Introduction To Robotics Craig Solutions Free

With no previous experience required, BASIC ROBOTICS walks readers step by step through the fundamentals of the industrial robot system. It begins with an exploration of the fascinating technological history that led to the modern robot, starting with events from Before the Common Era and ending with a glimpse of what the robots of tomorrow might become. From there the book explores safety, various parts of the robot, tooling, power transmission systems, the basics of programming, troubleshooting, maintenance, and much more. Engaging photos highlight various robotic systems and their parts, while stories of real-world events bring text concepts to life. This innovative First Edition incorporates many of the initiatives of STEM and is the culmination of lessons learned from the author's years of teaching robotics in various formats--from the traditional classroom to the industrial production floor with systems ranging from the LEGO Mindstorms NXT to the FANUC robot. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

One of the goals of artificial intelligence (AI) is creating autonomous agents that must make decisions based on uncertain and incomplete information. The goal is to design rational agents that must take the best action given the information available and their goals. Decision Theory Models for Applications in Artificial Intelligence: Concepts and Solutions provides an introduction to different types of decision theory techniques, including MDPs, POMDPs, Influence Diagrams, and Reinforcement Learning, and illustrates their application in artificial intelligence. This book provides insights into the advantages and challenges of using decision theory models for developing intelligent systems.

From theory and fundamentals to the latest advances in computational and experimental modal analysis, this is the definitive, updated reference on structural dynamics. This edition updates Professor Craig's classic introduction to structural dynamics, which has been an invaluable resource for practicing engineers and a textbook for undergraduate and graduate courses in vibrations and/or structural dynamics. Along with comprehensive coverage of structural dynamics fundamentals, finite-element-based computational methods, and dynamic testing methods, this Second Edition includes new and expanded coverage of computational methods, as well as introductions to more advanced topics, including experimental modal analysis and "active structures." With a systematic approach, it presents solution techniques that apply to various engineering disciplines. It discusses single degree-of-freedom (SDOF) systems, multiple degrees-of-freedom (MDOF) systems, and continuous systems in depth; and includes numeric evaluation of modes and frequency of MDOF systems; direct integration methods for dynamic response of SDOF systems and MDOF systems; and component mode synthesis. Numerous illustrative examples help engineers apply the techniques and methods to challenges they face in the real world. MATLAB(r) is extensively used throughout the book, and many of the .m-files are made available on the book's Web site. Fundamentals of Structural Dynamics, Second Edition is an indispensable reference and "refresher course" for engineering professionals; and a textbook for seniors or graduate students in mechanical engineering, civil engineering, engineering mechanics, or aerospace engineering.

A practical step-by-step introduction to the analysis of English grammar, taking an integrated approach to function and structure.

A modern and unified treatment of the mechanics, planning, and control of robots, suitable for a first course in robotics.

Offering a comprehensive overview of the challenges, risks and options facing the future of mechatronics, this book provides insights into how these issues are currently assessed and managed. Building on the previously published book 'Mechatronics in Action,' it identifies and discusses the key issues likely to impact on future mechatronic systems. It supports mechatronics practitioners in identifying key areas in design, modeling and technology and places these in the wider context of concepts such as cyber-physical systems and the Internet of Things. For educators it considers the potential effects of developments in these areas on mechatronic course design, and ways of integrating these. Written by experts in the field, it explores topics including systems integration, design, modeling, privacy, ethics and future application domains. Highlighting novel innovation directions, it is intended for academics, engineers and students working in the field of mechatronics, particularly those developing new concepts, methods and ideas.

Robotics: Theory and Industrial Applications is an introduction to the principles of industrial robotics, related systems, and applications. This text is a comprehensive tool in learning the technical aspects of robotics and includes coverage of power supply systems, degrees of freedom, programming methods, sensors, end effectors, implementation planning, and system maintenance. Each chapter begins with an outline of topics, learning objectives, and a listing of technical terms. The key concepts are discussed using a systems approach to enhance student learning. The second edition is updated with full-color illustrations and photos that reflect changes n both the field of robotics and technology in general. The content has been revised to keep pace with robotic technology and reorganized to maximize student comprehension. Various features throughout the text address special interest topics, including pioneers in the file of robotics, careers in robotics, and exciting applications of robotic technology. This bundle includes a copy of the Student Text and an Online Text (6-Year Classroom Subscription). Students can instantly access the Online Text with browser-based devices, including iPads, netbooks, PCs, and Mac computers.With G-W Online Textbooks, students easily navigate linked table of contents, search specific topics, quickly jump to specific pages, enlarge for full-screen reading mode, and print selected pages for offline reading.

