

# Fundamentals Of Electric Drives

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<i>Fundamentals Of Electric Drives</i>	<i>2020-04-26</i>
<b>SIMONE MOODY</b>	
<u>Fundamentals of Electric Drives</u> Springer Science & Business Media	
For introductory (senior) level and graduate level courses in electric drives/power electronics. The book develops a systematic approach to motor drives. While the emphasis is on practice; extensive modeling, simulation and analysis is developed to assist readers in their understanding of the subject matter from fundamental principles. Also, each motor drive is illustrated with an industrial application in detail at the end of chapters to enable readers to relate theory to practice.	
<b>Fundamentals of Electrical Drives</b> Alpha Science Int'l Ltd.	
Electric Motors and Drives is intended for non-specialist users of electric motors and drives, filling the gap between maths- and theory-based academic textbooks and the more prosaic 'handbooks', which provide useful detail but little opportunity for the development of real insight and understanding. The book explores all of the widely-used modern types of motor and drive, including conventional and brushless D.C., induction motors and servo drives, providing readers with the knowledge to select the right technology for a given job. The third edition includes additional diagrams and worked examples throughout. New topics include digital interfacing and control of drives, direct torque control of induction motors and current-fed operation in DC drives. The material on brushless servomotors has also been expanded. Austin Hughes' approach, using a minimum of maths, has established Electric Motors and Drives as a leading guide for electrical engineers and mechanical engineers, and the key to a complex subject for a wider readership, including technicians, managers and students. Acquire knowledge of and understanding of the capabilities and limitations of motors and drives without struggling through unnecessary maths and theory Updated material on the latest and most widely-used modern motors and drives, including brushless servomotors New edition includes additional diagrams and worked examples throughout	
<u>ELECTRIC DRIVES</u> Academic Guru Publishing House	
Power Electronics and Electric Drives for Traction Applications offers a practical approach to understanding power electronics applications in transportation systems ranging from railways to electric vehicles and ships. It is an application-oriented book for the design and development of traction systems accompanied by a description of the core technology. The first four introductory chapters describe the common knowledge and background required to understand the preceding chapters. After that, each application-specific chapter: highlights the significant manufacturers involved; provides a historical account of the technological evolution experienced; distinguishes the physics and mechanics; and where possible, analyses a real life example and provides the necessary models and simulation tools, block diagrams and simulation based validations. Key features: Surveys power electronics state-of-the-art in all aspects of traction applications. Presents vital design and development knowledge that is extremely important for the professional community in an original, simple, clear and complete manner. Offers design guidelines for power electronics traction systems in high-speed rail, ships, electric/hybrid vehicles, elevators and more applications. Application-specific chapters co-authored by traction industry expert. Learning supplemented by tutorial sections, case studies and MATLAB/Simulink-based simulations with data from practical systems. A valuable reference for application engineers in traction industry responsible for design and development of products as well as traction industry researchers, developers and graduate students on power electronics and motor drives needing a reference to the application examples.	
<b>Embedded Systems</b> New Age International	
· Provides an overall understanding of all aspects of AC electrical drives, from the motor and converter to the implemented control algorithm, with minimum mathematics needed · Demonstrates how to implement and debug electrical drive systems using a set of dedicated	

hardware platforms, motor setup and software tools in VisSim™ and PLECS™ · No expert programming skills required, allowing the reader to concentrate on drive development · Enables the reader to undertake real-time control of a safe (low voltage) and low cost experimental drive This book puts the fundamental and advanced concepts behind electric drives into practice. Avoiding involved mathematics whenever practical, this book shows the reader how to implement a range of modern day electrical drive concepts, without requiring in depth programming skills. It allows the user to build and run a series of AC drive concepts, ranging from very basic drives to sophisticated sensorless drives. Hence the book is the only modern resource available that bridges the gap between simulation and the actual experimental environment. Engineers who need to implement an electrical drive, or transition from sensed to sensorless drives, as well as students who need to understand the practical aspects of working with electrical drives, will greatly benefit from this unique reference.

*Electric Drives and Electromechanical Systems* John Wiley & Sons

Suitable for undergraduate courses on electrical drives, the contents in this book constitute a mix of modern and conventional. Topics such as solar powered drives, modern traction drives and energy conservation in electrical drives have been covered for the first time in a book of this level. A large number of solved and unsolved problems are included.

*Electrical Machines, Drives, and Power Systems* Cengage Learning

The purpose of this book is to familiarize the reader with all aspects of electrical drives. It contains a comprehensive user-friendly introductory text.

