

An Electronic Load Controller For Micro Hydro Power Plants

This book presents select proceedings of the International Conference on Advances in Electrical Control and Signal Systems (AECCS) 2019. The focus is on the current developments in control and signal systems in electrical engineering, and covers various topics such as power systems, energy systems, micro grid, smart grids, networks, fuzzy systems and their control. The book also discusses various properties and performance of signal systems and their applications in different fields. The contents of this book can be useful for students, researchers as well as professionals working in power and energy systems, and other related fields.

Now in its Third Edition, Alternative Energy Systems: Design and Analysis with Induction Generators has been renamed Modeling and Analysis with Induction Generators to convey the book's primary objective—to present the fundamentals of and latest advances in the modeling and analysis of induction generators. New to the Third Edition Revised equations and mathematical modeling Addition of solved problems as well as suggested problems at the end of each chapter New modeling and simulation cases Mathematical modeling of the Magnus turbine to be used with induction generators Detailed comparison between the induction generators and their competitors Modeling and Analysis with Induction Generators, Third Edition aids in understanding the process of self-excitation, numerical analysis of stand-alone and multiple induction generators, requirements for optimized laboratory experimentation, application of modern vector control, optimization of power transference, use of doubly fed induction generators, computer-based simulations, and social and economic impacts.

This derivative volume stemming from content included in our seminal Power Electronics Handbook takes its chapters related to renewables and establishes them at the core of a new volume dedicated to the increasingly pivotal and as yet under-published intersection of Power Electronics and Alternative Energy. While this re-versioning provides a corollary revenue stream to better leverage our core handbook asset, it does more than simply re-package existing content. Each chapter will be significantly updated and expanded by more than 50%, and all new introductory and summary chapters will be added to contextualize and tie the volume together. Therefore, unlike traditional derivative volumes, we will be able to offer new and updated material to the market and include this largely original content in our ScienceDirect Energy collection. Due to the inherently multi-disciplinary nature of renewables, many engineers come from backgrounds in Physics, Materials, or Chemical Engineering, and therefore do not have experience working in-depth with electronics. As more and more alternative and distributed energy systems require grid hook-ups and on-site storage, a working knowledge of batteries, inverters and other power electronics components becomes requisite. Further, as renewables enjoy broadening commercial implementation, power electronics professionals are interested to learn of the challenges and strategies particular to applications in alternative energy. This book will bring each group up-to-speed with the primary issues of importance at this technological node. This content clarifies the juncture of two key coverage areas for our Energy portfolio: alternative sources and power systems. It serves to bridge the information in our power engineering and renewable energy lists, supporting the growing grid cluster in the former and adding key information on practical implementation to the latter. Provides a thorough overview of the key technologies, methods and challenges for implementing power electronics in alternative energy systems for optimal power generation Includes hard-to-find information on how to apply converters, inverters, batteries, controllers and more for stand-alone and grid-connected systems Covers wind and solar applications, as well as ocean and geothermal energy, hybrid systems and fuel cells

Handbook of Research on Emerging Technologies For Electrical Power Planning, Analysis, and Optimization
Renewable Energy and the Environment
Patents

Technology Transfer in the Developing Countries
Water Power Solutions from the Experts
Smart Electrical Grid System

Smart grid (SG), also called intelligent grid, is a modern improvement of the traditional power grid that will revolutionize the way electricity is produced, delivered, and consumed. Studying key concepts such as advanced metering infrastructure, distribution management systems, and energy management systems will support the design of a cost-effective, reliable, and efficient supply system, and will create a real-time bidirectional communication means and information exchange between the consumer and the grid operator of electric power. Optimizing and Measuring Smart Grid Operation and Control is a critical reference source that presents recent research on the operation, control, and optimization of smart grids. Covering topics that include phase measurement units, smart metering, and synchrophasor technologies, this book examines all aspects of modern smart grid measurement and control. It is designed for engineers, researchers, academicians, and students.