This book introduces concepts in mobile, autonomous robotics to 3rd-4th year students in Computer Science or a related discipline. The book covers principles of robot motion, forward and inverse kinematics of robotic arms and simple wheeled platforms, perception, error propagation, localization and simultaneous localization and mapping. The cover picture shows a wind-up toy that is smart enough to not fall off a table just using intelligent mechanism design and illustrate the importance of the mechanism in designing intelligent, autonomous systems. This book is open source, open to contributions, and released under a creative common license.

Introduction to RoboticsMechanics and ControlPearson Educación

This book is for a first course in robotics, especially in unmanned aerial or underwater vehicles.

This accessible guide contains everything you need to get up to speed on the theory and implementation of MIMO techniques.

Written specifically to introduce advanced undergraduate and beginning graduate students to an important area of mathematics, this book is far more accessible than previous books on Lie algebras. The emphasis is on special cases and explicit calculation, with many examples and exercises with full solutions provided.

Written for senior level or first year graduate level robotics courses, this text includes material from traditional mechanical engineering, control theoretical material and computer science. It includes coverage of rigid-body transformations and forward and inverse positional kinematics.

The present surge of interest in robotics can be expected to continue through the1980s. Major research efforts are springing up throughout industry and in the universities. Senior and graduate level courses are being developed or planned in many places to prepare students to contribute to the development of the field and its industrial applications. Robot Motion will serve this emerging audience as a single source of information on current research in the field.The book brings together nineteen papers of fundamental importance to the development of a science of robotics. These are grouped in five sections: Dynamics; Trajectory Planning; Compliance and Force Control; Feedback Control; and Spatial Planning. Each section is introduced by a substantial analytical survey that lays out the problems that arise in that area of robotics and the approaches and solutions that have been tried, with an evaluation of their strengths and shortcomings. In addition, there is an overall introduction that relates robotics research to general trends in the development of artificial intelligence.Individual papers are the work of H. Hanafusa, H. Asada, N.Hogan, M. T. Mason, R. Paul, B. Shimano, M. H. Raibert, J. J. Craig, R. H. Taylor, D. E. Whitney, J.M. Hollerbach, J. Luh, M. Walker, R. J. Popplestone, A. P. Ambler, I. M. Bellos, T. LozanoPerez, E.Freund, D. F. Golla, S. C. Garg, P. C. Hughes, and K. D.

Young.The editors are all researchscientists at MIT's Artificial Intelligence Laboratory and in addition, Michael Brady is coeditorwith Richard Paul of The International Journal of Robotics Research. Robot Motion is included in theMIT Press Artificial Intelligence Series.

Introduction to Mechatronic Design is ideal for upper level and graduate Mechatronics courses in Electrical, Computing, or Mechanical & Aerospace Engineering. Unlike other texts on mechatronics that focus on derivations and calculations, Introduction to Mechatronics, 1e, takes a narrative approach, emphasizing the importance of building intuition and understanding before diving into the math. The authors believe that integration is the core of mechatronics and students must have a command of each of the domains to create the balance necessary for successful mechatronic design and devote sections of the book to each area, including mechanical, electrical, and software disciplines, as well as a section on system design and engineering. A robust package of teaching and learning resources accompanies the book.

A broadly accessible introduction to robotics that spans the most basic concepts and the most novel applications; for students, teachers, and hobbyists. The Robotics Primer offers a broadly accessible introduction to robotics for students at pre-university and university levels, robot hobbyists, and anyone interested in this burgeoning field. The text takes the reader from the most basic concepts (including perception and movement) to the most novel and sophisticated applications and topics (humanoids, shape-shifting robots, space robotics), with an emphasis on what it takes to create autonomous intelligent robot behavior. The core concepts of robotics are carried through from fundamental definitions to more complex explanations, all presented in an engaging, conversational style that will appeal to readers of different backgrounds. The Robotics Primer covers such topics as the definition of robotics, the history of robotics ("Where do Robots Come From?"), robot components, locomotion, manipulation, sensors, control, control architectures, representation, behavior ("Making Your Robot Behave"), navigation, group robotics, learning, and the future of robotics (and its ethical implications). To encourage further engagement, experimentation, and course and lesson design, The Robotics Primer is accompanied by a free robot programming exercise workbook that implements many of the ideas on the book on iRobot platforms. The Robotics Primer is unique as a principled, pedagogical treatment of the topic that is accessible to a broad audience; the only prerequisites are curiosity and attention. It can be used effectively in an educational setting or more informally for self-instruction. The Robotics Primer is a springboard for readers of all backgrounds—including students taking robotics as an elective outside the major, graduate students preparing to specialize in robotics, and K-12 teachers who bring robotics into their classrooms.

