
Richard D. Briscoe and David Leith - 2006-05-15

This book addresses the most relevant aspects in the generation and transmission of harmonics and inter-harmonics in electric power systems. It covers the latest advances in the field, presenting comprehensive analysis of power system harmonics and their impact on power system reliability and performance. The book includes detailed discussions on the causes, effects, standards, and measurements of power quality and harmonics. It is a tool for the practicing engineers of electrical power systems that are concerned with the generation and transmission of harmonics. It is a key resource for academics and researchers who have some background in electrical power systems.

Power Systems Harmonics - George J. Wakileh - 2001-08-28

The second edition of this must-have reference covers power quality issues in four parts, including new discussions related to renewable energy systems. The first part of the book provides background on causes, effects, standards, and measurements of power quality and harmonics. It is a tool for the practicing engineers of electrical power systems that are concerned with the generation and transmission of harmonics. It is a key resource for academics and researchers who have some background in electrical power systems.

Power System Harmonics and Passive Filter Designs - J. C. Das - 2015-03-16

This book presents new harmonic mitigation technologies in-depth analysis of the effects of harmonics. It is a tool for the practicing engineers of electrical power systems that are concerned with the generation and transmission of harmonics. It is a key resource for academics and researchers who have some background in electrical power systems.

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Power System Harmonic Analysis - Jos Arrillaga - 1997-10-07
Quantifies and analyzes the mains of harmonic analysis an essential element in power system planning and design. Power System Harmonic Analysis presents novel analytical and modeling tools for the accurate assessment of the impact of harmonics at harmonic frequencies. The recent proliferation of power electronic equipment is a significant source of harmonic distortion and the authors present effective techniques to tackle this real engineering problem. Features include: Introduction to the main harmonic modelling philosophies Analysis of the behaviour of harmonic sources, stressing the interaction of ac converters with the power system Information showing the reader how to predict accurately the levels of voltage and current harmonics and fundamentals of current systems Models currently used for the prediction of harmonic content and the more advanced algorithms recently developed to determine both characteristic and uncharacteristic harmonic levels Describes major sequence models of power system components Discusses Electromagnetic Transient analyses. This book will also serve as a useful reference for postgraduate students following courses in power systems and power electronics disciplines.

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Short-Circuits in AC and DC Systems - J. C. Das - 2017-10-24
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Load Flow Optimization and Optimal Power Flow - J. C. Das - 2017-10-24
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Advances in Renewable Energies and Power Quality - Manuel Pérez-Domínguez - 2020-02-13
This book brings together contributions dealing with renewable energies and power quality, presented over 5 years of the International Conference on Renewable Energy and Power Quality (ICREPQ). It contains a selection of the best papers and original contributions presenting state-of-the-art research in the field of renewable energy and power quality. This volume includes some of the leading authorities in their areas of expertise, the contributors to the volume are drawn from across the globe, with about 100 authors from 60 different countries.

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Power System Analysis: Short-Circuit Load Flow and Harmonic Analyses - J. C. Das - 2017-12-19
Fundamental to the planning, design, and operating stages of any electrical engineering endeavor, power system analysis is indispensable. This book presents the fundamental concepts and techniques that are necessary to understand the operation of power systems. It is written for students, engineers, and researchers working in the area of power system analysis and provides insights into what is happening inside power systems and helps them understand how to analyze, design, and operate power systems. Power System Analysis: Short-Circuit Load Flow and Harmonic Analyses is intended for use as a text in undergraduate and graduate courses in power systems and power electronics.