**Fundamentals of Electric Drives** Springer Nature

Discusses fundamentals of electrical drives, this book describes in detail dynamics of electrical drives; characteristics of dc and ac motors while starting, running and braking; and, determination of rating and heating of motors.

**Switched Reluctance Motor Drives** John Wiley & Sons

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 and Motor Drives CRC Press

Embedded Systems: A Contemporary Design Tool, Second Edition Embedded systems are one of the foundational elements of todays evolving and growing computer technology. From operating our cars, managing our smart phones, cleaning our homes, or cooking our meals, the special computers we call embedded systems are quietly and unobtrusively making our lives easier, safer, and more connected. While working in increasingly challenging environments, embedded systems give us the ability to put increasing amounts of capability into ever-smaller and more powerful devices. Embedded Systems: A Contemporary Design Tool, Second Edition introduces you to the theoretical hardware and software foundations of these systems and expands into the areas of signal integrity, system security, low power, and hardware-software co-design. The text builds upon earlier material to show you how to apply reliable, robust solutions to a wide range of applications operating in todays often challenging environments. Taking the users problem and needs as your starting point, you will explore each of the key theoretical and practical issues to consider when designing an application in todays world. Author James Peckol walks you through the formal hardware and software development process covering: Breaking the problem down into major functional blocks; Planning the digital and software architecture of the system; Utilizing the hardware and software co-design process; Designing the physical world interface to external analog and digital signals; Addressing security issues as an integral part of the design process; Managing signal integrity problems and reducing power demands in contemporary systems; Debugging and testing throughout the design and development cycle; Improving performance. Stressing the importance of security, safety, and reliability in the design and development of embedded systems and providing a balanced treatment of both the hardware and the software aspects, Embedded Systems: A Contemporary Design Tool, Second Edition gives you the tools for creating embedded designs that solve contemporary real-world challenges. Visit the book's website at: <http://bcs.wiley.com/he-bcs/Books?action=index&bcsId=11853&itemId=1119457505>

**Advanced Electrical Drives** PHI Learning Pvt. Ltd.

This comprehensive text examines existing and emerging electrical drive technologies. The authors clearly define the most basic electrical drive concepts and go on to explain the most important details while maintaining a solid connection to the theory and design of the associated electrical machines. Also including links to a number of industrial applications, the authors take their investigation of electrical drives beyond theory to examine a number of practical aspects of electrical drive control and application. Key features: \* Provides a comprehensive summary of all aspects of controlled-speed electrical drive technology including control and operation. \* Handling of electrical drives is solidly linked to the theory and design of the associated electrical machines. Added insight into problems and functions are illustrated with clearly understandable figures. \* Offers an understanding of the main phenomena associated with electrical machine drives. \* Considers the problem of bearing currents and voltage stresses of an electrical drive. \* Includes up-to-date theory and design guidelines, taking into account the most recent advances. This book's rigorous coverage of theoretical principles and techniques makes for an excellent introduction to controlled-speed electrical drive technologies for Electrical Engineering MSc or PhD students studying electrical drives. It also serves as an excellent reference for practicing electrical engineers looking to carry out design, analyses, and development of controlled-speed electrical drives.

*Electric Motors and Drives* John Wiley & Sons

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and

communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. Power Electronics and Motor Drives facilitates a necessary shift from low-power electronics to the high-power varieties used to control electromechanical systems and other industrial applications. This volume of the handbook: Focuses on special high-power semiconductor devices Describes various electrical machines and motors, their principles of operation, and their limitations Covers power conversion and the high-efficiency devices that perform the necessary switchover between AC and DC Explores very specialized electronic circuits for the efficient control of electric motors Details other applications of power electronics, aside from electric motors—including lighting, renewable energy conversion, and automotive electronics Addresses power electronics used in very-high-power electrical systems to transmit energy Other volumes in the set: Fundamentals of Industrial Electronics Control and Mechatronics Industrial Communication Systems Intelligent Systems

