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Selected Water Resources Abstracts
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Modelling and Controlling Hydropower Plants
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Electrical Engineer's Reference Book
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Proceedings of SoCTA 2019
Analysis and Simulation
A Practical and Theoretical Treatise on the Development, Design, Construction,

Equipment and Operation of Hydroelectric Transmission Plants
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POWER SYSTEM CONTROL AND STABILITY, 2ND ED
Electric Power Generation, Transmission, and Distribution
Proceedings of 2016 Chinese Intelligent Systems Conference
Hydroelectric Developments and Engineering
Hydraulic Machinery and Cavitation
ASCE Combined Index
Principles, Modelling and Gain Scheduling Design
Transactions
First International Conference, NCAA 2020, Shenzhen, China, July 3–5, 2020, Proceedings
Proceedings of the 7th IFAC/IFIP/IMACS Conference, Vienna, Austria, 17-20 September 1985
Proceedings of the 4th International Conference Hydropower, Bergen, Norway, 20-22 June 2001
Control Algorithm Design for Use with Hydraulic Turbine-driven Generators

HURLEY CAROLYN

Selected Water Resources Abstracts John Wiley & Sons

Hydroelectric power stations are a major source of electricity around the world; understanding their dynamics is crucial to achieving good performance. The electrical power generated is normally controlled by individual feedback loops on each unit. The reference input to the power loop is the grid frequency deviation from its set point, thus structuring an external frequency control loop. The book discusses practical and well-documented cases of modelling and controlling hydropower stations, focused on a pumped storage scheme based in Dinorwig, North Wales. These accounts are valuable to specialist control engineers who are working in this industry. In addition, the theoretical treatment of modern and classic controllers will be useful for graduate and final year undergraduate engineering students. This book reviews SISO and MIMO models, which cover the linear and nonlinear characteristics of pumped storage hydroelectric power stations. The most important dynamic features are discussed. The verification of these

models by hardware in the loop simulation is described. To show how the performance of a pumped storage hydroelectric power station can be improved, classical and modern controllers are applied to simulated models of Dinorwig power plant, that include PID, Fuzzy approximation, Feed-Forward and Model Based Predictive Control with linear and hybrid prediction models.

Dynamic Processes and Control for Stable and Efficient Operation

Springer

This subject is taught at many universities and the original book is used by industry engineers. Many of these readers have indicated a keen interest in the long-awaited material that is the subject of the proposed new chapters. We believe that many owners of the present volume will want to purchase the new expanded book.Chapter 1: Power System Stability.Chapter 2: The Elementary Mathematical ModelChapter 3: System Response to Small DisturbancesChapter 4: The Synchronous MachineChapter 5: The Simulation of Synchronous MachinesChapter 6: Linear Models of the Synchronous MachineChapter 7: Excitation SystemsChapter 8: Effect of Excitation on StabilityChapter 9: Multimachine Systems with Constant Impedance LoadsChapter 10: Speed GoverningChapter 11: Steam Turbine Prime MoversChapter 12: Hydraulic Turbine Prime

MoversChapter 13: Combustion Turbine and Combined-Cycle Power Plants

Blade-Pitch Control for Wind Turbine Load Reductions Tata McGraw-Hill Education

This thesis investigates the use of blade-pitch control and real-time wind measurements to reduce the structural loads on the rotors and blades of wind turbines. The first part of the thesis studies the main similarities between the various classes of current blade-pitch control strategies, which have to date remained overlooked by mainstream literature. It also investigates the feasibility of an estimator design that extracts the turbine tower motion signal from the blade load measurements. In turn, the second part of the thesis proposes a novel model predictive control layer in the control architecture that enables an existing controller to incorporate the upcoming wind information and constraint-handling features. This thesis provides essential clarifications of and systematic design guidelines for these topics, which can benefit the design of wind turbines and, it is hoped, inspire the development of more innovative mechanical load-reduction solutions in the field of wind energy.

