important book includes the latest tools for analysis and design of advanced GNC systems and presents new material on unmanned underwater vehicles, surface craft, and autonomous vehicles. References and examples are included to enable engineers to analyze existing projects before making their own designs, as well as MATLAB scripts for hands-on software development and testing. Highlights of this Second Edition include: Topical case studies and worked examples demonstrating how you can apply modeling and control design techniques to your own designs A Github repository with MATLAB scripts (MSS toolbox) compatible with the latest software releases from Mathworks New content on mathematical modeling, including models for ships and underwater vehicles, hydrostatics, and control forces and moments New methods for guidance and navigation, including line-of-sight (LOS) guidance laws for path following, sensory systems, model-based navigation systems, and inertial navigation systems This fully revised Second Edition includes innovative research in hydrodynamics and GNC systems for marine craft, from ships to autonomous vehicles operating on the surface and under water. Handbook of Marine Craft Hydrodynamics and Motion Control is a must-have for students and engineers working with unmanned systems, field robots, autonomous vehicles, and ships. MSS toolbox: <https://github.com/cybergalactic/mss> Lecture notes: <https://www.fossen.biz/wiley> Author's home page: <https://www.fossen.biz> Algorithms for Visual Design Using the Processing Language John Wiley & Sons As the first book to share the necessary algorithms for creating code to experiment with design problems in the processing language, this book offers a series of generic procedures that can function as building blocks and encourages you to then use those building blocks to experiment, explore, and channel your thoughts, ideas, and principles into potential solutions. The book covers such topics as structured shapes, solid geometry, networking and databases, physical computing, image processing, graphic user interfaces, and more. HTML5 Canvas Native Interactivity and Animation for the Web "O'Reilly Media, Inc." Flash is fading fast as Canvas continues to climb. The second edition of this popular book gets you started with HTML5 Canvas by showing you how to build interactive multimedia applications. You'll learn how to draw, render text, manipulate images, and create animation—all in the course of building an interactive web game throughout the book. Updated for the latest implementations of Canvas and related HTML5 technologies, this edition includes clear and reusable code examples to help you quickly pick up the basics—whether you currently use Flash, Silverlight, or just HTML and JavaScript. Discover why HTML5 is the future of innovative web development. Create and modify 2D drawings, text, and bitmap images Use algorithms for math-based movement and physics interactions Incorporate and manipulate video, and add audio Build a basic framework for creating a variety of games Use bitmaps and tile sheets to develop animated game graphics Go mobile: build web apps and then modify them for iOS devices Explore ways to use Canvas for 3D and multiplayer game applications Mathematical and Physical Theory of Turbulence CRC Press Although the current dynamical system approach offers several important insights into the turbulence problem, issues still remain that present challenges to conventional methodologies and concepts. These challenges call for the advancement and application of new physical concepts, mathematical modeling, and analysis techniques. Bringing together experts from physics, applied mathematics, and engineering, Mathematical and Physical Theory of Turbulence discusses recent progress and some of the major unresolved issues in two- and three-dimensional turbulence as well as scalar compressible turbulence. Containing introductory overviews as well as more specialized sections, this book examines a variety of turbulence-related topics. The authors concentrate on theory, experiments, computational, and mathematical aspects of Navier-Stokes turbulence; geophysical flows; modeling; laboratory experiments; and compressible/magnetohydrodynamic effects. The topics discussed in these areas include finite-time singularities and inviscid dissipation energy; validity of the idealized model incorporating local isotropy, homogeneity, and universality of small scales of high Reynolds numbers, Lagrangian statistics, and measurements; and subgrid-scale modeling and hybrid methods involving a mix of Reynolds-averaged Navier-Stokes (RANS), large-eddy simulations (LES), and direct numerical simulations (DNS). By sharing their expertise and recent research results, the authoritative contributors in Mathematical and Physical Theory of Turbulence promote further advances in the field, benefiting applied mathematicians, physicists, and engineers involved in understanding the complex issues of the turbulence problem. Planning Algorithms Cambridge University Press Planning algorithms are impacting technical disciplines and industries around the world, including robotics, computer-aided design, manufacturing, computer graphics, aerospace applications, drug design, and protein folding. This coherent and comprehensive book unifies material from several sources, including robotics, control theory, artificial intelligence, and algorithms. The treatment is centered on robot motion planning, but integrates material on planning in discrete spaces. A major part of the book is devoted to planning under uncertainty, including decision theory, Markov decision processes, and information spaces, which are the 'configuration spaces' of all sensor-based planning problems. The last part of the book delves into planning under differential constraints that arise when automating the motions of virtually any mechanical system. This text and reference is intended for students, engineers, and researchers in robotics, artificial intelligence, and control theory as well as computer graphics, algorithms, and computational biology. Reinforcement Learning, second edition An Introduction MIT Press The significantly expanded and updated new edition of a widely used text on reinforcement learning, one of the most active research areas in artificial intelligence. Reinforcement learning, one of the most active research areas in artificial intelligence, is a computational approach to learning whereby an agent tries to maximize the total amount of