**Electric Motors and Drives** John Wiley & Sons

Electrification is an evolving paradigm shift in the transportation industry toward more efficient, higher performance, safer, smarter, and more reliable vehicles. There is in fact a clear trend to move from internal combustion engines (ICEs) to more integrated electrified powertrains. Providing a detailed overview of this growing area, *Advanced Electric Drive Vehicles* begins with an introduction to the automotive industry, an explanation of the need for electrification, and a presentation of the fundamentals of conventional vehicles and ICEs. It then proceeds to address the major components of electrified vehicles—i.e., power electronic converters, electric machines, electric motor controllers, and energy storage systems. This comprehensive work: Covers more electric vehicles (MEVs), hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), range-extended electric vehicles (REEVs), and all-electric vehicles (EVs) including battery electric vehicles (BEVs) and fuel cell vehicles (FCVs) Describes the electrification technologies applied to nonpropulsion loads, such as power steering and air-conditioning systems Discusses hybrid battery/ultra-capacitor energy storage systems, as well as 48-V electrification and belt-driven starter generator systems Considers vehicle-to-grid (V2G) interface and electrical infrastructure issues, energy management, and optimization in advanced electric drive vehicles Contains numerous illustrations, practical examples, case studies, and challenging questions and problems throughout to ensure a solid understanding of key concepts and applications *Advanced Electric Drive Vehicles* makes an ideal textbook for senior-level undergraduate or graduate engineering courses and a user-friendly reference for researchers, engineers, managers, and other professionals interested in transportation electrification.

**Electric Machines and Drives** PHI Learning Pvt. Ltd.

Electrical drives play an important role as electromechanical energy converters in transportation, material handling and most production processes. The ease of controlling electrical drives is an important aspect for meeting the increasing demands by the user with respect to flexibility and precision, caused by technological progress in industry as well as the need for energy conservation. At the same time, the control of electrical drives has provided strong incentives to control engineering in general, leading to the development of new control structures and their introduction to other areas of control. This is due to the stringent operating conditions and widely varying specifications - a drive may alternately require control of torque, acceleration, speed or position - and the fact that most electric drives have - in contrast to chemical or thermal processes - well defined structures and consistent dynamic characteristics. During the last years the field of controlled electrical drives has undergone rapid expansion due mainly to the advances of semiconductors in the form of power electronics as well as analogue and digital signal electronics, eventually culminating in microelectronics and microprocessors. The introduction of electronically switched solid-state power converters has renewed the search for adjustable speed AC motor

drives, not subject to the limitations of the mechanical commutator of DC drives which dominated the field for a century.

**Advanced Electrical Drives** Tata McGraw-Hill Education

"In this book, fundamentals of electrical drives are discussed keeping in mind the students of electrical engineering. Dynamics of electrical drives; characteristics of dc and ac motors while starting, running and braking; determination of rating and heating of motors are described in detail. Drives used in various industries are discussed in a separate chapter 'Industrial Applications'. Solved examples and problems are given at the end of most of the chapters. The book acquaints the students with the recent trends in the development of electric motors used as prime movers in electric drive systems. The chapter on 'Introduction to Solid State Controlled Drives' has been expanded to include sections on increasingly used 'Brushless dc motors' and 'Switched-reluctance motors'. A separate chapter on the more commonly used position control drive motors, namely, 'Stepper Motors' has been also incorporated."--Amazon.in

**Advanced Electric Drive Vehicles** Butterworth-Heinemann

Master the basic topics and fundamental concepts underlying electric machines, power electronics, and electric drives with **FUNDAMENTALS OF ELECTRIC DRIVES**, 2nd Edition. While other books on electric drives concentrate on converters and waveform analysis and ignore mechanical load dynamics or emphasize motor characteristics with little analysis of converters and controllers, this unique approach provides a complete overview of the subject at a level that's ideal for full comprehension. You follow the analysis and design of a complete electric drive system with coverage of mechanical loads, motors, converters, sensing, and controllers. The author clearly presents drive applications to electric traction, robotics, and wind energy using real examples from industry throughout. With its practical content, this book even serves as a useful reference for professional electric drive engineers.

**Basics of Electrical Drives** Newnes

Suitable for undergraduate and postgraduate courses in electrical drives, this book covers topics on: Dynamics and control of electrical drives; Selection of motor power rating; DC, induction and synchronous motor drives; Stepper motor and switched reluctance motor drives; Permanent magnet ac and brushless dc motor drives; and more.

