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Topics covered

AC Transmission Grids
Apparatus Insulation
Control of Electric Machines
Control Systems Technology
DC Transmission Grids
Design of Electric Machines
Distribution Systems
Electric and Magnetic Materials
Electromagnetic Theory

Engineering Management
High Voltage Technologies
MicroGrids
Permanent Magnets
Power Electronics
Power Engineering
Power Technology
SmartGrids
SuperGrids
Electrical Engineering
Forthcoming Sets and Titles

Forthcoming Sets
Advanced SmartGrids coordinated by Nouredine Hadjsaïd, Jean-Claude Sabonnadière

Sets – Forthcoming and published Titles

Advanced SmartGrids
Coordinated by Nouredine Hadjsaïd, Grenoble-INP
and Jean-Claude Sabonnadière, Grenoble-INP

Advanced Smartgrids for Distribution System Operators by Boillot Marc
Business Models for Smartgrids by Geoffron Patrice
From Smart Grids to Smart Cities
   by La Scala Massimo, Bruno Sergio, Nucci Carlo Alberto, Lamonaca S, Stecchi U

Forthcoming Titles
Eddy Currents by Salon Sheppard, Chari MVK, Ergene Lale
Electric Energy Regulations by Meda Maurice, Janes Julien
Energy Storage in Electric Power Grids by Robyns Benoît et al.
Energy Storage in Transportation and Buildings by Robyns Benoît et al.
High Tc Superconductivity for Power Grids by Tixador Pascal, Odier Philippe
Integration of Demand Respons into the Electricity Chain by Losi Arturo, Mancarella Pierluigi, Vicino Antonio
Modeling and Control with Power Electronics based Systems by Benchaib Abdelkrim
Non Linear Programming and Dynamic Optimization in Energy Systems by La Scala Massimo
Power Systems and Restructuring – 2nd edition by Hadjsaïd Nouredine, Sabonnadière Jean-Claude
Probabilistic Stability Analysis of Uncertain Power Systems by Milanović Jovica V.
Protections for Smartgrids by Jeannot Robert
Smart Transmission Grids by Mignon Hervé
Solid State Lighting Technologies for Indoor Lighting by Zissis Georges, Buso David, Cachoncinille Christophe
Space and Time Scales for Control and Operation of Power System of the Future by Benchaib Abdelkrim
Analysis and Design of Multicell DCDC Converters using Vectorized Models
Thierry Meynard, LAPLACE - ENSEEIHT - INPT, University of Toulouse, France

Coordinated by Jean-Pascal Cambronne

The author of this book shows how the concepts of vectorization and design masks can be used to help the designer in comparing different designs and making the right choices. The book addresses series and parallel multicell conversion directly and the concepts can be generalized to describe other topologies.

Contents
1. General Properties of Multilevel Converters.
2. Topologies of Multilevel DC/DC Converters.
3. Concept of Vectorization in PLECS.
4. Vectorized Modulator for Multilevel Choppers.
6. Filter Design.
8. Closed-Loop Control of Multilevel DC/DC Converters.

Advanced Smart Grids for Distribution System Operators
Advanced Smart Grids Set – Volume 1
Marc Boillot, EDF Regional Action Division, France

Set coordinated by Nouredine Hadjsaïd and Jean-Claude Sabonnadière

Energy transition is underway in many regions of the world. This is a real challenge for electric systems and a paradigm shift for existing distribution networks. With the help of “advanced” smart technologies, DSOs will have a central role in the integration of renewable generation, electric vehicles and demand response programs. Smart Grids are a means for DSOs to ensure the quality and security of the power supply.

This book proposes a singular approach based on practical experience from Distribution System Operators (DSOs), which will complement the generally academic focus of previous books written on the subject of Smart Grids.

Very practical book based on the experience of a senior executive of the leading DSO in Europe, it focuses on several key topics (main functions of Smart Grids, contribution of Smart Metering Systems, flexibility options, data management, evolution of the competencies to manage networks equipped with advanced Smart Grids, etc.), systematically illustrated with ongoing experimentations conducted worldwide.

