

Stepper Motors Fundamentals Applications And Design

Harnessing a multitude of complementary green energy sources is the only plausible way to satisfy the energy demands of a greedy global economy. The potential of solar energy (being the most abundant) in fulfilling part of the energy requirements of mankind is immense and constitutes the focal point of this book. A self-powered solar tracker that points directly towards the sun by means of an integrated control mechanism with two degrees of rotational freedom was studied and developed. The electro-mechanical control system is based on a precisely-timed microcontroller circuit that first computes the altitude and azimuth of the sun in real-time and then drives a pair of stepper motors that steer the solar tracker towards it. A locally built fibre-glass parabolic dish, the surface of which is lined with a reflective vinyl mirror film, serves to concentrate solar rays on its surface.

Encouraged by the response to the first edition and to keep pace with recent developments, *Fundamentals of Electrical Drives, Second Edition* incorporates greater details on semi-conductor controlled drives, includes coverage of permanent magnet AC motor drives and switched reluctance motor drives, and highlights new trends in drive technology. Contents were chosen to satisfy the changing needs of the industry and provide the appropriate coverage of modern and conventional drives. With the large number of examples, problems, and solutions provided, *Fundamentals of Electrical Drives, Second Edition* will continue to be a useful reference for practicing engineers and for those preparing for Engineering Service Examinations.

Electric Aircraft Dynamics: A Systems Engineering Approach surveys engineering sciences that underpin the dynamics, control, monitoring, and design of electric propulsion systems for aircraft. It is structured to appeal to readers with a science and engineering background and is modular in format. The closely linked chapters present descriptive material and relevant mathematical modeling techniques. Taken as a whole, this ground-breaking text equips professional and student readers with a solid foundation for advanced work in this emerging field. Key Features: Provides the first systems-based overview of this emerging aerospace technology Surveys low-weight battery technologies and their use in electric aircraft propulsion Explores the design and use of plasma actuation for boundary layer and flow control Considers the integrated design of electric motor-driven propellers Includes PowerPoint slides for instructors using the text for classes Dr. Ranjan Vepa earned his PhD in applied mechanics from Stanford University, California. He currently serves as a lecturer in the School of Engineering and Material Science, Queen Mary University of London, where he has also been the programme director of the Avionics Programme since 2001. Dr. Vepa is a member of the Royal Aeronautical Society, London; the Institution of Electrical and Electronic Engineers (IIEE), New York; a Fellow of the Higher Education Academy; a member of the Royal Institute of Navigation, London; and a chartered engineer.

For the first time in a single reference, this book provides the beginner with a coherent and logical introduction to the hardware and software of the PIC32, bringing together key material from the PIC32 Reference Manual, Data Sheets, XC32 C Compiler User's Guide, Assembler and Linker Guide, MIPS32 CPU manuals, and Harmony documentation. This book also trains you to use the Microchip documentation, allowing better life-long learning of the PIC32. The philosophy is to get you started quickly, but to emphasize fundamentals and to eliminate "magic steps" that prevent a deep understanding of how the software you write connects to the hardware. Applications focus on mechatronics: microcontroller-controlled electromechanical systems incorporating sensors and actuators. To support a learn-by-doing approach, you can follow the examples throughout the book using the sample code and your PIC32 development board. The exercises at the end of each chapter help you put your new skills to practice.

Coverage includes: A practical introduction to the C programming language Getting up and running quickly with the PIC32 An exploration of the hardware architecture of the PIC32 and differences among PIC32 families Fundamentals of embedded computing with the PIC32, including the build process, time- and memory-efficient programming, and interrupts A peripheral reference, with extensive sample code covering digital input and output, counter/timers, PWM, analog input, input capture, watchdog timer, and communication by the parallel master port, SPI, I2C, CAN, USB, and UART An introduction to the Microchip Harmony programming framework Essential topics in mechatronics, including interfacing sensors to the PIC32, digital signal processing, theory of operation and control of brushed DC motors, motor sizing and gearing, and other actuators such as stepper motors, RC servos, and brushless DC motors For more information on the book, and to download free sample code, please visit <http://www.nu32.org> Extensive, freely downloadable sample code for the NU32 development board incorporating the PIC32MX795F512H microcontroller Free online instructional videos to support many of the chapters

