

Electrical Drives And Control Textbook

Fundamentals of Electrical Drives

André Veltman

2007-06-14 Electrical drives in general play a key role in power generation, household appliances, automotive and industrial applications. The rapidly expanding area of adjustable speed drives as used in robotics, wind turbines and hybrid vehicles is driven by innovations in machine design, power semi-conductors, digital signal processors and simulation software.

Fundamentals of Electrical Drives is for readers with a basic engineering knowledge who have a need or desire to comprehend and apply the theory and simulation methods which are applied by drive specialist throughout the world.

Control of Electrical Drives

Werner Leonhard 2012-12-06

Electrical drives play an important part as electromechanical energy

converters in transportation, materials handling and most production processes. This book presents a unified treatment of complete electrical drive systems, including the mechanical parts, electrical machines, and power converters and control. Since it was first published in 1985 the book has found its way onto many desks in industry and universities all over the world. For the second edition the text has been thoroughly revised and updated, with the aim of offering the reader a general view of the field of controlled electrical drives, which are maintaining and extending their importance as the most flexible source of controlled mechanical energy.

Applied Control of Electrical Drives

Duco W. J. Pulle

2015-09-17 · 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.

Fundamentals of Electrical Drives Andre Veltman

2016-06-10 The purpose of this book is to familiarize the reader with all aspects of electrical drives. It contains a comprehensive user-friendly introductory text.

Advanced Electrical Drives Rik De Doncker 2010-11-30

Electrical drives convert in a controlled manner, electrical energy into mechanical energy. Electrical drives comprise an electrical machine, i.e. an electro-mechanical energy converter, a power electronic converter, i.e. an electrical-to-electrical converter, and a controller/communication unit. Today, electrical drives are used as propulsion systems in high-speed trains, elevators,

escalators, electric ships, electric forklift trucks and electric vehicles. Advanced control algorithms (mostly digitally implemented) allow torque control over a high-bandwidth. Hence, precise motion control can be achieved. Examples are drives in robots, pick-and-place machines, factory automation hardware, etc. Most drives can operate in motoring and generating mode. Wind turbines use electrical drives to convert wind energy into electrical energy. More and more, variable speed drives are used to save energy for example, in air-conditioning units, compressors, blowers, pumps and home appliances. Key to ensure stable operation of a drive in the aforementioned applications are torque control algorithms. In *Advanced Electrical Drives*, a unique approach is followed 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 this generalized modeling approach that ultimately leads to the development of universal field-oriented control algorithms. In case of switched reluctance machines, torque observers are proposed to implement direct torque algorithms. From a didactic viewpoint, tutorials are included at the end of each chapter. The reader is encouraged to execute these tutorials to familiarize him or herself with all aspects of drive technology. Hence, *Advanced Electrical Drives* encourages “learning by doing”. Furthermore, the experienced drive specialist may find the simulation tools useful to design high-performance controllers for all sorts of electrical drives.

[A First Course on Electrical Drives](#) S. K. Pillai 1989 The Aim Of Revision Is Mainly To Acquaint 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

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Has Been Expanded To Include Sections On Increasingly Used *Brushless Dcmotors And Switched-Reluctance Motors.A Separate Chapter On The More Commonly Used Position Control Drive Motors, Namely, Stepper Motors Has Been Also Incorporated.The Drives Used In The Fast Growing Petroleum Industry Have Been Included In The Chapter On Industrial applications.

Electrical Machine Drives

Control Juha Pyrhonen

2016-10-10 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 Drives and Electromechanical Systems
Richard Crowder 2019-10-19
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

Electric Motors and Drives

Austin Hughes 1993 "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. Now 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."--BOOK JACKET.

Fundamentals of Electrical Drives DUBEY GOPAL K

2002-06-13 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.

Applied Control of Electrical Drives Duco W. J. Pulle 2015 ·

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.

Electrical Drives and Controls

J. Gnanavadiel 2004

Control of Electrical Drives' W. Leonhard 1990

Electrical Drives and Control Uday A. Bakshi 2007

Predictive Control of Power Converters and Electrical Drives Jose Rodriguez

2012-04-09 Describes the general principles and current research into Model Predictive Control (MPC); the most up-to-date control method for power converters and drives The book starts with an introduction to the subject before the first chapter on classical control methods for power converters and drives. This covers classical converter control methods and classical electrical drives control methods. The next chapter on Model predictive control first looks at predictive control methods for power converters and drives and presents the basic principles of MPC. It then looks at MPC for power electronics and drives. The third chapter is on predictive control applied to power converters. It discusses:

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control of a three-phase inverter; control of a neutral point clamped inverter; control of an active front end rectifier, and; control of a matrix converter. In the middle of the book there is Chapter four - Predictive control applied to motor drives. This section analyses predictive torque control of industrial machines and predictive control of permanent magnet synchronous motors. Design and implementation issues of model predictive control is the subject of the final chapter. The following topics are described in detail: cost function selection; weighting factors design; delay compensation; effect of model errors, and prediction of future references. While there are hundreds of books teaching control of electrical energy using pulse width modulation, this will be the very first book published in this new topic. Unique in presenting a completely new theoretic solution to control electric power in a simple way Discusses the application of

predictive control in motor drives, with several examples and case studies Matlab is included on a complementary website so the reader can run their own simulations