Contents
2. The Existing Distribution Networks: Design and Operation.
3. Main Drivers and Functions of Advanced Smart Grids.
4. Metering: A Core Activity of the DSOs.
5. Focus on Flexibility Options.
6. Pilot Projects and Use Cases.
7. Smart Grids are the Future for DSO.
8. Key Findings.


The above title is published in French by ISTE Editions (www.iste-editions.fr)
Electrical Engineering
Published Titles

Power Electronics Applied to Industrial Systems and Transports 1
Volume 1 – Synthetic Methodology to Converters and Components Technology
Nicolas Patin, University of Technology of Compiègne, France

Coordinated by Bernard Multon

ISBN: 9781787540003 • 2015 • 190 pages • USD 105.00 • ISTE-ELSEVIER

The author presents the major types of components available, always from a user’s point of view, with the gate drive/fire control and other auxiliary circuits that are required for their proper functioning (snubbers, for example). The different passive components (capacitors, coils and transformers) are discussed, as well as printed circuit technology, especially in the aspect of their design.

This book also focuses on the importance of packaging by reviewing the electrical representation of components thermal models and the currently available electronics cooling technologies. Modeling is discussed, as well as different technological aspects used in the engineering design of an electronic power converter, useful for obtaining satisfactory performance and reliability.

Contents
1. Theoretical Tools and Active Components for Power Electronics.
2. Thermics, Packaging and Power Component Technologies.
3. Auxiliary Converter Circuits.

Applications de l’électronique de puissance aux systèmes industriels et aux transports 1
ISBN: 9781784050603

The above title is published in French by ISTE Editions (www.iste-editions.fr)

Power Electronics Applied to Industrial Systems and Transports 2
Volume 2 – Power Converters and their Control
Nicolas Patin, University of Technology of Compiègne, France

Coordinated by Bernard Multon

ISBN: 9781787540010 • 2015 • 332 pages • USD 145.00 • ISTE-ELSEVIER

In this volume, the author provides an overview of electronic power converters (DC/DC, DC/AC, AC/DC and AC/AC), their use in industrial applications and, in particular, their application in AC drives.

In addition to a detailed analysis of vector PWM for three-phase inverters and their impact on the DC power bus, which has been overlooked in previous works on the subject, this book also provides an introduction to multi-level converters.

Finally, the reader is provided with a case study involving full-dimensioning of an industrial variable-speed drive. This case study draws on the different aspects discussed in the book.

Contents
1. DC/DC Converters.
2. DC/AC Converters.
3. AC/DC Converters.
4. AC/AC Converters.
5. Introduction to Multi-Level Converters.
6. Case Study – The Variable Speed Drive.

Applications de l’électronique de puissance aux systèmes industriels et aux transports 2
ISBN: 9781784050610

The above title is published in French by ISTE Editions (www.iste-editions.fr)
Power Electronics Applied to Industrial Systems and Transports 3
Volume 3 – Switching Power Supplies
Nicolas Patin, University of Technology of Compiègne, France

Contents
1. Non-Isolated Switch-Mode Power Supplies.
2. Isolated Converters.
3. Resonant Converters and Soft Switching.

Coordinated by Bernard Multon

ISBN: 978178540027 • 2015 • 178 pages • USD 105.00 • ISTE-ELSEVIER

This volume deals with other technical aspects of switch-mode power supplies (SMPS) such as galvanic insulation with two categories of DC/DC converters (non-isolated and isolated). The soft switching concept is also introduced through a particular example of a resonant converter. Then, the methodology developed by Middlebrook et al. is used to establish transfer functions of various SMPS thus allowing the design of closed-loop controls for such converters. Finally, a case study illustrates the complete design methodology from a specification sheet up to a Printed Circuit Board (PCB) including not only passive and active components of a Flyback converter but also voltage/current sensors that allow the galvanic insulation of the power converter to be preserved.