Using a combination of theoretical discussion and real-world case studies, this book focuses on current and future use of RAISA technologies in the tourism economy, including examples from the hotel, restaurant, travel agency, museum, and events industries.

The second edition of a comprehensive introduction to all aspects of mobile robotics, from algorithms to mechanisms. Mobile robots range from the Mars Pathfinder mission's teleoperated Sojourner to the cleaning robots in the Paris Metro. This text offers students and other interested readers an introduction to the fundamentals of mobile robotics, spanning the mechanical, motor, sensory, perceptual, and cognitive layers the field comprises. The text focuses on mobility itself, offering an overview of the mechanisms that allow a mobile robot to move through a real world environment to perform its tasks, including locomotion, sensing, localization, and motion planning. It synthesizes material from such fields as kinematics, control theory, signal analysis, computer vision, information theory, artificial intelligence, and probability theory. The book presents the techniques and technology that enable mobility in a series of interacting modules. Each chapter treats a different aspect of mobility, as the book moves from low-level to high-level details. It covers all aspects of mobile robotics, including software and hardware design considerations, related technologies, and algorithmic techniques. This second edition has been revised and updated throughout, with 130 pages of new material on such topics as locomotion, perception, localization, and planning and navigation. Problem sets have been added at the end of each chapter. Bringing together all aspects of mobile robotics into one volume, Introduction to Autonomous Mobile Robots can serve as a textbook or a working tool for beginning practitioners. Curriculum developed by Dr. Robert King, Colorado School of Mines, and Dr. James Conrad, University of North Carolina-Charlotte, to accompany the National Instruments LabVIEW Robotics Starter Kit, are available. Included are 13 (6 by Dr. King and 7 by Dr. Conrad) laboratory exercises for using the LabVIEW Robotics Starter Kit to teach mobile robotics concepts.

The book focuses on a conceptual flaw in contemporary artificial intelligence and cognitive science. Many people have discovered diverse manifestations and facets of this flaw, but the central conceptual impasse is at best only partially perceived. Its consequences, nevertheless, visit themselves as distortions and failures of multiple research projects - and make impossible the ultimate aspirations of the fields. The impasse concerns a presupposition concerning the nature of representation - that all representation has the nature of encodings: encodingism. Encodings certainly exist, but encodingism is at root logically incoherent; any programmatic research predicted on it is doomed too distortion and ultimate failure. The impasse and its consequences - and steps away from that impasse - are explored in a large number of projects and approaches. These include SOAR, CYC, PDP, situated cognition, subsumption architecture robotics, and the frame problems - a general survey of the current research in AI and Cognitive Science emerges. Interactivism, an alternative model of representation, is proposed and examined.

The Contemporary Introduction to Deep Reinforcement Learning that Combines Theory and Practice Deep reinforcement learning (deep RL) combines deep learning and reinforcement learning, in which artificial agents learn to solve sequential decision-making problems. In the past decade deep RL has achieved remarkable results on a range of problems, from single and multiplayer games—such as Go, Atari games, and DotA 2—to robotics. Foundations of Deep Reinforcement Learning is an introduction to deep RL that uniquely combines both theory and implementation. It starts with intuition, then carefully explains the theory of deep RL algorithms, discusses implementations in its companion software library SLM Lab, and finishes with the practical details of getting deep RL to work. This guide is ideal for both computer science students and software engineers who are familiar with basic machine learning concepts and have a working understanding of Python. Understand each key aspect of a deep RL problem Explore policy- and value-based algorithms, including REINFORCE, SARSA, DQN, Double DQN, and Prioritized Experience Replay (PER) Delve into combined algorithms, including Actor-Critic and Proximal Policy Optimization (PPO) Understand how algorithms can be parallelized synchronously and asynchronously Run algorithms in SLM Lab and learn the practical implementation details for getting deep RL to work Explore algorithm benchmark results with tuned hyperparameters Understand how deep RL

environments are designed Register your book for convenient access to downloads, updates, and/or corrections as they become available. See inside book for details.