**Fundamentals Of Electric Drives** CRC Press

*Electric Drives and Electromechanical Devices: Applications and Control*, Second Edition, presents a unified approach to the design and application of modern drive system. It explores problems involved in assembling complete, modern electric drive systems involving mechanical, electrical, and electronic elements. This book provides a global overview of design, specification applications, important design information, and methodologies. This new edition has been restructured to present a seamless, logical discussion on a wide range of topical problems relating to the design and specification of the complete motor-drive system. It is organised to establish immediate solutions to specific application problem. Subsidiary issues that have a considerable impact on the overall performance and reliability, including environmental protection and costs, energy efficiency, and cyber security, are also considered. Presents a comprehensive consideration of electromechanical systems with insights into the complete drive system, including required sensors and mechanical components Features in-depth discussion of control schemes, particularly focusing on practical operation Includes extensive references to modern application domains and real-world case studies, such as electric vehicles Considers the cyber aspects of drives, including networking and security

**Fundamentals of Industrial Drives** Springer

A guide to drives essential to electric vehicles, wind turbines, and other motor-driven systems *Analysis and Control of Electric Drives* is a practical and comprehensive text that offers a clear understanding of electric drives and their industrial applications in the real-world including electric vehicles and wind turbines. The authors—noted experts on the topic—review the basic knowledge needed to understand electric drives and include the pertinent material that examines DC and AC machines in steady state using a unique physics-based approach. The book also analyzes electric machine operation under dynamic conditions, assisted by Space Vectors. The book is filled with

illustrative examples and includes information on electric machines with Interior Permanent Magnets. To enhance learning, the book contains end-of-chapter problems and all topics covered use computer simulations with MATLAB Simulink® and Sciamble® Workbench software that is available free online for educational purposes. This important book: Explores additional topics such as electric machines with Interior Permanent Magnets Includes multiple examples and end-of-chapter homework problems Provides simulations made using MATLAB Simulink® and Sciamble® Workbench, free software for educational purposes Contains helpful presentation slides and Solutions Manual for Instructors; simulation files are available on the associated website for easy implementation A unique feature of this book is that the simulations in Sciamble® Workbench software can seamlessly be used to control experiments in a hardware laboratory Written for undergraduate and graduate students, *Analysis and Control of Electric Drives* is an essential guide to understanding electric vehicles, wind turbines, and increased efficiency of motor-driven systems.

**Fundamentals of Electric Machines: A Primer with MATLAB** Wiley Global Education

Written for non-specialist users of electric motors and drives, this book explains how electric drives work and compares the performance of the main systems, with many examples of applications. The author's approach - using a minimum of mathematics - has made this book equally popular as an outline for professionals and an introductory student text. \* First edition (1990) has sold over 6000 copies. Drives and Controls on the first edition: 'This book is very readable, up-to-date and should be extremely useful to both users and o.e.m. designers. I unhesitatingly recommend it to any busy engineer who needs to make informed judgements about selecting the right drive system.' New features of the second edition: \* New section on the cycloconverter drive. \* More on switched reluctance motor drives. \* More on vector-controlled induction motor drives. \* More on power switching devices. \* New 'question and answer' sections on common problems and misconceptions. \* Updating throughout. *Electric Motors and Drives* is for non-specialist users of electric motors and drives. It fills the gap between specialist textbooks (which are pitched at a level which is too academic for the average user) and the more prosaic 'handbooks' which are filled with useful detail but provide little opportunity for the development of any real insight or understanding. The book explores most of the widely-used modern types of motor and drive, including conventional and brushless d.c., induction motors (mains and inverter-fed), stepping motors, synchronous motors (mains and converter-fed) and reluctance motors.

**Electric Drives** John Wiley & Sons

This book provides a unique approach to derive model-based torque controllers for all types of Lorentz force machines, i.e. DC, synchronous and induction machines. The rotating transformer model forms the basis for the generalized modeling approach of rotating field machines, which leads to the development of universal field-oriented control algorithms. Contrary to this, direct torque control algorithms, using observer-based methods, are developed for switched reluctance machines. Tutorials are included at the end of each chapter, and the reader is encouraged to execute these tutorials in order to gain familiarity with the dynamic behavior of drive systems. This updated edition uses PLECS® simulation and vector processing tools that were specifically adopted for the purpose of these hands-on tutorials. Hence, *Advanced Electrical Drives* encourages "learning by doing" and the experienced drive specialist may find the simulation tools useful to design high-performance torque controllers. Although it is a powerful reference in its own right, when used in conjunction with the companion texts *Fundamentals of Electrical Drives* and *Applied Control of Electrical Drives*, this book provides a uniquely comprehensive reference set that takes readers all the way from understanding the basics of how electrical drives work, to deep familiarity with advanced features and models, to a mastery of applying the concepts to actual hardware in practice. Teaches readers to perform insightful analysis of AC electrical machines and drives; Introduces new modeling methods and modern control techniques for switched reluctance drives; Updated to use PLECS® simulation tools for modeling electrical drives, including new and more experimental results; Numerous tutorials at end of each chapter to learn by doing, step-by-step; Includes extra material featuring "build and play" lab modules, for lectures and self-study.