The author proposes a case study of an isolated converter (Flyback) for which the complete design is presented: the active and passive components are chosen based on the specifications initially set. Particular attention is given to the converter output capacitors and all the surrounding components.

Power Electronics Applied to Industrial Systems and Transports 4
Volume 4 – Electromagnetic Compatibility
Nicolas Patin, University of Technology of Compiègne, France

Contents
1. Introduction to EMC.
2. Lumped Parameter Models.
3. Distributed Element Models.

Coordinated by Bernard Multon

ISBN: 978178540034 • 2015 • 210 pages • USD 105.00 • ISTE-ELSEVIER

This volume, the fourth book of the series, concentrates on the study of disturbance mechanisms and on tools used to combat these difficulties. The first chapter presents sources of interference, including not only artificial sources, such as electronic switches in switching mode, but also natural interference (lightning and static electricity carried by the human body). Spectral modeling of the PWM waveform using an innovative approach, not widely used in power electronics, based on the Heisenberg uncertainty principle, is presented in detail.

Chapters 2 and 3 focus on the paths taken by electromagnetic disturbances between the emitter and the receiver. Chapter 2 discusses conducted interference and, more generally, interference using electrical couplings with lumped elements. Chapter 3 discusses propagation mechanisms for which the spatio-temporal dimension cannot be reduced. While this clearly includes the case of radiated interference, the division between Chapters 2 and 3 does not fully conform to the classic separation of conducted and radiated interference generally used when studying electromagnetic compatibility.
Lithium Batteries and Other Electrochemical Storage Systems
Christian Glaize, University of Montpellier, Sylvie Geniès, CEA, Grenoble, France

Coordinated by Bernard Multon

ISBN: 9781848214965 • 2013 • 384 pages • USD 145.00 • ISTE-WILEY

This book shows the diversity of applications for secondary batteries and the main characteristics required of them in terms of storage.

Contents

Part 1. Storage Requirements Characteristics of Secondary Batteries Examples of Use
1. Breakdown of Storage Requirements.
Part 2. Lithium Batteries
4. Introduction to Lithium Batteries.
5. The Basic Elements in Lithium-ion Batteries: Electrodes, Electrolytes and Collectors.
6. Usual Lithium-ion Batteries.
7. Present and Future Developments Regarding Lithium-ion Batteries.
8. Lithium-Metal Polymer Batteries.
10. Lithium-Air Batteries.
11. Lithium Resources.
Part 3. Other Types of Batteries
12. Other Types of Batteries.

Electrochemical Components
Marie-Cécile Pera, IUT Belfort Montbéliard, Daniel Hissel and Hamid Gualous, University of Franche-Comte and Christophe Turpin, CNRS-LAPLACE, Toulouse, France

Coordinated by Bernard Multon

ISBN: 9781848214019 • 2013 • 336 pages • USD 125.00 • ISTE-WILEY

This book focuses on the methods of storage commonly used in hybrid systems.

Contents

1. Basic Concepts of Electrochemistry used in Electrical Engineering.
2. Water Electrolyzers.
5. Electrochemical Accumulators.
6. Hybrid Electrical System.

Dielectric Materials and Electrostatics
Olivier Gallot-Lavallée, University Joseph Fourier, Grenoble, France

Coordinated by Jean-Claude Sabonnadière

ISBN: 9781848216044 • 2013 • 224 pages • USD 95.00 • ISTE-WILEY

The first part of this title presents a mathematical and intuitive approach to dielectrics.
The second part provides readers with the keys to understanding the physics of solid, liquid and gas insulation.

Contents

1. Mathematical Examination of Dielectrics.
2. Physical Examination of Dielectrics.
**Integrated Design by Optimization of Electrical Energy Systems**  
*Edited by Xavier Roboam, Paul Sabatier University, Toulouse, France  
Coordinated by Jean-Claude Sabonnadière*

ISBN: 9781848213890 • 2012 • 320 pages • USD 145.00 • ISTE-WILEY

This book summarizes design methodologies based in particular on a systemic viewpoint, by considering the system as a whole.