Development of an Intelligent Electronic Load Controller for Stand-alone Micro-hydropower SystemsTowards an Updated Electronic Load Controller for Microhydro Systems in Rural Nepal
Energy, Resources and Environment documents the first U.S.-China Conference and discusses the concerns about the world's energy situation, such as its resource, environmental effects, and possible alternative sources. The book is comprised of 72 chapters including the keynote address, five lecture papers, and 66 technical papers that are organized according to its contents, specifically the type of energy it discusses. The text begins with the keynote address, and then discusses the plenary and technical papers. The plenary papers discuss the importance of energy, resources, environment, and future development. The technical papers cover the technological advancement of alternative energy source and their application. The conference covers the following theme: chemical fuels, coal energy, electric power systems, energy conservation, geothermal and other natural energy, hydropower, ice storage for cooling, solar energy, wind energy, economic aspect of energy utilization, and impact of energy on the environment. The book will be of great interest to individuals concerned with the development of alternative energy sources.

Researchers whose work involves alternative energy will be able to make use of this book as a reference material.
Second International Joint Conference, AIM/CCPE 2012, Bangalore, India, April 27-28, 2012. Revised Papers

Proceedings of IEPCT 2019
Proceedings of ICTSES 2018

Modeling, Simulation and Control
Introduction to Plant Automation and Controls

A Test Case for Implementing Feedback Control in a Micro Hydro Power Plant

This book discusses reliability applications for power systems, renewable energy and smart grids and highlights trends in reliable communication, fault-tolerant systems, VLSI system design and embedded systems. Further, it includes chapters on software reliability and other computer engineering and software management-related disciplines, and also examines areas such as big data analytics and ubiquitous computing. Outlining novel, innovative concepts in applied areas of reliability in electrical, electronics and computer engineering disciplines, it is a valuable resource for researchers and practitioners of reliability theory in circuit-based engineering domains.

Waterpower is the largest source of renewable energy in the world today, and microhydro is a mature, proven technology that can provide clean, inexpensive, renewable energy with little or no impact on the environment. Serious Microhydro brings you dozens of firsthand stories of energy independence covering a complete range of systems, from household pressure sites to higher pressure installations capable of powering a farm, business, or small neighborhood. Topics include: Low head and medium head sites AC-only systems as well as ones using a battery/inverter subsystem Stand alone power supply or grid inertie setups Hybrid systems (combined with photovoltaics or wind) With all the variables involved in microhydro, there is no "typical" system. These case studies represent the most comprehensive collection of knowledge and experience available for tailoring an installation to meet the needs of a site and its owner or operators. If you are considering building a system, you are bound to find a wealth of creative solutions appropriate to your own circumstances. Serious Microhydro shows how scores of people are achieving a high standard of living from local energy sources with a minimal ecological footprint. It has particular appeal to homeowners, teachers, renewable energy professionals, activists, and decision makers who want to understand the technology from a "hands-on" perspective. Scott Davis is an award-winning renewable energy project developer with decades of experience operating, installing, designing, selling, and teaching microhydro technology. He is a founder and president of Friends of Renewable Energy BC, and the author of Microhydro: Clean Power From Water.

Providing essential theory and useful practical techniques for implementing hydroelectric projects, this book outlines the resources, power generation technologies, applications, and strengths and weaknesses for hydroelectric technologies. Emphasizing the links between energy and the environment, it serves as a useful background resource and facilitates decision-making regarding which renewable energy technology works best for different types of applications and regions. Including examples, real-world case studies, and lessons learned, each chapter contains exercise questions, references, and ample photographs and technical drawings from actual micro hydropower plants.

Advanced Hierarchical Control and Stability Analysis of DC Microgrids
Intelligent Computing Techniques for Smart Energy Systems

Advances in Electrical Control and Signal Systems
Wind Power Electric Systems

Proceedings of ... International Conference on Power Electronics and Drive Systems
Proceedings of the International Symposium

This book features selected high-quality papers from the International Conference on Innovation in Electrical Power Engineering, Communication, and Computing Technology (IEPCT 2019), held at Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, India, on 13–14 December 2019. Presenting innovations in power, communication, and computing, it covers topics such as mini, micro, smart and future power grids; power system economics; energy storage systems; intelligent control; power converters; improving power quality; signal processing; sensors and actuators; image/video processing; high-performance data mining algorithms; advances in deep learning; and optimization methods.

