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National Laser Symposium, Proceedings December 22-24, 2003

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High-Power Converters and AC Drives

Springer Handbook of Semiconductor Devices

Reliability and Safety in Railway

Direct Current Fault Protection

Power Electronics

Electric Traction - Motive Power and Energy Supply

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Untersuchungen zu Resonant Commutated Pole Kommutierungszellen in Spannungs- und Stromzwischenkreis-Umrichtern

Thermal Analysis of Power Electronic Devices Used in Renewable Energy Systems

Recent Developments on Power Inverters

SANCHEZ KARTER**National Laser Symposium, Proceedings December 22-24, 2003** BoD – Books on Demand

This book examines a number of topics, mainly in connection with advances in semiconductor devices and magnetic materials and developments in medium and large-scale renewable power plant technologies, grid integration techniques and new converter topologies, including advanced digital control systems for medium-voltage networks. The book's individual chapters provide an extensive compilation of fundamental theories and in-depth information on current research and development trends, while also exploring new approaches to overcoming some critical limitations of conventional grid integration technologies. Its main objective is to present the design and implementation processes for medium-voltage converters, allowing the direct grid integration of renewable power plants without the need for step-up transformers.

MDPI

This book presents recent studies on the power electronics used for the next generation wind turbine system. Some criteria and tools for evaluating and improving the critical performances of the wind power converters have been proposed and established. The book addresses some emerging problems as well as possibilities for the wind power conversion, and may be useful as an inspiring reference for the researchers in this field.

Leistungselektronische Schaltungen John Wiley & Sons

In railway applications, performance studies are fundamental to increase the lifetime of railway systems. One of their main goals is verifying whether their working conditions are reliable and safety. This task not only takes into account the analysis of the whole traction chain, but also requires ensuring that the railway infrastructure is properly working. Therefore, several tests for detecting any dysfunctions on their proper operation have been developed. This book covers this topic, introducing the reader to railway traction fundamentals, providing some ideas on safety and reliability issues, and experimental approaches to detect any of these dysfunctions. The objective of the book is to serve as a valuable reference for students, educators, scientists, faculty members, researchers, and engineers.

Elektrische Maschinen und Antriebstechnik Springer Nature

Die Bedeutung der Leistungselektronik ist in den vergangenen Jahren sowohl bei den Schaltungstechniken und den Leistungsbereichen wie auch bei den Anwendungen gewachsen. Diese Entwicklungen wurden in die 2. Auflage des vierten Bandes der Reihe „Elektrische Antriebe“ berücksichtigt. Neu hinzugekommen sind Abschnitte zu brückenlosen PFC-Schaltungen, aktiven Filtern und Zusatzbeanspruchungen der Drehfeld-Maschinen aufgrund steiler Schaltflanken sowie zu den Anwendungsfeldern Photovoltaik, Windkraftwerke, Hybrid- und Brennstoffzellen-Fahrzeuge.

Der Monolithische Bidirektionale Schalte in der Funktion einer Diode John Wiley & Sons

This book analyzes the thermal characteristics of power electronic devices (PEDs) with a focus on those used in wind and solar energy systems. The authors focus on the devices used in such

applications, for example boost converters and inverters under different operating conditions. The book explains in detail finite element modeling techniques, setting up measuring systems, data analysis, and PEDs' lifetime calculations. It is appropriate reading for graduate students and researchers who focus on the design and reliability of power electronic devices.

Proceedings of the ... International Symposium on Power Semiconductor Devices and ICs Springer Nature

A comprehensive and "state-of-the-art" coverage of the design and fabrication of IGBT. All-in-one resource Explains the fundamentals of MOS and bipolar physics. Covers IGBT operation, device and process design, power modules, and new IGBT structures.

Elektrische Triebfahrzeuge und ihre Energieversorgung Springer-Verlag

Power electronics technology is still an emerging technology, and it has found its way into many applications, from renewable energy generation (i.e., wind power and solar power) to electrical vehicles (EVs), biomedical devices, and small appliances, such as laptop chargers. In the near future, electrical energy will be provided and handled by power electronics and consumed through power electronics; this not only will intensify the role of power electronics technology in power conversion processes, but also implies that power systems are undergoing a paradigm shift, from centralized distribution to distributed generation. Today, more than 1000 GW of renewable energy generation sources (photovoltaic (PV) and wind) have been installed, all of which are handled by power electronics technology. The main aim of this book is to highlight and address recent breakthroughs in the range of emerging applications in power electronics and in harmonic and electromagnetic interference (EMI) issues at device and system levels as discussed in robust and reliable power electronics technologies, including fault prognosis and diagnosis technique stability of grid-connected converters and smart control of power electronics in devices, microgrids, and at system levels.