Written by two of Europe's leading robotics experts, this book provides the tools for a unified approach to the modelling of robotic manipulators, whatever their mechanical structure. No other publication covers the three fundamental issues of robotics: modelling, identification and control. It covers the development of various mathematical models required for the control and simulation of robots. · World class authority · Unique range of coverage not available in any other book · Provides a complete course on robotic control at an undergraduate and graduate level

After functional, measure and stochastic analysis prerequisites, the author covers chaos decomposition, Skorohod integral processes, Malliavin derivative and Girsanov transformations.

Fluid Mechanics for Chemical Engineers, Second Edition, with Microfluidics and CFD, systematically introduces fluid mechanics from the perspective of the chemical engineer who must understand actual physical behavior and solve real-world problems. Building on a first edition that earned Choice Magazine's Outstanding Academic Title award, this edition has been thoroughly updated to reflect the field's latest advances. This second edition contains extensive new coverage of both microfluidics and computational fluid dynamics, systematically demonstrating CFD through detailed examples using FlowLab and COMSOL Multiphysics. The chapter on turbulence has been extensively revised to address more complex and realistic challenges, including turbulent mixing and recirculating flows.

Mechanical engineering, an engineering discipline borne of the needs of the industrial revolution, is once again asked to do its substantial share in the call for industrial renewal. The general call is urgent as we face profound is sues of productivity and competitiveness that require engineering solutions, among others. The Mechanical Engineering Series features graduate texts and research monographs intended to address the need for information in contemporary areas of mechanical engineering. The series is conceived as a comprehensive one that covers a broad range of concentrations important to mechanical engineering graduate education and research. We are fortunate to have a distinguished rost er of consulting editors on the advisory board, each an expert in one the areas of concentra tion. The names of the consulting editors are listed on the next page of this volume. The areas of concentration are: applied mechanics; biome chan ics; computational mechanics; dynamic systems and control; energetics; mechanics of materials; processing; thermal science; and tribology.

A Mathematical Introduction to Robotic Manipulation presents a mathematical formulation of the kinematics, dynamics, and control of robot manipulators. It uses an elegant set of mathematical tools that emphasizes the geometry of robot motion and allows a large class of robotic manipulation problems to be analyzed within a unified framework. The foundation of the book is a derivation of robot kinematics using the product of the exponentials formula. The authors explore the kinematics of open-chain manipulators and multifingered robot hands, present an analysis of the dynamics and control of robot systems, discuss the specification and control of internal forces and internal motions, and address the implications of the nonholonomic nature of rolling contact are addressed, as well. The wealth of information, numerous examples, and exercises make A Mathematical Introduction to Robotic Manipulation valuable as both a reference for robotics researchers and a text for students in advanced robotics courses.

Methods of contro1151 Mechanical master-slave telemanipulators 151 Powered telemanipulators 152 Servo control of unilateral telemanipulators 152 Bilateral servo manipulators 155 Special characteristics of teleoperators 158 Design criteria for teleoperators 159 Vehicles and transporters 160 Applications of teleoperators 161 Remote handling of radioactive materials 161 Remote handling of explosive and toxic materials 161 Telemanipulation of heavy objects 163 Underwater teleoperation 163 Teleoperation in space and planetary exploration 164 Telemanipulators for the disabled 164 Computer assisted teleoperation 166 Bibliographic notes 170 Chapter 9: Mobile robots 171 Introduction 171 Land surface robots 171 Arrangements of wheels and tracks 171 Unusual wheel and track arrangements 172 Navigation for land vehicles 174 Teleoperation 174 Dead reckoning 175 Inertial navigation 175 Tracking from a fixed base; beacons 175 Satellite navigation 175 Map matching 175 Wall following 176 Route planning 176 Control and communication 176 Sensors for mobile robots 177 Body orientation and angular rates 1 77 Body position, speed and acceleration 177 Terrain scanning 178 Types and applications of mobile robots 179 Education and research 179 Remote handling 183 Military mobile robots 183 Fire-fighting and rescue 187 Construction 188 Mining 188 Planetary exploration 188 Legged robots 188 Comparison of legs and wheels 189 Leg number and arrangement 189 Leg number 189 Leg disposition 190 Relative leg length 190 Leg construction 190 Control 191 Climbing robots 195 Robot submersibles 196 Uses of submersible robots 199 Robots in air and space 201 Space 202 Bibliographic notes 204 Chapter 10: Automated guided vehicles 205