Micro-hydro turbines generate power for small villages and industries in Afghanistan. They usually produce less than 100 kW of power. Currently the flow into the turbine is controlled manually and the voltage is controlled automatically with an electronic load controller. Excess power not used by the village is dumped into a community water heater. For larger sites that have a reservoir and/or large variable load throughout the day and night, the turbine needs to be fitted with an automatic flow control system to conserve water in the reservoir or deal with the variable loads.

Large turbines usually use hydraulic governors that automatically adjust the flow of water into the turbine. For micro-hydro sized plants this method would be too expensive and be difficult to build and maintain locally. For this reason, a 3 phase AC induction motor will be used to move the internal flow of water into the turbine. Because a sudden change in load is possible (30 - 40%) for micro-hydro plants, the electronic load controller will also be needed to respond to quick changes in load so that the village voltage does not exceed 220V. This report documents the process of building a test system comprising of a dynamic resistive load, microcontroller controlled resistive load, a three phase AC generator and a DC Motor. Where the dynamic resistive load represents the load of the village, the computer controlled resistive load would represent the community water heater, the three phase AC generator represents the Generator on site and the DC Motor together with its DC input voltage would emulate the turbine and its water flow respectively. The DC input voltage would be also controlled with a PWM signal through a delay loop to represent the water gate delay effects on the turbine as close as possible. With this, it would be possible to completely build and test a control system that emulates the dynamics of a water turbine generator.

Smart technologies, such as artificial intelligence and machine learning, play a vital role in modeling, analysis, performance prediction, effective control, and utilization of smart energy systems. This book presents novel concepts in the development of smart cities and smart grids as well as discusses the technologies involved in producing efficient and economically feasible energy technologies around the world. It comprehensively covers important topics, including optimization methods for smart grids, power converters, smart meters, load frequency control, automatic generation control, and power electronics for smart grids. This book focuses mainly on three areas of electrical engineering: control systems, power electronics, and renewable resources, including artificial intelligence for the development of smart electrical grids. Key Features • Clarifies how the smart grid plays an important role in modern smart technologies • Introduces the basic concepts of modernization of smart grid with the assumption of basic knowledge of mathematics and power systems • Describes the structure of technologies based on Internet of Things (IoT), which acts like a bridge to cover the gap between the physical and virtual worlds required for the realization of the smart grid • Includes practical examples of the smart grid and energy saving • Illustrates the integration of renewable energy sources with worked examples • Enables readers to engage with the immediate development of power systems by using smart approaches for future smart grids

Serious Microhydro
The First International Conference on Small-Scale Hydropower : Conference Proceedings

Latest Trends in Renewable Energy Technologies
Electric Renewable Energy Systems

Microgrid: Operation, Control, Monitoring and Protection
Renewable Energy Resources

The book compiles the research works related to smart solutions concept in context to smart energy systems, maintaining electrical grid discipline and resiliency, computational collective intelligence consisted of interaction between smart devices, smart environments and smart interactions, as well as information technology support for such areas. It includes high-quality papers presented in the International Conference on Intelligent Computing Techniques for Smart Energy Systems organized by Manipal University Jaipur. This book will motivate scholars to work in these areas. The book also propheisies their approach to be used for the business and the humanitarian technology development as research proposal to various government organizations for funding approval.

This book comprises the refereed proceedings of the International Conference, AIM/CCPE 2012, held in Bangalore, India, in April 2012. The papers presented were carefully reviewed and selected from numerous submissions and focus on the various aspects of research and development activities in computer science, information technology, computational engineering, mobile communication, control and instrumentation, communication system, power electronics and power engineering.

The second edition of this standard text reflects the experience gained as a result of the rapid developments in renewable energy technologies, and will be of use to both students and professionals.