reward it receives while interacting with a complex, uncertain environment. In Reinforcement Learning, Richard Sutton and Andrew Barto provide a clear and simple account of the field's key ideas and algorithms. This second edition has been significantly expanded and updated, presenting new topics and updating coverage of other topics. Like the first edition, this second edition focuses on core online learning algorithms, with the more mathematical material set off in shaded boxes. Part I covers as much of reinforcement learning as possible without going beyond the tabular case for which exact solutions can be found. Many algorithms presented in this part are new to the second edition, including UCB, Expected Sarsa, and Double Learning. Part II extends these ideas to function approximation, with new sections on such topics as artificial neural networks and the Fourier basis, and offers expanded treatment of off-policy learning and policy-gradient methods. Part III has new chapters on reinforcement learning's relationships to psychology and neuroscience, as well as an updated case-studies chapter including AlphaGo and AlphaGo Zero, Atari game playing, and IBM Watson's wagering strategy. The final chapter discusses the future societal impacts of reinforcement learning. Markov Chains and Mixing Times American Mathematical Soc. This book is an introduction to the modern approach to the theory of Markov chains. The main goal of this approach is to determine the rate of convergence of a Markov chain to the stationary distribution as a function of the size and geometry of the state space. The authors develop the key tools for estimating convergence times, including coupling, strong stationary times, and spectral methods. Whenever possible, probabilistic methods are emphasized. The book includes many examples and provides brief introductions to some central models of statistical mechanics. Also provided are accounts of random walks on networks, including hitting and cover times, and analyses of several methods of shuffling cards. As a prerequisite, the authors assume a modest understanding of probability theory and linear algebra at an undergraduate level. Markov Chains and Mixing Times is meant to bring the excitement of this active area of research to a wide audience. Proceedings IEEE Workshop on Detection and Recognition of Events in Video, 8 July 2001, Vancouver, Canada IEEE Annotation Contains 12 papers from a July 2001 workshop, reporting on recent research in the processing of video data for the detection and recognition of events. Themes are event detection and tracking, human motion and action recognition, and multi-modal events. Specific topics include foreground segmentation using adaptive mixture models in color and depth, multi-modal 3-D tracking and event detection via the particle filter, and hierarchical motion history images for recognizing human motion. Other subjects are view-invariant representation and learning of human action, content-based video retrieval by integration of spatio-temporal and stochastic recognition of events, and detecting semantic concepts using context and audiovisual features. This volume lacks a subject index. c. Book News Inc. A MATLAB Exercise Book Lulu.com A practical guide to problem solving using MATLAB. Designed to complement a taught course introducing MATLAB but ideally suited for any beginner. This book provides a brief tour of some of the tasks that MATLAB is perfectly suited to instead of focusing on any particular topic. Providing instruction, guidance and a large supply of exercises, this book is meant to stimulate problem-solving skills rather than provide an in-depth knowledge of the MATLAB language. Fundamentals of Biomechanics Springer Science & Business Media Fundamentals of Biomechanics introduces the exciting world of how human movement is created and how it can be improved. Teachers, coaches and physical therapists all use biomechanics to help people improve movement and decrease the risk of injury. The book presents a comprehensive review of the major concepts of biomechanics and summarizes them in nine principles of biomechanics. Fundamentals of Biomechanics concludes by showing how these principles can be used by movement professionals to improve human movement. Specific case studies are presented in physical education, coaching, strength and conditioning, and sports medicine. Advanced Calculus Revised World Scientific Publishing Company An authorised reissue of the long out of print classic textbook, Advanced Calculus by the late Dr Lynn Loomis and Dr Shlomo Sternberg both of Harvard University has been a revered but hard to find textbook for the advanced calculus course for decades. This book is based on an honors course in advanced calculus that the authors gave in the 1960's. The foundational material, presented in the unstarred sections of Chapters 1 through 11, was normally covered, but different applications of this basic material were stressed from year to year, and the book therefore contains more material than was covered in any one year. It can accordingly be used (with omissions) as a text for a year's course in advanced calculus, or as a text for a three-semester introduction to analysis. The prerequisites are a good grounding in the calculus of one variable from a mathematically rigorous point of view, together with some acquaintance with linear algebra. The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication. As possible introductory texts, we mention Differential and Integral Calculus by R Courant, Calculus by T Apostol, Calculus by M Spivak, and Pure Mathematics by G Hardy. The reader should also have some experience with partial derivatives. In overall plan the book divides roughly into a first half which develops the calculus (principally the differential calculus) in the setting of normed vector spaces, and a second half which deals with the calculus of differentiable manifolds. Physics for Scientists and Engineers, Volume 2 Cengage Learning Achieve success in your physics course by making the most of what PHYSICS FOR SCIENTISTS AND ENGINEERS has to offer. From a host of in-text features to a range of outstanding technology resources, you'll have everything you need to understand the natural forces and principles of physics. Throughout every chapter, the authors have built in a wide range of examples, exercises, and illustrations that will help you understand the laws of physics AND succeed in your course! Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.