**Contents**


**Systemic Design Methodologies for Electrical Energy Systems**  
*Analysis, Synthesis and Management*  
*Edited by Xavier Roboam, Paul Sabatier University, Toulouse, France  
Coordinated by Jean-Claude Sabonnadière*

ISBN: 9781848213883 • 2012 • 400 pages • USD 165.00 • ISTE-WILEY

This book proposes systemic design methodologies applied to electrical energy systems, in particular analysis and system management, modeling and sizing tools.

**Contents**

1. Introduction to Systemic Design.  
2. The Bond Graph Formalism for an Energetic and Dynamic Approach of the Analysis and Synthesis of Multiphysical Systems.  
3. Graphic Formalisms for the Control of Multi-Physical Energetic Systems: COG and EMR.  
5. Quality and Stability of Embedded Power DC Networks.  

**Electrothermics**  
*Edited by Javad Fouladgar, University of Nantes, France*  
*Electrical Engineering Series*

ISBN: 9781848212428 • 2012 • 304 pages • USD 147.00 • ISTE-WILEY

This book concerns the analysis and design of induction heating of poor electrical conduction materials. Some innovating applications such as inductive plasma installation or transformers, thermo inductive non-destructive testing and carbon-reinforced composite materials heating are studied. Analytical, semi-analytical and numerical models are combined to obtain the best modeling technique for each case.

**Contents**

1. Thermal and Electromagnetic Coupling.  
3. Design Methodology of a Very Low-Frequency Plasma Transformer.  
5. Induction Heating of Composite Materials.
SmartGrids
Edited by Nouredine Hadjsaïd and Jean-Claude Sabonnadière, Grenoble INP, France

Electrical Engineering Series

ISBN: 9781848212619 • 2012 • 384 pages • USD 145.00 • ISTE-WILEY

This book describes future electricity networks that will enable all energy services to become sustainable.

Contents

1. SmartGrids: Motivation, Stakes and Perspectives.
2. From the SmartGrid to the Smart Customer: the Paradigm Shift.
5. The Distribution System Operator at the Heart of the SmartGrid Revolution.
8. Integration of Vehicles with Rechargeable Batteries into Distribution Networks.
9. How Information and Communication Technologies will Shape SmartGrids.
12. The Regulation of SmartGrids.

Lead and Nickel Electrochemical Batteries
Christian Glaize, University of Montpellier, Sylvie Geniès, CEA, Grenoble, France

Electrical Engineering Series

ISBN: 9781848213760 • 2012 • 320 pages • USD 147.00 • ISTE-WILEY

The authors present the fundamental electrochemical and chemical phenomena involved in as simple and as clear a way as possible.

Contents

Part 1. Universal Characteristics of Batteries
1. Definitions and Methods of Measurement.
Part 2. Lead–Acid Batteries
2. The Operation of Lead–Acid Batteries.
3. Internal Composition and Types of Lead–Acid Batteries.
4. Lead Batteries: Main Characteristics.
5. Manufacturing Starting, Lighting and Ignition Batteries.
Part 3. Introduction to Nickel-Based Batteries
8. Other Nickel-Based Batteries.
9. Integration of the Decentralized Production into the Electrical Network.

Electricity Production from Renewable Energies
Benoît Robyns, Arnaud Davigny, Antoine Henneton, Jonathan Sprooten, Ecole des Hautes Etudes d'Ingénieur, Lille and Bruno François, Ecole Centrale de Lille, France

Coordinated by Bernard Multon

Electrical Engineering Series

ISBN: 9781848213906 • 2012 • 336 pages • USD 127.00 • ISTE-WILEY

The basic electrical concepts necessary for understanding the operating characteristics of the energy converters are introduced, and the constraints and problems of integration in the electrical networks of those means of production are discussed.