Energy, Resources and Environment

Electronic Priority Load Controller for the Wind Turbine on Camano Island, Washington
Hydroelectric Energy
Select Proceedings of NCRESE 2020

A New Market-oriented Approach to Maximize Electrification Benefits with Special Focus on Indonesia

Encyclopedia of Sustainable Technologies provides an authoritative assessment of the sustainable technologies that are currently available or in development. Sustainable technology includes the scientific understanding, development and application of a wide range of technologies and processes and their environmental implications. Systems and lifecycle analyses of energy systems, environmental management, agriculture, manufacturing and digital technologies provide a comprehensive method for understanding the full sustainability of processes. In addition, the development of clean processes through green chemistry and engineering techniques are also described. The book is the first multi-volume reference work to employ both Life Cycle Analysis (LCA) and Triple Bottom Line (TBL) approaches to assessing the wide range of technologies available and their impact upon the world. Both approaches are long established and widely recognized, playing a key role in the organizing principles of this valuable work. Provides readers with a one-stop guide to the most current research in the field Presents a grounding of the fundamentals of the field of sustainable technologies Written by international leaders in the field, offering comprehensive coverage of the field and a consistent, high-quality scientific standard Includes the Life Cycle Analysis and Triple Bottom Line approaches to help users understand and assess sustainable technologies

The book helps readers understand key concepts in standalane and grid connected wind energy systems and features analysis into the modeling and optimization of commonly used configurations through the implementation of different control strategies. Utilizing several electrical machinery control approaches, such as vector control and direct torque control 'Wind Power Electric Systems' equips readers with the means to understand, assess and develop their own wind energy systems and to evaluate the performance of such systems.

Mathematical models are provided for each system and a corresponding MATLAB/SIMULINK example is included at the end of each section in order to demonstrate key processes and methods.

This book presents select proceedings of the National Conference on Renewable Energy and Sustainable Environment (NCRESE 2020) and examines a range of reliable energy-efficient harvesting technologies, their applications and utilization of available alternate energy resources. The topics covered include alternate energy technologies, smart grid topologies, and their relevant issues, solar thermal and bio-energy systems, electric vehicles and energy storage systems and its control issues. The book also discusses various properties and performance attributes of advance renewable energy techniques and impact on environmental sustainability. The book will be useful for researchers and professionals working in the areas of energy and sustainable environment and the allied fields.

Mini Hydropower for Rural Development

Proceedings of Symposium on Power Electronic and Renewable Energy Systems Control
Optimizing and Measuring Smart Grid Operation and Control

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

Development of an Intelligent Electronic Load Controller for Stand-alone Micro-hydropower Systems

Modeling and Analysis with Induction Generators, Third Edition

This book includes high-quality research papers presented at Symposium on Power Electronic and Renewable Energy Systems Control (PERESC 2020), which is held at the School of Electrical Sciences, IIT Bhubaneswar, Odisha, India, during 4-5 December 2020. The book covers original work in power electronics which has greatly enabled integration of renewable and distributed energy systems, control of electric machine drives, high voltage system control and operation. The book is highly useful for academicians, engineers, researchers and students to be familiar with the latest state of the art in power electronics technology and its applications. This book provides students and practicing engineers with a comprehensive guide to off-grid electrification: from microgrids and energy kiosks to solar home systems and solar lanterns. As the off-grid electrification industry grows, universities are starting and expanding courses and programs in humanitarian engineering and appropriate technology. However, there is no textbook that serves this growing market. This book fills that gap by providing a technical foundation of off-grid electrical systems, putting into context the technical aspects for developing countries, and discussing best practices by utilizing real-world data. Chapters expertly integrate the technical details with practical considerations from actual systems highlighting the interaction of off-grid systems with the economic, environmental, social and broader development aspects of rural electrification. Whole chapters are dedicated to the operation and control of mini-grids, load and resource estimation, and design of off-grid systems. Special topics focused on electricity access in developing countries are included, such as energy use in rural communities, technical and economic considerations of grid extension, electricity theft, metering, and best practices devoted to common problems. Each chapter is instructor friendly and contains illustrative examples and problems that reinforce key concepts. Complex, open-ended design problems throughout the book challenge the reader to think critically and deeply. The book is appropriate for use in advanced undergraduate and graduate courses related to electrical and energy engineering, humanitarian engineering, and appropriate technology. Provides a technical foundation of off-grid electrical systems; Contextualizes the technical aspects for developing countries; Captures the current and state-of-the art in this rapidly developing field.