Modelling and Controlling Hydropower Plants Springer

This comprehensive text offers a detailed treatment of modelling of components and sub-systems for studying the transient and dynamic

stability of large-scale power systems. Beginning with an overview of basic concepts of stability of simple systems, the book is devoted to in-depth coverage of modelling of synchronous machine and its excitation systems and speed governing controllers. Apart from covering the modelling aspects, methods of interfacing component models for the analysis of small-signal stability of power systems are presented in an easy-to-understand manner. The book also offers a study of simulation of transient stability of power systems as well as electromagnetic transients involving synchronous machines. Practical data pertaining to power systems, numerical examples and derivations are interspersed throughout the text to give students practice in applying key concepts. This text serves as a well-knit introduction to Power System Dynamics and is suitable for a one-semester course for the senior-level undergraduate students of electrical engineering and postgraduate students specializing in Power Systems. Contents: contents Preface 1. ONCE OVER LIGHTLY 2. POWER SYSTEM STABILITY—ELEMENTARY ANALYSIS 3. SYNCHRONOUS MACHINE MODELLING FOR POWER SYSTEM DYNAMICS 4. MODELLING OF OTHER COMPONENTS FOR DYNAMIC ANALYSIS 5. OVERVIEW OF NUMERICAL METHODS 6. SMALL-SIGNAL STABILITY ANALYSIS OF POWER SYSTEMS 7. TRANSIENT

STABILITY ANALYSIS OF POWER SYSTEMS 8. SUBSYNCHRONOUS AND TORSIONAL OSCILLATIONS 9. ENHANCEMENT AND COUNTERMEASURES Index

Volume II Elsevier

Considers the application of modern control engineering on digital computers with a view to improving productivity and product quality, easing supervision of industrial processes and reducing energy consumption and pollution. The topics covered may be divided into two main subject areas: (1) applications of digital control - in the chemical and oil industries, in water turbines, energy and power systems, robotics and manufacturing, cement, metallurgical processes, traffic control, heating and cooling; (2) systems theoretical aspects of digital control - adaptive systems, control aspects, multivariable systems, optimization and reliability, modelling and identification, real-time software and languages, distributed systems and data networks. Contains 84 papers.

Power System Dynamics Springer

Maximizing reader insights into the latest technical developments and trends involving wind turbine control and monitoring, fault diagnosis, and wind power systems, ‘Wind Turbine Control and Monitoring’ presents an accessible and straightforward introduction to wind turbines, but also includes an in-depth analysis incorporating illustrations,

tables and examples on how to use wind turbine modeling and simulation software. Featuring analysis from leading experts and researchers in the field, the book provides new understanding, methodologies and algorithms of control and monitoring, computer tools for modeling and simulation, and advances the current state-of-the-art on wind turbine monitoring and fault diagnosis; power converter systems; and cooperative & fault-tolerant control systems for maximizing the wind power generation and reducing the maintenance cost. This book is primarily intended for researchers in the field of wind turbines, control, mechatronics and energy; postgraduates in the field of mechanical and electrical engineering; and graduate and senior undergraduate students in engineering wishing to expand their knowledge of wind energy systems. The book will also interest practicing engineers dealing with wind technology who will benefit from the comprehensive coverage of the theoretic control topics, the simplicity of the models and the use of commonly available control algorithms and monitoring techniques.

Neural Computing for Advanced Applications

Elsevier

Electric power systems worldwide face radical transformation with the need to decarbonise electricity supply, replace ageing assets and harness new information and communication

technologies (ICT). The Smart Grid uses advanced ICT to control next generation power systems reliably and efficiently. This authoritative guide demonstrates the importance of the Smart Grid and shows how ICT will extend beyond transmission voltages to distribution networks and customer-level operation through Smart Meters and Smart Homes. Smart Grid Technology and Applications: Clearly unravels the evolving Smart Grid concept with extensive illustrations and practical examples. Describes the spectrum of key enabling technologies required for the realisation of the Smart Grid with worked examples to illustrate the applications. Enables readers to engage with the immediate development of the power system and take part in the debate over the future Smart Grid. Introduces the constituent topics from first principles, assuming only a basic knowledge of mathematics, circuits and power systems. Brings together the expertise of a highly experienced and international author team from the UK, Sri Lanka, China and Japan. Electrical, electronics and computer engineering researchers, practitioners and consultants working in inter-disciplinary Smart Grid RD&D will significantly enhance their knowledge through this reference. The tutorial style will greatly benefit final year undergraduate and master’s students as the curriculum increasing focuses on the breadth of technologies that contribute to Smart Grid

realisation.

Smart Grid Springer Nature

These proceedings present selected research papers from CISC'16, held in Xiamen, China. The topics include Multi-agent system, Evolutionary Computation, Artificial Intelligence, Complex systems, Computation intelligence and soft computing, Intelligent control, Advanced control technology, Robotics and applications, Intelligent information processing, Iterative learning control, Machine Learning, and etc. Engineers and researchers from academia, industry, and government can get an insight view of the solutions combining ideas from multiple disciplines in the field of intelligent systems.