Introduces the basic concepts of robot manipulation--the fundamental kinematic and dynamic analysis of manipulator arms, and the key techniques for trajectory control and compliant motion control. Material is supported with abundant examples adapted from successful industrial practice or advanced research topics. Includes carefully devised conceptual diagrams, discussion of current research topics with references to the latest publications, and end-of-book problem sets. Appendixes. Bibliography.

Based on the successful Modelling and Control of Robot Manipulators by Sciavicco and Siciliano (Springer, 2000), Robotics provides the basic know-how on the foundations of robotics: modelling, planning and control. It has been expanded to include coverage of mobile robots, visual control and motion planning. A variety of problems is raised throughout, and the proper tools to find engineering-oriented solutions are introduced and explained. The text includes coverage of fundamental topics like kinematics, and trajectory planning and related technological aspects including actuators and sensors. To impart practical skill, examples and case studies are carefully worked out and interwoven through the text, with frequent resort to simulation. In addition, end-of-chapter exercises are proposed, and the book is

accompanied by an electronic solutions manual containing the MATLAB® code for computer problems; this is available free of charge to those adopting this volume as a textbook for courses.

This open access book bridges the gap between playing with robots in school and studying robotics at the upper undergraduate and graduate levels to prepare for careers in industry and research. Robotic algorithms are presented formally, but using only mathematics known by high-school and first-year college students, such as calculus, matrices and probability. Concepts and algorithms are explained through detailed diagrams and calculations. Elements of Robotics presents an overview of different types of robots and the components used to build robots, but focuses on robotic algorithms: simple algorithms like odometry and feedback control, as well as algorithms for advanced topics like localization, mapping, image processing, machine learning and swarm robotics. These algorithms are demonstrated in simplified contexts that enable detailed computations to be performed and feasible activities to be posed. Students who study these simplified demonstrations will be well prepared for advanced study of robotics. The algorithms are presented at a relatively abstract level, not tied to any specific robot. Instead a generic robot is defined that uses elements common to most educational robots: differential drive with two motors, proximity sensors and some method of displaying output to the user. The theory is supplemented with over 100 activities, most of which can be successfully implemented using inexpensive educational robots. Activities that require more computation can be programmed on a computer. Archives are available with suggested implementations for the Thymio robot and standalone programs in Python.

Niku offers comprehensive, yet concise coverage of robotics that will appeal to engineers. Robotic applications are drawn from a wide variety of fields. Emphasis is placed on design along with analysis and modeling. Kinematics and dynamics are covered extensively in an accessible style. Vision systems are discussed in detail, which is a cutting-edge area in robotics. Engineers will also find a running design project that reinforces the concepts by having them apply what they've learned.

For courses in decision support systems, computerized decision-making tools, and management support systems. Market-leading guide to modern analytics, for better business decisionsAnalytics, Data Science, & Artificial Intelligence: Systems for Decision Support is the most comprehensive introduction to technologies collectively called analytics (or business analytics) and the fundamental methods, techniques, and software used to design and develop these systems. Students gain inspiration from examples of organisations that have employed analytics to make decisions, while leveraging the resources of a companion website. With six new chapters, the 11th edition marks a major reorganisation reflecting a new focus -- analytics and its enabling technologies, including AI, machine-learning, robotics, chatbots, and IoT.