Rural electrification is the most sustainable of energy technologies. Rural electrification, however, has often translated solely into electrical lighting, and rarely provides a clean alternative to wood biomass ovens - estimated to be responsible for 7500 deaths/year in Nepal (WHO 2007). Electronic load controllers (ELCs) are intended to improve the longevity of microhydro systems by diverting surplus power into a dump load to regulate voltage and frequency, have been documented as one of the most common microhydro components to fail. The remoteness of communities makes the ELC's durability and weight very important. Distributed electronic load controller (DELC) slow-cookers proposed by Roodsari, Nowicki, Freere (2013) intend to address these issues. An ELC compatible with DELCs is developed in this thesis using a Simulink model and a bench-scale prototype. The model and prototype are evaluated within the framework of Nepal's microhydro standards for voltage regulation, frequency regulation, and total harmonic distortion. Results are validated against those documented in Roodsari, Nowicki, and Freere (2013), and used to estimate the potential weight reduction of the powerhouse ELC as well as the feasibility of slow-cooking with dumped surplus power.

Electronic Systems and Intelligent Computing
Select Proceedings of AECCS 2019

ICICT 2019 - System Reliability, Quality Control, Safety, Maintenance and Management
Innovation in Electrical Power Engineering, Communication, and Computing Technology

Official Gazette of the United States Patent and Trademark Office
Proceedings of SIS 2021

This book is a collection of high-quality research papers presented at the International Conference on Smart and Intelligent Systems (SIS 2021), which will be held in Velagapudi Ramakrishna Siddhartha Engineering College (VRSEC), Andhra Pradesh, India, during February 25-26, 2021, in virtual mode. It highlights how recent informatics intelligent systems have successfully been used to develop innovative smart techniques and infrastructure in the field of modern engineering and technology. The book will also be of interest to those working in the field of computational intelligence, smart computer network and security analysis, control and automation system, cloud computing, fog computing and IoT, smart grid communication, smart cities, solar cell synthesis and their performance, green technology, and many more. The contents of this book prove useful to researchers and professionals.

Today, there is a great deal of attention focused on sustainable growth worldwide. The increase in efficiency in the use of energy may even, in this historical moment, bring greater benefit than the use of renewable energies. Electricity appears to be the most sustainable of energies and the most promising hope for a planet capable of growing without compromising its own health and that of its inhabitants. Power electronics and electrical drives are the key technologies that will allow energy savings through the reduction of energy losses in many applications. This Special Issue has collected several scientific contributions related to energy efficiency in electrical equipment. Some articles are dedicated to the use and optimization of permanent magnet motors, which allow obtaining the highest level of efficiency. Most of the contributions describe the energy improvements that can be achieved with power electronics and the use of suitable control techniques. Last but not least, some articles describe interesting solutions for hybrid vehicles, which were created mainly to save energy in the smartest way possible.

Rural electrification enjoys high priority on Indonesia's development agenda. In remote villages located beyond the reach of national electricity grids, mini hydropower offers an environmentally friendly alternative to decentralized electricity generation. Technical assistance programs have successfully introduced mini hydro technology in developing countries but have often failed to attain sustainable plant operation. This book provides insight into the multifaceted conditions under which village communities are struggling to keep systems running. A new approach linking productive electricity use and mini hydro operation is developed which incorporates experiences of market-oriented approaches in small enterprise development. Village communities are no longer left alone after the commissioning of the plants but are continuously provided need-oriented services. The study is exceptional in that the approach is experimentally applied in an actual project involving a village-owned coffee roastery. It is shown that the new approach not only contributes to a sustainable electricity supply but also to village development.