Internationaler ETG-Kongress ... Springer

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 mitigations 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 NSERC/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 (EIC), 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 Model Predictive Control of Wind Energy Conversion Systems (both by Wiley-IEEE Press). Mehdi 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 author/co-author of more than 50 technical papers and four US/European patents (issued/pending review). His current research interests include power conversion, high power converters, control of power electronics, and renewable energy systems.

Technical Assessment of Maglev System Concepts MDPI

Around 80% of electrical consumption in an industrialised society is used by machinery and electrical drives. Therefore, it is key to have reliable grids that feed these electrical assets. Consequently, it is necessary to carry out pre-commissioning tests of their insulation systems and, in some cases, to implement an online condition monitoring and trending analysis of key variables, such as partial discharges and temperature, among others. Because the tests carried out for analysing the dielectric behaviour of insulation systems are commonly standardised, it is of interest to have tools that simulate the real behaviour of those and their weaknesses to prevent electrical breakdowns. The aim of this book is to provide the reader with models for electrical insulation systems diagnosis.

Transportation Electrification Springer-Verlag

Power Electronics: Switches and Converters explains the principles and practices of power electronics, electronic switches and converters with the support of illustration and worked examples, guiding the reader from theory to real-life application. Covering insights on industrial applications and practical aspects of power electronic devices and power converter systems, the book is intended for engineers, researchers and students in the field of power electronics who are interested in advanced control of power converters and the exploration of new applications of control theory. Includes illustrated diagrams to cover up-to-date industry applications Provides in-depth, worked examples that support the understanding of discussed power electronics theory and applications Includes end-of-chapter evaluations to reinforce the acquired knowledge

Power Converters for Medium Voltage Networks Allied Publishers

Die große Resonanz auf die erste Auflage von "Elektrische Antriebe 3 - Leistungselektronische Bauelemente" hat eine Neuauflage erfordert. Der Grundsatz des Buches, Leistungs-Halbleiter auf der Basis halbleiterphysikalischer Grundlagen zu verstehen und nicht nur phänomenologisch zu beschreiben, ist auch in dieser zweiten Auflage beibehalten worden. Allerdings hat der immense technologische Fortschritt wesentliche Überarbeitungen und Erweiterungen erfordert. Es wurden deshalb nicht nur die vorhandenen Kapitel aktualisiert und zum Teil erheblich erweitert, sondern um die folgenden zwei neuen Kapitel "Aufbau- und Verbindungstechniken in der Leistungselektronik" sowie die "physikalische Modellbildung von Leistungshalbleitern" ergänzt. Damit liegt ein hochmodernes Werk vor, das eine umfangreiche Basis für den fundierten Einstieg in die

Leistungselektronik bietet.

Power Electronics for the Next Generation Wind Turbine System Springer Nature

Designing and building power semiconductor modules requires a broad, interdisciplinary base of knowledge and experience, ranging from semiconductor materials and technologies, thermal management, and soldering to environmental constraints, inspection techniques, and statistical process control. This diversity poses a significant challenge to engine

Regelverfahren für einen Umrichter zur Symmetrierung einphasiger Lasten in Drehstromnetzen Oldenbourg Industrieverlag

This book focuses on the thermal reliability of power semiconductor device by looking at the failure mechanism, thermal parameters monitoring, junction temperature estimation, lifetime evaluation, and thermal management. Theoretical analysis and experimental tests are presented to explain existing reliability improvement techniques. This book is a valuable reference for the students and researchers who pay attention to the thermal reliability design of power semiconductor device.

Energy Efficiency in Electric Motors, Drives, Power Converters and Related Systems

Cuvillier Verlag

The book presents the latest power conversion and control technology in modern wind energy systems. It has nine chapters, covering technology overview and market survey, electric generators and modeling, power converters and modulation techniques, wind turbine characteristics and configurations, and control schemes for fixed- and variable-speed wind energy systems. The book also provides in-depth steady-state and dynamic analysis of squirrel cage induction generator, doubly fed induction generator, and synchronous generator based wind energy systems. To illustrate the key concepts and help the reader tackle real-world issues, the book contains more than 30 case studies and 100 solved problems in addition to simulations and experiments. The book serves as a comprehensive reference for academic researchers and practicing engineers. It can also be used as a textbook for graduate students and final year undergraduate students.

Simulation and Modelling of Electrical Insulation Weaknesses in Electrical Equipment Cuvillier Verlag

Untersuchungen zu Resonant Commutated Pole Kommutierungszellen in Spannungs- und Stromzwischenkreis-Umrichtern Cuvillier Verlag

Applications of Power Electronics Springer

Recent research and development in the field of high-current circuit breaker technology are devoted to meeting two challenges: the environmental compatibility and new demands on electrical grids caused by the increasing use of renewable energies. Electric arcs in gases or a vacuum are the key component in the technology at present and will play a key role also in future concepts, e.g., for hybrid and fast switching required for high-voltage direct-current (HVDC) transmission systems. In addition, the replacement of the environmentally harmful SF6 in gas breakers and gas-insulated switchgear is an actual issue. This Special Issue comprises eight peer-reviewed papers, which address recent studies of switching arcs and electrical insulation at high and medium voltage. Three papers consider issues of the replacement of the environmentally harmful SF6 by CO2 in high-voltage gas circuit breakers. One paper deals with fast switching in air with relevance for hybrid fault current limiters and hybrid HVDC interrupters. The other four papers illustrate actual research on vacuum current breakers as an additional option for environmentally compatible switchgear;

fundamental studies of the vacuum arc ignition, as well as concepts for the use of vacuum arcs for DC interruption.