Robotics engineering has progressed from an infant industry in 1961 to one including over 500 robot and allied firms around the world in 1989. During this growth period, many robotics books have been published, so me of which have served as industry standards. Until recently, the design of robotics systems has been primarily the responsibility of the mechanical engineer, and their application in factories has been the responsibility of the manufacturing engineer. Few robotics books address the many systems issues facing electronics engineers or computer programmers. The mid-1980s witnessed a major change in the robotics field. The development of advanced sensor systems (particularly vision), improvements in the intelligence area, and the desire to integrate groups of robots working together in local work cells or in factory-wide systems have greatly increased the participation of electronics engineers and computer programmers. Further, as robots gain in mobility, they are being used in completely new areas, such as construction, firefighting, and underwater exploration, and the need for computers and smart sensors has increased. *Fundamentals of Robotics Engineering* is aimed at the practicing electrical engineer or computer analyst who needs to review the fundamentals of engineering as applied to robotics and to understand the impact on system design caused by constraints unique to robotics. Because there are many good texts covering mechanical engineering topics, this book is limited to an overview of those topics and the effects they have on electrical design and system programs.

Due to their flexible and efficient capabilities, lasers are often used over more traditional machining technologies, such as mechanical drilling and chemical etching, in manufacturing a wide variety of products, from medical implants, gyroscopes, and drug delivery catheters to aircraft engines, printed circuit boards, and fuel cells. *Fundamentals of Laser Micromachining* explains how laser technology is applied to precision micromachining. The book combines background on physics, lasers, optics, and hardware with analysis of markets, materials, and applications. It gives sufficient theoretical background for readers to understand basic concepts while including a further reading appendix for those interested in more detailed theoretical discussions. After reviewing laser history and technology, the author compares available laser sources, including CO₂, excimer, Nd:YAG, fiber, and short pulse. He also addresses topics crucial to obtaining good processing results, such as IR and UV material-photon interaction,

basic optical components, and system integration. The text goes on to cover real-world applications in the medical, microelectronics, aerospace, and other fields. It concludes with details on processing many common materials, such as metals, silicon, ceramics, and glasses. For engineers and project managers, this book provides the foundation to achieve cost-effectiveness, the best edge quality, and the highest resolution in small-scale industrial laser machining. It will help you select the correct kind of laser for your application and identify real opportunities for growth in the marketplace.

Electric Motor Control: DC, AC, and BLDC Motors introduces practical drive techniques of electric motors to enable stable and efficient control of many application systems, also covering basic principles of high-performance motor control techniques, driving methods, control theories and power converters. Electric motor drive systems play a critical role in home appliances, motor vehicles, robotics, aerospace and transportation, heating ventilating and cooling equipment's, robotics, industrial machinery and other commercial applications. The book provides engineers with drive techniques that will help them develop motor drive system for their applications. Includes practical solutions and control techniques for industrial motor drive applications currently in use Contains MATLAB/Simulink simulation files Enables engineers to understand the applications and advantages of electric motor drive systems

While most books on the subject present material only on sensors and actuators, hardware and simulation, or modeling and control, **Mechatronics: An Integrated Approach** presents all of these topics in a single, unified volume from which users with a variety of engineering backgrounds can benefit. The integrated approach emphasizes the design and inst

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 177 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 **Fundamentals of Mobile Heavy Equipment** provides students with a thorough introduction to the diagnosis, repair, and maintenance of off-road mobile heavy equipment. With comprehensive, up-to-date coverage of the latest technology in the field, it addresses the equipment used in construction, agricultural, forestry, and mining industries.