Handbook of Renewable Energy Technology
Smart and Intelligent Systems

Proceedings of the Seminar on Environment Friendly Ellectric Power Generation
PERESC 2020

Power Sources for Transportation Applications
Proceedings of ESIC 2021

The objective of this book is to present the problems and possibilities of transferring technology from the developed countries to the developing countries to raise their standard of living. It develops the conceptual issues, legal ramifications, empirical testing of mathematical models and case studies of different industries in many countries. It contains articles by distinguished scholars in the field, practitioners and government officials. It is an important supplement to the hands-on approach used by many private industries and national and international organizations. The unique feature of this book is that it is multidisciplinary and that it has a balanced combination of abstract theoretical approaches and practical considerations.

This book, consisting a series of papers written by experts in their respective fields of specialization, will provide a comprehensive coverage of renewable energy technologies, such as wind, wave and solar thermal energy. Other industrial terms like photovoltaic systems, biomass, distributed generations and small hydro power systems are also discussed and further elaborated upon. The Handbook of Renewable Energy Technology will be of great practical benefit to professionals, scientists and researchers in the relevant industries, and will be of interest to those of the general public wanting to know more about renewable energy technologies.

This book discusses various challenges and solutions in the fields of operation, control, design, monitoring and protection of microgrids, and facilitates the integration of renewable energy and distribution systems through localization of generation, storage and consumption. It covers five major topics relating to microgrid i.e., operation, control, design, monitoring and protection. The book is primarily intended for electric power and control engineering researchers who are seeking factual information, but also appeals to professionals from other engineering disciplines wanting an overview of the entire field or specific information on one aspect of it. Featuring practical case studies and demonstrating different root causes of large power failures, it helps readers develop new concepts for mitigating blackout issues. This book is a comprehensive reference resource for graduate and postgraduate students, academic researchers, and practicing engineers working in the fields of power system and microgrid.

Encyclopedia of Sustainable Technologies
Research & Technology 2003

Design Principle, Modernization, and Techniques
Towards an Updated Electronic Load Controller for Microhydro Systems in Rural Nepal

Waterpower 79
NASA Tech Briefs

Comprehensive, cross-disciplinary coverage of Smart Grid issues from global expert researchers and practitioners. This definitive reference meets the need for a large scale, high quality work reference in Smart Grid engineering which is pivotal in the development of a low-carbon energy infrastructure. Including a total of 83 articles across 3 volumes The Smart Grid Handbook is organized in to 6 sections: Vision and Drivers, Transmission, Distribution, Smart Meters and Customers, Information and Communications Technology, and Socio-Economic Issues. Key features: Written by a team representing smart grid R&D, technology deployment, standards, industry practice, and socio-economic aspects. Vision and Drivers covers the vision, definitions, evolution, and global development of the smart grid as well as new technologies and standards. The Transmission section discusses industry practice, operational experience, standards, cyber security, and grid codes. The Distribution section introduces distribution systems and the system configurations in different countries and different load areas served by the grid. The Smart Meters and Customers section assesses how smart meters enable the customers to interact with the power grid. Socio-economic issues and information and communications technology requirements are covered in dedicated articles.The Smart Grid Handbook will meet the need for a high quality reference work to support advanced study and research in the field of electrical power generation, transmission and distribution. It will be an essential reference for regulators and government officials, testing laboratories and certification organizations, and engineers and researchers in Smart Grid-related industries.

As the demand for efficient energy systems continues to grow around the globe, electrical systems are becoming more essential in order to meet these increased needs. As these systems are being utilized more frequently, it becomes imperative to find ways of optimizing their overall function. The Handbook of Research on Emerging Technologies for Electrical Power Planning, Analysis, and Optimization features emergent methods and research to grow around the globe, electrical systems are becoming more essential in order to meet these increased needs. As these systems are being utilized more frequently, it becomes imperative to find ways of optimizing their overall function. The Handbook of Research on Emerging Technologies for Electrical Power Planning, Analysis, and Optimization features emergent methods and research to grow around the globe, electrical systems are becoming more essential in order to meet these increased needs. 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