Contents

1. Decentralized Electricity Production from Renewable Energy.
5. Thermal Power Generation.
6. Integration of the Decentralized Production into the Electrical Network.
Electrical Engineering
Backlist Titles (published prior to 2012)

Control of Non-conventional Synchronous Motors
Edited by Jean-Paul Louis, ENS Cachan, France
9781848213319 • 2011 • 448 pages • USD 197.00

Proton Exchange Membrane Fuel Cell Modeling
Fei Gao, Benjamin Blunier and Abdellatif Miraoui, University of Technology of Belfort-Montbéliard, France
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Non-conventional Electrical Machines
Edited by Abderezak Rezzoug, Henri Poincaré University, Nancy and Mohamed-El-Hadi Zaim, Polytech’Nantes, France
9781848213005 • 2011 • 288 pages • USD 147.00

Electrical Machines Diagnosis
Edited by Jean-Claude Trigeassou, University of Bordeaux, France
9781848212633 • 2011 • 352 pages • USD 147.00

Electrical Distribution Networks
Edited by Nouredine Hadjsaïd and Jean-Claude Sabonnadière, Grenoble INP, France
9781848212459 • 2011 • 512 pages • USD 197.00

Non-standard Antennas
Edited by François Le Chevalier, THALES Air Systems, Dominique Lesselier, Paris-Sud University and Robert Staraj, University of Nice-Sophia Antipolis, France
9781848212749 • 2011 • 480 pages • USD 205.00

Power Electronic Converters
Edited by Eric Monmasson, SATIE, Cergy-Pontoise University, France
9781848211957 • 2011 • 576 pages • USD 195.00

Handbook of Asynchronous Machine with Variable Speed
Hubert Razik, Claude Bernard University Lyon I, France
9781848212251 • 2011 • 432 pages • USD 205.00

Energy Storage
Edited by Yves Brunet, Grenoble INP, France
9781848211834 • 2010 • 272 pages • USD 93.00

Dielectric Materials for Electrical Engineering
Edited by Juan Martinez-Vega, Paul Sabatier University, Toulouse, France
9781848211650 • 2010 • 608 pages • USD 215.00

Electric Drives
Design Methodology
Marcel Jufer, Emeritus Professor at EPFL, Switzerland
9781848212176 • 2010 • 240 pages • USD 125.00

Electrical Actuators
Identification and observation
Edited by Bernard de Fornel, ENSEEIHT, Toulouse and Jean-Paul Louis, ENS Cachan, France
9781848210967 • 2010 • 496 pages • USD 190.00

Rotating Electrical Machines
René Le Doeuff, University of Nantes and Mohamed-El Hadi Zaim, Polytech’Nantes, Saint-Nazaire, France
9781848211698 • 2010 • 304 pages • USD 125.00

Automotive Electricity
Electric Drives
Edited by Joseph Beretta, PSA Peugeot Citroën, France
9781848210950 • 2010 • 336 pages • USD 145.00

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Edited by Jean-Claude Sabonnadière, Grenoble INP, France
9781848211360 • 2009 • 480 pages • USD 180.00

Power Systems and Restructuring
Nouredine Hadjsaïd and Jean-Claude Sabonnadière, Grenoble INP, France
9781848211209 • 2009 • 704 pages • USD 250.00

Renewable Energy Technologies
Edited by Jean-Claude Sabonnadière, Grenoble INP, France
9781848211353 • 2009 • 512 pages • USD 180.00

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Edited by Patrick Mottier, CEA-LETI, Grenoble, France
9781848211452 • 2009 • 296 pages • USD 135.00

The Finite Element Method for Electromagnetic Modeling
Edited by Gérard Meunier, G2Elab-INPG, Grenoble, France
9781848210301 • 2008 • 624 pages • USD 280.00

Control Methods for Electrical Machines
Edited by René Husson, INPL-ENSEM, Nancy, France
9781848210936 • 2009 • 400 pages • USD 165.00

Electric Power Systems
Edited by Michel Crappe, Faculté Polytechnique, Mons, Belgium
9781848210080 • 2008 • 392 pages • USD 220.00

Protection of Electrical Networks
Christophe Prévé, AREVA, Mâcon, France
9781905209064 • 2006 • 512 pages • USD 220.00
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