Power Electronics: Drive Technology and Motion Control explores the principles and practices of power electronics, emphasizing drive technology and motion control. The book covers the fundamentals of electric machine transformers, drive systems, electric traction and renewable energy in an e-Mobility chapter. Supported with illustrations and worked examples, the book covers theory, real life applications, and practical/industrial applications of power electronic drive technology and motion control. This book is intended for engineers, researchers and students who are interested in advanced control of power converters and control specialists who like to explore new applications of control theory. Electronic power control is a coupling of electronic technology and applications from power engineering which rely on one another to provide cleaner electrical power, increased speed, reliability of power and accurate and efficient control of power. Includes illustrated diagrams to cover up-to-date industry applications Features in-depth worked examples to enhance understanding of power electronics theory and related practical applications Covers the fundamentals of electric machine transformers, drive systems, electric traction and renewable energy in an e-Mobility chapter

One of the most thorough introductions available to the world's most popular microcontroller!

Embedded Microcomputer Systems: Real Time Interfacing provides an in-depth discussion of the design of real-time embedded systems using 9S12 microcontrollers. This book covers the hardware aspects of interfacing, advanced software topics (including interrupts), and a systems approach to typical embedded applications. This text stands out from other microcomputer systems books because of its balanced, in-depth treatment of both hardware and software issues important in real time embedded systems design. It features a wealth of detailed case studies that demonstrate basic concepts in the context of actual working examples of systems. It also features a unique simulation software package on the bound-in CD-ROM (called Test Execute and Simulate, or TExaS, for short) that provides a self-contained software environment for designing, writing, implementing, and testing both the hardware and software components of embedded systems. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

The objective of **FUNDAMENTALS OF MECHATRONICS** is to cover both hardware and software aspects of mechatronics systems in a single text, giving a complete treatment to the subject matter. The text focuses on application considerations and relevant practical issues that arise in the selection and design of mechatronics components and systems. The text uses several programming languages to illustrate the key topics. Different programming platforms are presented to give instructors the choice to select the programming language most suited to their course objectives. A separate laboratory book, with additional exercises is provided to give guided hands-on experience with many of the topics covered in the text. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Master electric circuits, machines, devices, and power electronics hands on-without expensive equipment. In **LabVIEW for Electric Circuits, Machines, Drives, and Laboratories** Dr. Nesimi Ertugrul uses custom-written LabVIEW Virtual Instruments to illuminate the analysis and operation of a wide range of AC and DC circuits, electrical machines, and drives-including high-voltage/current/power applications covered in no other book. Includes detailed background, VI panels, lab practices, hardware information, and self-study questions - everything you need to achieve true mastery.

This book provides a comprehensive guide to the design and prototyping of wearable technology and internet of things (IoT), in addition to their various components, applications, and practical considerations. The book also offers detailed design and prototyping of vital examples of these technologies covering all practical considerations. The authors begin with an introduction and brief history of wearable tech and IoT. They then move on to describe applications of the technology in the fields of biomedicine, civil defense, education, and more. This is followed by a review of electronic and digital circuits and other critical components. Later chapters discuss product development, security and privacy concerns, and software development.

Fundamentals of Temperature Control focuses on theoretical foundations and principles involved in temperature control. The book first offers information on thermal-process representation and response. Discussions focus on response to

damped harmonic inputs, principle of superposition, bode diagrams, ramp, step, and impulse functions, harmonic response, electrical analogs, basic equations, and thermal conductivity. The text then examines common thermal elements and open-loop temperature control. The publication ponders on closed-loop temperature control and the dynamics of discontinuous temperature control. Topics include dynamics in the phase plane and time domain, dynamic analysis, closed-loop control, secondary feedback, and cooling processes. The manuscript then examines quasi-continuous and continuous temperature control, as well as quasi-continuously controlled process behavior in the time domain and quasi-continuously controlled process behavior in the phase plane. The text is a vital source of data for researchers interested in the fundamentals of temperature control.