Theory, Design and Application National Academies Press

The wind energy industry is a key player in the booming alternative energy market, and job opportunities abound in this rapidly-growing field. Wind Turbine Control Systems provides critical resources for experienced and novice learners alike. The text provides an in-depth survey of wind turbine control systems. It covers key wind-energy control strategies and offers a comprehensive overview of the ways in which wind is generated, converted, and controlled.

Wind Turbine Control Systems Springer

Control Algorithm Design for Use with Hydraulic Turbine-driven GeneratorsControl Design and Validation for the Hydraulic DOT500 Wind TurbineModelling and

Controlling Hydropower PlantsSpringer Science & Business Media

Soft Computing: Theories and Applications CRC Press

Wind-driven power systems represent a renewable energy technology. Arrays of interconnected wind turbines can convert power carried by the wind into electricity. This book defines a research and development agenda for the U.S. Department of Energy's wind energy program in hopes of improving the performance of this emerging technology.

Convention Springer

This book thoroughly covers the fundamentals of the QFT robust control, as well as practical control solutions, for unstable, time-delay, non-minimum phase or distributed parameter systems, plants with large model uncertainty, high-performance specifications, nonlinear components, multi-input multi-output characteristics or asymmetric topologies. The reader will discover practical applications through a collection of fifty successful, real world case studies and projects, in which the author has been involved during the last twenty-five years, including commercial wind turbines, wastewater treatment plants, power systems, satellites with flexible appendages, spacecraft, large radio telescopes, and industrial manufacturing systems. Furthermore, the book presents problems and projects with the popular QFT Control Toolbox (QFTCT) for MATLAB,

which was developed by the author.

Installation of Vertical Hydraulic-turbine-driven Generators and Reversible Generator/motors of Pumped Storage Installations John Wiley & Sons

Electrical Engineer's Reference Book, Fourteenth Edition focuses on electrical engineering. The book first discusses units, mathematics, and physical quantities, including the international unit system, physical properties, and electricity. The text also looks at network and control systems analysis. The book examines materials used in electrical engineering. Topics include conducting materials, superconductors, silicon, insulating materials, electrical steels, and soft irons and relay steels. The text underscores electrical metrology and instrumentation, steam-generating plants, turbines and diesel plants, and nuclear reactor plants. The book also discusses alternative energy sources. Concerns include wind, geothermal, wave, ocean thermal, solar, and tidal energy. The text then looks at alternating-current generators. Stator windings, insulation, output equation, armature reaction, and reactants and time-constraints are described. The book also examines overhead lines, cables, power transformers, switchgears and protection, supply and control of reactive power, and power systems operation and

control. The text is a vital source of reference for readers interested in electrical engineering.

Control Design and Validation for the Hydraulic DOT500 Wind Turbine Springer

The power sector has undergone a liberalization process both in industrialized and developing countries, involving market regimes, as well as ownership structure. These processes have called for new and innovative concepts, affecting both the operation of existing hydropower plants and transmission facilities, as well as the development and implementation of new projects. At the same time a sharper focus is being placed on environmental considerations. In this context it is important to emphasize the obvious benefits of hydropower as a clean, renewable and sustainable energy source. It is however also relevant to focus on the impact on the local environment during the planning and operation of hydropower plants. New knowledge and methods have been developed that make it possible to mitigate the local undesirable effects of such projects. Development and operation of modern power systems require sophisticated technology. Continuous research and development in this field is therefore crucial to maintaining hydropower as a competitive and environmentally well-accepted form of power generation.

Wind Power Generation and Wind Turbine Design

Springer Science & Business Media
This important book presents a selection of new research on wind turbine technology, including aerodynamics, generators and gear systems, towers and foundations, control systems, and environmental issues. This informative book: • Introduces the principles of wind turbine design • Presents methods for analysis of wind turbine performance • Discusses approaches for wind turbine improvement and optimization • Covers fault detection in wind turbines • Describes mediating the adverse effects of wind turbine use and installation
Hydraulic Machines
Springer Nature
Hydraulic Wind Power Transfer System is a promising alternative to conventional wind turbines, and an increased research in this field indicates the ability of this technology to replace conventional wind turbines. This technology not only provides an initial economical advantage by eliminating the need for a gearbox unit, but also provides further long term economical and reliability advantage by transferring the generation unit to the ground level, which provides a low-cost and easier maintenance and inspection. In addition, transferring the generation unit to the ground level and eliminating the gearbox decreases the weight of the wind turbine and thus reducing the size of the foundation. However, the unpredictability of renewable energies make