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Power System Protection - John Choi - 2021-12-02

An in-depth treatment of power system protection fundamentals, practices, and applications Made up of an assembly of electrical components, power system protections are a critical piece of the electric power system. Despite its central importance to the safe operation of the power grid, the information available on the topic is limited in scope and detail. In Power System Protection: Fundamentals and Applications, a team of renowned engineers delivers an authoritative and robust overview of power system protection ideal for new and early-career engineers and technologists. The book offers device- and manufacturer-agnostic fundamentals using an accessible balance of theory and practical application. It offers a wealth of examples and easy-to-grasp illustrations to aid the reader in understanding and retaining the information provided within. In addition to providing a wealth of information on power system protection, the book covers a broad range of topics, as well as unit and distribution system protections. The book offers readers a thorough introduction to power system protection, including why it’s required and foundational definitions. The book is comprehensive, including in-depth discussions of power system protection components (such as instrument transformers, terminations, telecommunications, and more) and practical discussions of basic topics of protection (such as overcurrent, overvoltage, and distance relays). It offers in-depth examinations of breaker failure protection and automatic reclosing, including typical breaker failure tripping zones, logic paths, pedestal breakers, and more. Perfect for system planning engineers, system operators, and power system protection engineers, as well as organizational leaders in these fields, Power System Protection: Fundamentals and Applications will also serve a place in the libraries of design and field engineering and technologists, as well as students and scholars of power system protection.

Frequency Variations in Power Systems - Federico Milano - 2020-06-16

Frequency Variations in Power Systems: Modeling, State Estimation and Control presents the Frequency Divider Formula (FDVF), a unique approach that defines, calculates and estimates the frequency in electric power systems. This authoritative book is written by two noted researchers on the topic. They define the meaning of frequency variations in electric power systems, calculate the frequency variations in electric power systems, and cover the consequences of using a frequency divider in systems where part of the generation is not based on synchronous machines, but rather converter-interfaced energy resources, such as wind and solar power plants. This important book: Offers a unified view that accurately reveals the core (frequency divider) that links modeling, control and estimation Includes information on the many implications that "local frequency variations" have on power system dynamics and control. Contains several numerical examples Written for researchers, academic staff members, students, specialists consulted and professional software developers, Frequency Variations in Power Systems questions the conventional transient stability model of power system and proposes a new formulation.

Electric Power System Basics for the Nonelectrical Professional - Steven W. Blume - 2016-11-21

The second edition of Steven W. Blume’s bestseller provides a comprehensive treatment of power technology for books in power systems through IEEE and Wiley. Electric Power System Basics for the Nonelectrical Professional, Second Edition, gives business engineers a thorough introduction to power technology as it relates to organizational change. New methods of modeling, which can fulfill technical and physical boundary conditions and nevertheless consider economic environmental and social aspects, are also developed.

Sustainable Energy Systems: From Primary to End-Use - João Carlos de Oliveira Matias - 2019-09-03

This book focuses on sustainable systems. While several innovative and alternative concepts are proposed in these systems, there is an obvious lack of space for the integration of sustainable technologies in electric power systems. This important book: Offers a unified view that accurately reveals the core (frequency divider) that links modeling, control and estimation Includes information on the many implications that "local frequency variations" have on power system dynamics and control. Contains several numerical examples Written for researchers, academic staff members, students, specialists consulted and professional software developers, Frequency Variations in Power Systems questions the conventional transient stability model of power system and proposes a new formulation.

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topology, involving linear and nonlinear components. The text provides an in-depth knowledge of the different components involved.

**Power Quality** - Marcelo Perez-Domingo - 2010-05-09

Power quality is a very broad subject, covering all stages of power systems engineering, from the generation, transmission, and distribution of electrical power to its consumption by end-users. The text is an introduction to the analysis of power quality and its impact on modern power systems. It is designed to provide a comprehensive understanding of the technical aspects of power quality and the measures that can be taken to improve it.

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Instantaneous Power Theory and Applications to Power Conditioning - Hiroaki Akagi - 2007-03-09
This book presents a deep review of various power theories and shows how the instantaneous active and reactive power theory provides an important basic knowledge for understanding and designing active filters for power conditioning. The only book of its kind, it also demonstrates how the instantaneous active and reactive power theory can be used for combined shunt-series filters and in flexible AC Transmission Systems (FACTS).