This Is The First Indian Publication Devoted Solely To Stepper Motors. It Covers All Aspects Of Stepper Motors: Construction, Operation And Characteristics Of Stepper Motors; Electronic As Well As Microprocessor Based Controllers For Stepper Motors; Stepper Motor Applications In Control, Instrumentation, Computer Peripheral Devices, Cnc Systems, Robotics, Etc.; And Stepper Motor Analysis And Design. Furthermore, The Book Contains Certain Special Features Which Have Appeared, Perhaps For The First Time, In A Book Of This Nature Such As The Latest Remp Disk Magnet Stepper Motor Micros-Tepping Controller, Etc. Certain Indian Contributions To Stepper Motor Controller Technology Have Been Highlighted In Microprocessor-Based Controllers For Stepper Motor. For Practising Engineers And Students, Selection And Sizing Of Stepper Motor Has Been Discussed In Detail And Illustrated With Typical Illustrative Examples. Finally!...a practical, easy-to-understand source for controlling stepper motors! You don't have to be an electrical engineer or rocket scientist to learn how to identify, wire and program stepper motors for your robotic projects. Michael Wright takes the complicated and makes it incredibly easy. Whether you are an elementary student, high school student or robotics engineer, this book is for you! This book includes: Full & Half Stepping for Unipolar/Bipolar Motors Microstepping from scratch!!! How to identify all types of stepper motors. How to figure out what each wire does. How to use the following controllers: ULN2003A X113647 L293D L298N TB6600 FQP30N06L MOSFET Wiring circuits with ease. Programming the Arduino Microcontroller. Detailed line-by-line explanations of the code.

Fundamentals of Medium/Heavy Duty Commercial Vehicle Systems, Second Edition offers comprehensive coverage of basic concepts and fundamentals, building up to advanced instruction on the latest technology coming to market for medium- and heavy-duty trucks and buses. This industry-leading Second Edition includes six new chapters that reflect state-of-the-art technological innovations, such as distributed electronic control systems, energy-saving technologies, and automated driver-assistance systems.

Concern for reliable power supply and energy-efficient system design has led to usage of power electronics-based systems, including efficient electric power conversion and power semiconductor devices. This book provides integration of complete fundamental theory, design, simulation and application of power electronics, and drives covering up-to-date subject components. It contains twenty-one chapters arranged in four sections on power semiconductor devices, basic power electronic converters, advanced power electronics converters, power supplies, electrical drives and advanced applications. Aimed at senior undergraduate and graduate students in electrical engineering and power electronics including related professionals, this book • Includes electrical drives such as DC motor, AC motor, special motor, high performance motor drives, solar, electrical/hybrid vehicle and fuel cell drives • Reviews advances in renewable energy technologies (wind, PV, hybrid power systems) and their integration • Explores topics like distributed generation, microgrid, and wireless power transfer system • Includes simulation examples using MATLAB®/Simulink and over four hundred solved, unsolved and review problems

This book provides a practical and accessible understanding of the fundamental principles of virtual instrumentation. It explains how to acquire, analyze and present data using LabVIEW (Laboratory Virtual Instrument Engineering Workbench) as the application development environment. The book introduces the students to the graphical system design model and its different phases of functionality such as design, prototyping and deployment. It explains the basic concepts of graphical programming and highlights the features and techniques used in LabVIEW to create Virtual Instruments (VIs). Using the technique of modular programming, the book teaches how to make a VI as a subVI. Arrays, clusters, structures and strings in LabVIEW are covered in detail. The book also includes coverage of emerging graphical system design technologies for real-world applications. In addition, extensive discussions on data acquisition, image acquisition, motion control and LabVIEW tools are presented. This book is designed for undergraduate and postgraduate students of instrumentation and control engineering, electronics and instrumentation engineering, electrical and electronics engineering, electronics and communication engineering, and computer science and engineering. It will be also useful to engineering students of other disciplines where courses in virtual instrumentation are offered. Key Features : Builds the concept of virtual instrumentation by using clear-cut programming elements. Includes a summary that outlines important learning points and skills taught in the chapter. Offers a number of solved problems to help students gain hands-on experience of problem solving. Provides several chapter-end questions and problems to assist students in reinforcing their knowledge.