Gallium Nitride and Silicon Carbide Power Technologies 4 John Wiley & Sons

As concerns about climate change, energy prices, and energy security loom, regulatory and research communities have shown growing interest in alternative energy sources and their integration into distributed energy systems. However, many of the candidate microgeneration and associated storage systems cannot be readily interfaced to the 50/60 Hz grid. In *Power Electronic Converters for Microgrids*, Sharkh and Abu-Sara introduce the basics and practical concerns of analyzing and designing such micro-generation grid interface systems. Readers will become familiar with methods for stably feeding the larger grid, importing from the grid to charge on-site storage, disconnecting from the grid in case of grid failure, as well as connect multiple microgrids while sharing their loads appropriately. Sharkh and Abu-Sara introduce not only the larger context of the technology, but also present potential future applications, along with detailed case studies and tutorials to help the reader effectively engineer microgrid systems.

Power Electronic Modules Springer-Verlag

This book conveys mechanical fundamentals of electric railway propulsion, which includes rail-bound guidance, transmission of traction effort from wheel to rail under the influence of non-constant levels of adhesion and the transmission of motor torque to a spring-mounted and thus sliding drive set.

Environmental Compatible Circuit Breaker Technologies BoD – Books on Demand

An invaluable academic reference for the area of high-power converters, covering all the latest developments in the field High-power multilevel converters are well known in industry and academia as one of the preferred choices for efficient power conversion. Over the past decade, several power converters have been developed and commercialized in the form of standard and customized products that power a wide range of industrial applications. Currently, the modular multilevel converter is a fast-growing technology and has received wide acceptance from both industry and academia. Providing adequate technical background for graduate- and undergraduate-level teaching, this book includes a comprehensive analysis of the conventional and advanced modular multilevel converters employed in motor drives, HVDC systems, and power quality improvement. *Modular Multilevel Converters: Analysis, Control, and Applications* provides an overview of high-power converters, reference frame theory, classical control methods, pulse width modulation schemes, advanced model predictive control methods, modeling of ac drives, advanced drive control

schemes, modeling and control of HVDC systems, active and reactive power control, power quality problems, reactive power, harmonics and unbalance compensation, modeling and control of static synchronous compensators (STATCOM) and unified power quality compensators. Furthermore, this book: Explores technical challenges, modeling, and control of various modular multilevel converters in a wide range of applications such as transformer and transformerless motor drives, high voltage direct current transmission systems, and power quality improvement Reflects the latest developments in high-power converters in medium-voltage motor drive systems Offers design guidance with tables, charts graphs, and MATLAB simulations *Modular Multilevel Converters: Analysis, Control, and Applications* is a valuable reference book for academic researchers, practicing engineers, and other professionals in the field of high power converters. It also serves well as a textbook for graduate-level students.

ISPSD '2000 Oldenbourg Industrieverlag

The IGBT Device: Physics, Design and Applications of the Insulated Gate Bipolar Transistor, Second Edition provides the essential information needed by applications engineers to design new products using the device in sectors including consumer, industrial, lighting, transportation, medical and renewable energy. The IGBT device has proven to be a highly important Power Semiconductor, providing the basis for adjustable speed motor drives (used in air conditioning and refrigeration and railway locomotives), electronic ignition systems for gasoline powered motor vehicles and energy-saving compact fluorescent light bulbs. The book presents recent applications in plasma displays (flat-screen TVs) and electric power transmission systems, alternative energy systems and energy storage, but it is also used in all renewable energy generation systems, including solar and wind power. This book is the first available on the applications of the IGBT. It will unlock IGBT for a new generation of engineering applications, making it essential reading for a wide audience of electrical and design engineers, as well as an important publication for semiconductor specialists. Presents essential design information for applications engineers utilizing IGBTs in the consumer, industrial, lighting, transportation, medical and renewable energy sectors Teaches the methodology for the design of IGBT chips, including edge terminations, cell topologies, gate layouts, and integrated current sensors Covers applications of the IGBT, a device manufactured around the world by more than a dozen companies with sales exceeding \$5 Billion Written by the inventor of the device, this is the first book to highlight the key role of the IGBT in enabling electric vehicles and renewable energy systems with global impacts on climate change

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