Grid and Distributed Computing - Tai-Heon Kim - 2011-12-03
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Identify and Solve Key Electric-Power Problems and Ensure Reliable Power Delivery to All Customers
Power Quality in Electrical Systems equips you with the latest engineering techniques for providing power quality to all customers, and includes vital information on manufacturing, data processing, and healthcare facilities. Based on an IEEE Professional Education course, the book is a practice-oriented engineering tutorial for solving key electric-power-quality problems. This skills-building resource is designed to improve job performance by taking you step-by-step through voltage distortion/harmonic current source/power quality measurement. It includes three new chapters, Control of Synchronous Motor Drives, Transformerless MV Drives, and Matrix Converter Fed Drives. In addition, there are extensively revised chapters on Multilevel Voltage Source Inverters and Voltage Source Inverter-Fed Drives. This book includes a systematic analysis on a variety of high-power multilevel converters, illustrates important concepts with simulations and experiments, introduces various megawatt drives produced by world leading drive manufacturers, and addresses practical problems and their mitigation methods. This new edition: Provides an in-depth discussion and analysis of various control schemes for the MV synchronous motor drives Examines new technologies developed to eliminate the isolation transformer in the MV drives Discusses the operating principle and modulation schemes of matrix converter (MC) topology and multi-module cascaded matrix converters (CMCs) for MV drives, and their application in commercial MV drives Bin Wu is a Professor and Senior NSEC/Rockwell Automation Industrial Research Chair in Power Electronics and Electric Drives at Ryerson University, Canada. He is a fellow of Institute of Electrical and Electronics Engineers (IEEE), Engineering Institute of Canada (IEC), and Canadian Academy of Engineering (CAE). Dr. Wu has published more than 400 papers and holds more than 30 granted/pending US/European patents. He co-authored several books including Power Conversion and Control of Wind Energy Systems and Modelling Predictive Control of Wind Energy Conversion Systems (both by Wiley-IEEE Press). Mehrdad Narimani is a Postdoctoral Research Associate with the Department of Electrical and computer Engineering at Ryerson University, Canada, and Rockwell Automation Canada. He is a senior member of IEEE. Dr. Narimani is the author/co-author of more than 50 technical papers and four US/European patents (issued/pending reviews). His current research interests include power conversion, high power converters, control of power electronics, and renewable energy systems.

High-Power Converters and AC Drives - Bin Wu - 2017-01-17
A comprehensive reference of the latest developments in MV drive technology in the area of power converter topologies This new edition reflects the recent technological advancements in the MV drive industry, such as advanced multilevel converters and drive configurations. It includes three new chapters, Control of Synchronous Motor Drives, Transformerless MV Drives, and Matrix Converter Fed Drives. In addition, there are extensively revised chapters on Multilevel Voltage Source Inverters and Voltage Source Inverter-Fed Drives. This book includes a systematic analysis on a variety of high-power multilevel converters, illustrates important concepts with simulations and experiments, introduces various megawatt drives produced by world leading drive manufacturers, and addresses practical problems and their mitigation methods. This new edition: Provides an in-depth discussion and analysis of various control schemes for the MV synchronous motor drives Examines new technologies developed to eliminate the isolation transformer in the MV drives Discusses the operating principle and modulation schemes of matrix converter (MC) topology and multi-module cascaded matrix converters (CMCs) for MV drives, and their application in commercial MV drives Bin Wu is a Professor and Senior NSEC/Rockwell Automation Industrial Research Chair in Power Electronics and Electric Drives at Ryerson University, Canada. He is a fellow of Institute of Electrical and Electronics Engineers (IEEE), Engineering Institute of Canada (IEC), and Canadian Academy of Engineering (CAE). Dr. Wu has published more than 400 papers and holds more than 30 granted/pending US/European patents. He co-authored several books including Power Conversion and Control of Wind Energy Systems and Modelling Predictive Control of Wind Energy Conversion Systems (both by Wiley-IEEE Press). Mehrdad Narimani is a Postdoctoral Research Associate with the Department of Electrical and computer Engineering at Ryerson University, Canada, and Rockwell Automation Canada. He is a senior member of IEEE. Dr. Narimani is the author/co-author of more than 50 technical papers and four US/European patents (issued/pending reviews). His current research interests include power conversion, high power converters, control of power electronics, and renewable energy systems.