Stepper Motors : Fundamentals, Applications And Design New Age International

This book covers the complete syllabi prescribed for undergraduate courses in electrical, electronics, mechanical and instrumentation engineering offered by various Indian universities. The objective of this text is to provide thorough knowledge in the emerging field of special electrical machines. It discusses the stepper motor, switched reluctance motor, permanent magnet dc and ac motors, brushless dc motors, single phase special electric motors, servomotors, linear electric machines and permanent magnet axial flux machines. Key Features • Chapter on permanent magnet axial flux machines (not available in other Indian authors' books) • Numerous worked-out examples • Based on classroom tested materials • Simplified mathematical analysis Besides undergraduate students, the book will also be useful to the

postgraduate students specialising in drives and control, power electronics, control systems and mechatronics.

An electric machine is a device that converts mechanical energy into electrical energy or vice versa. It can take the form of an electric generator, electric motor, or transformer. Electric generators produce virtually all electric power we use all over the world. Electric machine blends the three major areas of electrical engineering: power, control and power electronics. This book presents the relation of power quantities for the machine as the current, voltage power flow, power losses, and efficiency. This book will provide a good understanding of the behavior and its drive, beginning with the study of salient features of electrical dc and ac machines.

Electric motors are the largest consumer of electric energy and they play a critical role in the growing market for electrification. Due to their simple construction, switched reluctance motors (SRMs) are exceptionally attractive for the industry to respond to the increasing demand for high-efficiency, high-performance, and low-cost electric motors with a more secure supply chain. Switched Reluctance Motor Drives: Fundamentals to Applications is a comprehensive textbook covering the major aspects of switched reluctance motor drives. It provides an overview of the use of electric motors in the industrial, residential, commercial, and transportation sectors. It explains the theory behind the operation of switched reluctance motors and provides models to analyze them. The book extensively concentrates on the fundamentals and applications of SRM design and covers various design details, such as materials, mechanical construction, and controls. Acoustic noise and vibration is the most well-known issue in switched reluctance motors, but this can be reduced significantly through a multidisciplinary approach. These methodologies are explained in two chapters of the book. The first covers the fundamentals of acoustic noise and vibration so readers have the necessary tools to analyze the problems and explains the surface waves, spring-mass models, forcing harmonics, and mode shapes that are utilized in modeling and analyzing acoustic noise and vibration. The second applies these fundamentals to switched reluctance motors and provides examples for determining the sources of any acoustic noise in switched reluctance motors. In the final chapter two SRM designs are presented and proposed as replacements for permanent magnet machines in a residential HVAC application and a hybrid-electric propulsion application. It also shows a high-power and compact converter design for SRM drives. Features: Comprehensive coverage of switched reluctance motor drives from fundamental principles to design, operation, and applications A specific chapter on electric motor usage in industrial, residential, commercial, and transportation applications to address the benefits of switched reluctance machines Two chapters address acoustic noise and vibration in detail Numerous illustrations and practical examples on the design, modeling, and analysis of switched reluctance motor drives Examples of switched reluctance motor and drive design

Power electronics, which is a rapidly growing area in terms of research and applications, uses modern electronics technology to convert electric power from one form to another, such as ac-dc, dc-dc, dc-ac, and ac-ac with a variable output magnitude and frequency. It has many applications in our every day life such as air-conditioners, electric cars, sub-way trains, motor drives, renewable energy sources and power supplies for computers. This book covers all aspects of switching devices, converter circuit topologies, control techniques, analytical methods and some examples of their applications. Designed to appeal to a new generation of engineering professionals, Power Electronics Handbook, 3rd Edition features four new chapters covering renewable energy, energy transmission, energy storage, as well as an introduction to Distributed and Cogeneration (DCG) technology, including gas turbines, gensets, microturbines, wind turbines, variable speed generators, photovoltaics and fuel cells, has been gaining momentum for quite some time now. smart grid technology. With this book readers should be able to provide technical design leadership on assigned power electronics design projects and lead the design from the concept to production involving significant scope and complexity. Contains 45 chapters covering all aspects of power electronics and its applications Three new chapters now including coverage Energy Sources, Energy Storage and Electric Power Transmission Contributions from more than fifty leading experts spanning twelve different countries