them less reliable and prone to power shortage. To mitigate this issue, an energy storage system can be coupled to the generation system so that it would store the excess energy when the renewable source has more power than the demand, and return the excess energy back to the system when the renewable source is not able to meet the demand. Similar to conventional wind turbines, this technology also requires complex control algorithms to operate. These algorithms not only aim to improve the power quality and match the grid rules, but also aim to absorb the maximum amount of power from wind. To design proper control strategies, a detailed model of the system is needed for the simulation. During my research in this lab, my contributions included: (1) Introduction of a method to eliminate the need for proportional valve for frequency control and thus eliminating the valve pressure loss in the hydraulic wind power system (2) Integration of a energy storage system with the hydraulic system and design of a control system in order to maintain the generator frequency during power shortage (3) Proposal of an strategy and control method for Maximum Power Point Tracking (MPPT) and increasing the efficiency of the wind power absorption. Besides these mentioned points, I have also conducted simulations and have revised methods for wind speed estimation, and use of neural-networks to

optimize the generators. However, due to time constraint or unfinished work, I have included them as recommendations for future research.

Power World Scientific Hydropower is found to be one of the most reliable and inexpensive options for renewable energy which was now widely been adopted by many countries to substitute fossil fuel sources. This Brief highlights the impact of climate change on hydropower plants, especially on the turbine design, as turbines are responsible for optimal conversion and regular energy production. The vulnerability of turbines is analyzed with the help of Artificial Neural Networks, followed by Multi Criteria Decision Making methods for development of intelligent indices to represent the level of vulnerability of turbines due to the change in climate.

Principles and Design John Wiley & Sons Hydraulic machinery such as turbines and pumps is widely used around the world. Related topics concerning design, operation and maintenance are of relevant interest. In this context, cavitation is a phenomenon to be taken into account, and this was treated in the XVIII IAHR Symposium on Hydraulic Machinery and Cavitation which took place in Valencia, Spain, 16th-19th September, 1996 and which was hosted by the Polytechnic University of Valencia. The proceedings of the Symposium have been published in two volumes. In this first

volume, the papers included cover the following topics: Hydraulic Turbines, Analysis and Design Hydraulic Pumps Hydraulic Elements, Dynamic Characterization and Hydraulic Behaviour Cavitation and Sand Erosion In the second volume, the papers included cover the following topics: Hydraulic Transients and Control Systems Related to Hydraulic Machinery and Plants Oscillatory and Vibration Problems in Hydraulic Machinery and Power Stations Experimental Investigations related to Hydraulic Machinery and its Applications Practical Applications of the Hydraulic Machinery Monitoring, Predictive Maintenance and Refurbishment The 119 papers presented at the Symposium, from research groups, consulting companies and manufacturers, constitute an important collection for investigators, engineers and technicians who are interested in updated information on hydraulic machinery. This book is intended to be a reference text comprising the latest innovations on this subject.

Hydropower in the New Millennium Jones & Bartlett Publishers

This book emphasizes the application of Linear Parameter Varying (LPV) gain scheduling techniques to the control of wind energy conversion systems. This reformulation of the classical problem of gain scheduling allows straightforward design procedure and simple controller implementation.

From an overview of basic wind energy conversion, to analysis of common control strategies, to design details for LPV gain-scheduled controllers for both fixed- and variable-pitch, this is a thorough and informative monograph.

Hydraulic Machinery And Cavitation - Proceedings Of The Xix Iahr Symposium (In 2 Volumes) WIT Press

Wind energy's bestselling textbook- fully revised. This must-have second edition includes up-to-date data, diagrams, illustrations and thorough new material on: the fundamentals of wind turbine aerodynamics; wind turbine testing and modelling; wind turbine design standards; offshore wind energy; special purpose applications, such as energy storage and fuel production. Fifty additional homework problems and a new appendix on data processing make this comprehensive edition perfect for engineering students. This book offers a complete examination of one of the most promising sources of renewable energy and is a great introduction to this cross-disciplinary field for practising engineers. "provides a wealth of information and is an excellent reference book for people interested in the subject of wind energy." (IEEE Power & Energy Magazine, November/December 2003) "deserves a place in the library of every university and college where renewable energy is taught." (The International Journal of Electrical Engineering

Education, Vol.41, No.2 April 2004) “a very comprehensive and well-organized treatment of the current status of wind power.” (Choice, Vol. 40, No. 4, December 2002)

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