Electricity Markets - Jeremy Lin - 2017-10-09
A comprehensive resource that provides the basic concepts of electric power systems, microeconomics, and optimization techniques Electricity Markets: Theories and Applications offers students and practitioners a clear understanding of the fundamental concepts of the economic theories, particularly microeconomic theories, as well as information on some advanced optimization methods of electricity markets. The authors—noted experts in the field—cover the basic drivers for the transformation of the electricity industry in both the United States and around the world and discuss the fundamentals of power system operation, electricity market design and structures, and electricity market operations. The text also explores advanced topics of power system operations and electricity market design and structures including nodal versus nodal pricing, market performance and market power issues, transmission pricing, and the emerging problems electricity markets face in smart grid and micro-grid environments. The authors also examine system planning under the context of electricity market regime. They explain the new ways to solve problems with the tremendous amount of economic data related to power understand the operations and functions of electricity markets Presents basic characteristics of power systems and physical laws governing operation Includes mathematical optimization methods related to electricity markets and their applications to practical market clearing issues Electricity Markets: Theories and Applications is an authoritative text that explores the basic concepts of the economic theories and key information on advanced optimization methods of electricity markets.

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A comprehensive resource that provides the basic concepts of electric power systems, microeconomics, and optimization techniques Electricity Markets: Theories and Applications offers students and practitioners a clear understanding of the fundamental concepts of the economic theories, particularly microeconomic theories, as well as information on some advanced optimization methods of electricity markets. The authors—noted experts in the field—cover the basic drivers for the transformation of the electricity industry in both the United States and around the world and discuss the fundamentals of power system operation, electricity market design and structures, and electricity market operations. The text also explores advanced topics of power system operations and electricity market design and structures including nodal versus nodal pricing, market performance and market power issues, transmission pricing, and the emerging problems electricity markets face in smart grid and micro-grid environments. The authors also examine system planning under the context of electricity market regime. They explain the new ways to solve problems with the tremendous amount of economic data related to power understand the operations and functions of electricity markets Presents basic characteristics of power systems and physical laws governing operation Includes mathematical optimization methods related to electricity markets and their applications to practical market clearing issues Electricity Markets: Theories and Applications is an authoritative text that explores the basic concepts of the economic theories and key information on advanced optimization methods of electricity markets.

High-Power Converters and AC Drives - Bin Wu - 2017-01-17
A comprehensive reference of the latest developments in MV drive technology in the area of power converter topologies This new edition reflects the recent technological advancements in the MV drive industry, such as advanced multilevel converters and drive configurations. It includes three new chapters, Control of Synchronous Motor Drives, Transformerless MV Drives, and Matrix Converter Fed Drives. In addition, there are extensively revised chapters on Multilevel Voltage Source Inverters and Voltage Source Inverter-Fed Drives. This book includes a systematic analysis on a variety of high-power multilevel converters, illustrates important concepts with simulations and experiments, introduces various megawatt drives produced by world leading drive manufacturers, and addresses practical problems and their mitigation methods. This new edition: Provides an in-depth discussion and analysis of various control schemes for the MV synchronous motor drives Examines new technologies developed to eliminate the isolation transformer in the MV drives Discusses the operating principle and modulation schemes of matrix converter (MC) topology and multi-module cascaded matrix converters (CMCs) for MV drives, and their application in commercial MV drives Bin Wu is a Professor and Senior NSEC/Rockwell Automation Industrial Research Chair in Power Electronics and Electric Drives at Ryerson University, Canada. He is a fellow of Institute of Electrical and Electronics Engineers (IEEE), Engineering Institute of Canada (IEC), and Canadian Academy of Engineering (CAE). Dr. Wu has published more than 400 papers and holds more than 30 granted/pending US/European patents. He co-authored several books including Power Conversion and Control of Wind Energy Systems and Modelling Predictive Control of Wind Energy Conversion Systems (both by Wiley-IEEE Press). Mehrdad Narimani is a Postdoctoral Research Associate with the Department of Electrical and computer Engineering at Ryerson University, Canada, and Rockwell Automation Canada. He is a senior member of IEEE. Dr. Narimani is the author/co-author of more than 50 technical papers and four US/European patents (issued/pending reviews). His current research interests include power conversion, high power converters, control of power electronics, and renewable energy systems.