The Importance of servo motor sizing should not be underestimated. Proper motor sizing will not only result in significant cost savings by saving energy, reducing purchasing and operating costs, reducing downtime, etc.; it also helps the engineer to design better motion control systems. However, the knowledge of mechanical systems and their influence on motor speed, inertia and torque requirements seems to decline in a world where modern technology aspects, such as tuning and programming, seem to be the main focus. The motor sizing process involves a number of mathematical equations, which are most certainly documented, but not necessarily with the motor sizing process in mind. This book focuses primarily on servo motor sizing and it documents in detail the inertia and torque calculations of standard mechanical components and the motor selection process.

This book provides a thorough overview of cutting-edge research on electronics applications relevant to industry, the environment, and society at large. It covers a broad spectrum of application domains, from automotive to space and from health to security, while devoting special attention to the use of embedded devices and sensors for imaging, communication and control. The book is based on the 2018 ApplePies Conference, held in Pisa, Italy in September 2018, which brought together researchers and stakeholders to consider the most significant current trends in the field of applied electronics and to debate visions for the future. Areas addressed by the conference included information communication technology; biotechnology and biomedical imaging; space; secure, clean and efficient energy; the environment; and smart, green and integrated transport. As electronics technology continues to develop apace, constantly meeting previously unthinkable targets, further attention needs to be directed toward the electronics applications and the development of systems that facilitate human activities. This book, written by industrial and academic professionals, represents a valuable contribution in this endeavor.

This is a single-volume book on 'electrical machines' that teaches the subject precisely and yet with amazing clarity. The extent has been kept in control so that the entire subject can be covered by students within the limited time of the semesters. Thus, they will not have to consult multiple books anymore. The discussions of concepts include the modern trends used in industry, like efficient transformers, efficient induction motors, DC drives, and the problems related to them.

HYDRAULIC FLUID POWER LEARN MORE ABOUT HYDRAULIC TECHNOLOGY IN HYDRAULIC SYSTEMS DESIGN WITH THIS COMPREHENSIVE RESOURCE Hydraulic Fluid Power provides readers with an original approach to hydraulic technology education that focuses on the design of complete hydraulic systems. Accomplished authors and researchers Andrea Vacca and Germano Franzoni begin by describing the foundational principles of hydraulics and the basic physical components of hydraulics systems. They go on to walk readers through the most practical and useful system concepts for controlling hydraulic functions in modern, state-of-the-art systems. Written in an approachable and accessible style, the book's concepts are classified, analyzed,

presented, and compared on a system level. The book also provides readers with the basic and advanced tools required to understand how hydraulic circuit design affects the operation of the equipment in which it's found, focusing on the energy performance and control features of each design architecture. Readers will also learn how to choose the best design solution for any application. Readers of Hydraulic Fluid Power will benefit from: Approaching hydraulic fluid power concepts from an "outside-in" perspective, emphasizing a problem-solving orientation Abundant numerical examples and end-of-chapter problems designed to aid the reader in learning and retaining the material A balance between academic and practical content derived from the authors' experience in both academia and industry Strong coverage of the fundamentals of hydraulic systems, including the equations and properties of hydraulic fluids Hydraulic Fluid Power is perfect for undergraduate and graduate students of mechanical, agricultural, and aerospace engineering, as well as engineers designing hydraulic components, mobile machineries, or industrial systems.

*A complete, definitive source for the design, manufacture, application, and testing of small electric motors less than ten horsepower *Gives motor design engineers, test technicians, and engineers top-to-bottom coverage of materials used in motor manufacturing, as well as how-to advice on selecting the right design and assembly method *Includes a full section on motor applications

An introductory guide to basic science and engineering concepts.