Basic Optics: Principles and Concepts addresses in great detail the basic principles of the science of optics, and their related concepts. The book provides a lucid and coherent presentation of an extensive range of concepts from the field of optics, which is of central relevance to several broad areas of science, including physics, chemistry, and biology. With its extensive range of discourse, the book's content arms scientists and students with knowledge of the essential concepts of classical and modern optics. It can be used as a reference book and also as a supplementary text by students at college and university levels and will, at the same time, be of considerable use to researchers and teachers. The book is composed of nine chapters and includes a great deal of material not covered in many of the more well-known textbooks on the subject. The science of optics has undergone major changes in the last fifty years because of developments in the areas of the optics of metamaterials, Fourier optics, statistical optics, quantum optics, and nonlinear optics, all of which find their place in this book, with a clear presentation of their basic principles. Even the more traditional areas of ray optics and wave optics are elaborated within the framework of electromagnetic theory, at a level more fundamental than what one finds in many of the currently available textbooks. Thus, the eikonal approximation leading to ray optics, the Lagrangian and Hamiltonian formulations of ray optics, the quantum theoretic interpretation of interference, the vector and dyadic diffraction theories, the geometrical theory of diffraction, and similar other topics of basic relevance are presented in clear terms. The presentation is lucid and elegant, capturing the essential magic and charm of physics. All this taken together makes the book a unique text, of major contemporary relevance, in the field of optics. Avijit Lahiri is a well-known researcher, teacher, and author, with publications in several areas of physics, and with a broad range of current interests, including physics and the philosophy of science. Provides extensive and thoroughly exhaustive coverage of classical and modern optics Offers a lucid presentation in understandable language, rendering the abstract and difficult concepts of physics in an easy, accessible way Develops all concepts from elementary levels to advanced stages Includes a sequential description of all needed mathematical tools Relates fundamental concepts to areas of current research interest

Human-Robot Interaction: Safety, Standardization, and Benchmarking provides a comprehensive introduction to the new scenarios emerging where humans and robots interact in various environments and applications on a daily basis. The focus is on the current status and foreseeable implications of robot safety, approaching these issues from the standardization and benchmarking perspectives. Featuring contributions from leading experts, the book presents state-of-the-art research, and includes real-world applications and use cases. It explores the key leading sectors—robotics, service robotics, and medical robotics—and elaborates on the safety approaches that are being developed for effective human-robot interaction, including physical robot-human contacts, collaboration in task execution, workspace sharing, human-aware motion planning, and exploring the landscape of relevant standards and guidelines. Features Presenting a comprehensive introduction to human-robot interaction in a number of domains, including industrial robotics, medical robotics, and service robotics Focusing on robot safety standards and benchmarking Providing insight into current developments in international standards Featuring contributions from leading experts, actively pursuing new robot development

The papers presented at the Second International Conference on Robotics and Factories of the Future held in San Diego, California, USA during July 28-31, 1987 are compiled in this volume. Over two hundred participants attended the conference,

made technical presentations and discussed about various aspects of manufacturing, robotics and factories of the future. The number of papers published in this volume and the number of unpublished presentations at the conference indicates the evidance of growing interest in the areas of CAD/CAM, robotics and their role in future factories. The conference consisted of five plenary sessions, twenty three technical sessions, workshops, and exhibits from local industries and educational institutions. I wish to acknowledge with many thanks the contributions of all the authors who presented their work at the conference and submitted the manuscripts for publication. It is also my pleasure to acknowledge the role of keynote, banquet, and plenary sessions speakers whose contributions added greatly to the success of the conference. My sincere thanks to all session chairmen. I wish that the series of the International Conferences on Robotics and Factories of the Future which was initiated in 1984 in Charlotte, North Carolina will have a major impact on the use of robots and computers in the automated factories of the future.

The starting point of this book is Sperner's theorem, which answers the question: What is the maximum possible size of a family of pairwise (with respect to inclusion) subsets of a finite set? This theorem stimulated the development of a fast growing theory dealing with external problems on finite sets and, more generally, on finite partially ordered sets. This book presents Sperner theory from a unified point of view, bringing combinatorial techniques together with methods from programming, linear algebra, Lie-algebra representations and eigenvalue methods, probability theory, and enumerative combinatorics. Researchers and graduate students in discrete mathematics, optimisation, algebra, probability theory, number theory, and geometry will find many powerful new methods arising from Sperner theory.

Robotics: Fundamental Concepts and Analysis introduces the science and engineering of robotics and covers mechanical manipulation and sensing. Comprehensive in its coverage, the book also covers some advanced topics which would be useful to both undergraduate and postgraduate students. Written in a lucid style, the text is student-friendly with a large number of examples and exercise problems.

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