Control of Electric Machine Drive Systems Seung-Ki Sul
2011-04-20 A unique approach to sensorless control and regulator design of electric drives Based on the author's vast industry experience and collaborative works with other industries, Control of Electric Machine Drive Systems is packed with tested, implemented, and verified ideas that engineers can apply to everyday problems in the field. Originally published in Korean as a textbook, this highly practical updated version features the latest information on the control of electric machines and apparatus, as well as a new chapter on sensorless control of AC machines, a topic not covered in any other publication. The book begins by explaining the features of the electric drive system and trends of development in

related technologies, as well as the basic structure and operation principles of the electric machine. It also addresses steady state characteristics and control of the machines and the transformation of physical variables of AC machines using reference frame theory in order to provide a proper foundation for the material. The heart of the book reviews several control algorithms of electric machines and power converters, explaining active damping and how to regulate current, speed, and position in a feedback manner. Seung-Ki Sul introduces tricks to enhance the control performance of the electric machines, and the algorithm to detect the phase angle of an AC source and to control DC link voltages of power converters. Topics also covered are: Vector control Control algorithms for position/speed sensorless drive of AC machines Methods for identifying the parameters of electric machines and power converters The matrix algebra

to model a three-phase AC machine in d-q-n axes Every chapter features exercise problems drawn from actual industry experience. The book also includes more than 300 figures and offers access to an FTP site, which provides MATLAB programs for selected problems. The book's practicality and realworld relatability make it an invaluable resource for professionals and engineers involved in the research and development of electric machine drive business, industrial drive designers, and senior undergraduate and graduate students. To obtain instructor materials please send an email to pressbooks@ieee.org To visit this book's FTP site to download MATLAB codes, please click on this link: ftp://ftp.wiley.com/public/sci_tech_med/electric_machine/ MATLAB codes are also downloadable from Wiley Booksupport Site at <http://booksupport.wiley.com>

Advanced Control of Electrical Drives and Power

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Electronic Converters Jacek Kabziński 2016-09-30 This contributed volume is written by key specialists working in multidisciplinary fields in electrical engineering, linking control theory, power electronics, artificial neural networks, embedded controllers and signal processing. The authors of each chapter report the state of the art of the various topics addressed and present results of their own research, laboratory experiments and successful applications. The presented solutions concentrate on three main areas of interest: · motion control in complex electromechanical systems, including sensorless control; · fault diagnosis and fault tolerant control of electric drives; · new control algorithms for power electronics converters. The chapters and the complete book possess strong monograph attributes. Important practical and theoretical problems are deeply and accurately

presented on the background of an exhaustive state-of-the-art review. Many results are completely new and were never published before. Well-known control methods like field oriented control (FOC) or direct torque control (DTC) are referred as a starting point for modifications or are used for comparison. Among numerous control theories used to solve particular problems are: nonlinear control, robust control, adaptive control, Lyapunov techniques, observer design, model predictive control, neural control, sliding mode control, signal filtration and processing, fault diagnosis, and fault tolerant control.

Electrical Drives and Control for Automation P.

Aruna Jeyanthi 2018-06-03 Electrical drives convert electrical energy into mechanical energy and act as a intermediary between electrical supply systems, various energy sources, driven machines and the energy consumer. Electrical drives are major component in industrial applications, driven technical

developments and focus of various developments. The core component of every electrical drive is the motor. This book is divided into six modules. Module 1 deals with DC machines, principles of operation, emf equation and armature reaction. Module 2 contain principles of DC motors and their torque-speed characteristics. Module 3 mainly deals with transformers and their efficiency calculations. In module 4, various aspects of induction motors were covered. Module 5 and 6 mainly focusses on split phase and stepper motors. Today electrical drives and their automation has become an essential integral part of every system and process. This book will focus primarily on electrical drives and their control for automation, although some of the topics covered will remain applicable to process control.

Control of Electrical Drives

Werner Leonhard 1985

Electrical drives play an important role as electromechanical energy

converters in transportation 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. Conversely, the control of electrical drives has in the past provided strong incentives to control engineering in general, leading to the development of new other areas of control. This is due to control structures and their introduction to 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 few years the field of controlled electrical drives has experienced rapid expansion caused mainly by 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 ac motor drives, not subject to the limitations of the mechanical commutator of dc drives; this has created new and difficult control problems.

Electric Drives Ion Boldea
2016-09-15 Electric Drives provides a practical understanding of the subtleties involved in the operation of modern electric drives. The Third Edition of this bestselling textbook has been fully updated and greatly expanded to incorporate the latest technologies used to save energy and increase productivity, stability, and reliability. Every phrase, equation, number, and reference in the text has been revisited, with the necessary changes made throughout. In addition, new references to key research and development activities have been included to

accurately reflect the current state of the art. Nearly 120 new pages covering recent advances, such as those made in the sensorless control of A.C. motor drives, have been added; as have two new chapters on advanced scalar control and multiphase electric machine drives. All solved numerical examples have been retained, and the 10 MATLAB®-Simulink® programs remain online. Thus, **Electric Drives**, Third Edition offers an up-to-date synthesis of the basic and advanced control of electric drives, with ample material for a two-semester course at the university level.

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