The First Maker-Friendly Guide to Electric Motors! Makers can do amazing things with motors. Yes, they're more complicated than some other circuit elements, but with this book, you can completely master them. Once you do, incredible new projects become possible. Unlike other books, Motors for Makers is 100% focused on what you can do. Not theory. Making. First, Matthew Scarpino explains how electric motors work and what you need to know about each major type: stepper, servo, induction, and linear motors. Next, he presents detailed instructions and working code for interfacing with and controlling servomotors with Arduino Mega, Raspberry Pi, and BeagleBone Black. All source code and design files are available for you to download from motorsformakers.com. From start to finish, you'll learn through practical examples, crystal-clear explanations, and photos. If you've ever dreamed of what you could do with electric motors, stop dreaming...and start making! Understand why electric motors are so versatile and how they work Choose the right motor for any project Build the circuits needed to control each type of motor Program motor control with Arduino Mega, Raspberry Pi, or BeagleBone Black Use gearmotors to get the right amount of torque Use linear motors to improve speed and precision Design a fully functional electronic speed control (ESC) circuit Design your own quadcopter Discover how electric motors work in modern electric vehicles--with a fascinating inside look at Tesla's patents for motor design and control!

In this book, modeling and control design of electric motors, namely step motors, brushless DC motors and induction motors, are considered. The book focuses on recent advances on feedback control designs for various types of electric motors, with a slight emphasis on stepper motors. For this purpose, the authors explore modeling of these devices to the extent needed to provide a high-performance controller, but at the same time one amenable to model-based nonlinear designs. The control designs focus primarily on recent robust adaptive nonlinear controllers to attain high performance. It is shown that the adaptive robust nonlinear controller on its own achieves reasonably good performance without requiring the exact knowledge of motor parameters. While carefully tuned classical controllers often achieve required performance in many applications, it is hoped that the advocated robust and adaptive designs will lead to standard universal controllers with minimal need for fine tuning of control parameters.

Electric Motors and Drives: Fundamentals, Types and Applications provides information regarding the inner workings of motor and drive system. The book is comprised of nine chapters that cover several aspects and types of motor and drive systems. Chapter 1 discusses electric motors, and Chapter 2 deals with power electronic converters for motor drives. Chapter 3 covers the conventional d.c. motors, while Chapter 4 tackles inductions motors – rotating field, slip, and torque. The book also talks about the operating characteristics of induction motors, and then deals with the inverter-fed induction motor drives. The stepping motor systems; the synchronous, switched reluctance, and brushless d.c. drives; and the motor/drive selection are also covered. The text will be of great use to individuals who wish to familiarize themselves with motor and drive systems.

Fundamentals of 3D Food Printing and Applications provides an update on this emerging technology that can not only create complex edible shapes, but also enable the alteration of food texture and nutritional content required by specific diets. This book discusses 3D food printing technologies and their working mechanisms within a broad spectrum of application areas, including, but not limited to, the development of soft foods and confectionary designs. It provides a unique and contemporary guide to help correlate supply materials (edible inks) and the technologies (e.g., extrusion and laser based) used during the construction of computer-aided 3D shapes. Users will find a great reference that will help food engineers and research leaders in food science understand the characteristics of 3D food printing technologies and edible inks. Details existing 3D food printing techniques, with an in-depth discussion on the mechanisms of formation of self-supporting layers Includes the effects of flow behaviour and viscoelastic properties of printing materials Presents strategies to enhance printability, such as the incorporation of hydrocolloids and lubricant enhancers 3D printing features of a range of food materials, including cereal based, insect enriched, fruits and vegetables, chocolate and dairy ingredients Business development for chocolate printing and the prospects of 3D food printing at home for domestic applications Prosumer-driven 3D food printing Safety and labelling of 3D printed food

[Copyright: 79f32607489a6bbd5dd3075c0c1c12d8](https://www.amazon.com/dp/79f32607489a6bbd5dd3075c0c1c12d8)