

## Fault Analysis Powerworld

Today's readers learn the basic concepts of power systems as they master the tools necessary to apply these skills to real world situations with POWER SYSTEM ANALYSIS AND DESIGN, 6E. This new edition highlights physical concepts while also giving necessary attention to mathematical techniques. The authors develop both theory and modeling from simple beginnings so readers are prepared to readily extend these principles to new and complex situations. Software tools and the latest content throughout this edition aid readers with design issues while reflecting the most recent trends in the field. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Amoral, cunning, ruthless, and instructive, this multi-million-copy New York Times bestseller is the definitive manual for anyone interested in gaining, observing, or defending against ultimate control – from the author of *The Laws of Human Nature*. In the book that *People* magazine proclaimed “beguiling” and “fascinating,” Robert Greene and Joost Elffers have distilled three thousand years of the history of power into 48 essential laws by drawing from the philosophies of Machiavelli, Sun Tzu, and Carl Von Clausewitz and also from the lives of figures ranging from Henry Kissinger to P.T. Barnum. Some laws teach the need for prudence (“Law 1: Never Outshine the Master”), others teach the value of confidence (“Law 28: Enter Action with Boldness”), and many recommend absolute self-preservation (“Law 15: Crush Your Enemy Totally”). Every law, though, has one thing in common: an interest in total domination. In a bold and arresting two-color package, *The 48 Laws of Power* is ideal whether your aim is conquest, self-defense, or simply to understand the rules of the game.

The objective of this project is to investigate the usefulness of the power system simulator PowerWorld program developed by “Glover, Overbye &Sarma”. The results obtained from the power simulator program were presented for different case studies. The following power system network was used in this study. The system consists from 6 buses. Area 1 includes bus 1-5 while Bus 6 will be part of Area 1 in some case studies, or will form separate area 2 in other case studies for comparison purpose. Note that the Available Transfer Capability (ATC) analysis add-on which determines the maximum MW transfer possible between two parts of a power system without violating any limits, and the voltage adequacy and stability tool (VAST) add-on that can solve multiple power flow solutions in order to generate a PV curve for a particular transfer or a QV curve at a given bus, was not studied here because we don't have yet VAST add-on and the ATC add-on packages

The market liberalization is expected to affect drastically the operation of power systems, which under economical pressure and increasing amount of transactions are being operated much closer to their limits than previously. These changes put the system operators faced with rather different and much more problematic scenarios than in the past. They have now to calculate available transfer capabilities and manage congestion problems in a near on line environment, while operating the transmission system under extremely stressed conditions. This requires highly reliable and efficient software aids, which today are non-existent, or not yet in use. One of the most problematic issues, very much needed but not yet encountered today, is on-line dynamic security assessment and control, enabling the power system to withstand unexpected contingencies without experiencing voltage or transient instabilities. This monograph is devoted to a unified approach to transient stability assessment and control, called Single Machine Equivalent (SIME).

In the United States, especially in metropolitan areas, transmission infrastructure is congested due to a combination of increasing load demands, declining investment, and aging facilities. It is anticipated that significant investments will be required for new construction and upgrades in order to serve load demands. This thesis explores higher phase order systems, specifically, six-phase, as a means of increasing power transfer capability, and provides a comparison with conventional three-phase double circuit transmission lines. In this thesis, the line parameters, electric and magnetic fields, and right of way are the criteria for comparing six-phase and three-phase double circuit lines. The calculations of the criteria were achieved by a program developed using MATLAB. This thesis also presents fault analysis and recommends suitable protection for six-phase transmission lines. This calculation was performed on 4-bus, 9-bus, and 118-bus systems from Powerworld® sample cases. The simulations were performed using Powerworld® and PSCAD®. Line parameters calculations performed in this thesis show that line impedances in six-phase lines have a slight difference, compared to three-phase double circuit line. The shunt capacitance of compacted six phase line is twice of the value in the three-phase double circuit line. As a consequence, the compacted six-phase line provides higher surge impedance loadings. The electric and magnetic fields calculations show that, ground level electric fields of the six-phase lines decline more rapidly as the distance from center of the lines increase. The six-phase lines have a better performance on ground level magnetic field. Based on the electric and magnetic field results, right of way requirements for the six-phase lines and three-phase double circuit line were calculated. The calculation results of right of way show that six-phase lines provide higher power transfer capability with a given right of way. Results from transmission line fault analysis, and protection study show that, fault types and protection system in six-phase lines are more complicated, compared to three-phase double circuit line. To clarify the concern about six-phase line protection, a six-phase line protection system was designed. Appropriate protection settings were determined for a six-phase line in the 4-bus system.

This book provides a comprehensive practical treatment of the modelling of electrical power systems, and the theory and practice of fault analysis of power systems covering detailed and advanced theories as well as modern industry practices. The continuity and quality of electricity delivered safely and economically by today's and future's electrical power networks are important for both developed and developing economies. The correct modelling of power system equipment and correct fault analysis of electrical networks are pre-requisite to ensuring safety and they play a critical role in the identification of economic network investments. Environmental and economic factors require engineers to maximise the use of existing assets which in turn require accurate modelling and analysis techniques. The technology described in this book will always be required for the safe and economic design and operation of electrical power systems. The book describes relevant advances in industry such as in the areas of international standards developments, emerging new generation technologies such as wind turbine generators, fault current limiters, multi-phase fault analysis, measurement of equipment parameters, probabilistic short-circuit analysis and electrical interference. \*A fully up-to-date guide to the analysis and practical troubleshooting of short-circuit faults in electricity utilities and industrial power systems \*Covers generators, transformers, substations, overhead power lines and industrial systems with a focus on best-practice techniques, safety issues, power system planning and economics \*North American and British / European standards covered

This book bridges the divide between the fields of power systems engineering and computer communication through the new field of power system information theory. Written by an expert with vast experience in the field, this book explores the smart grid from generation to consumption, both as it is planned today and how it will evolve tomorrow. The book focuses upon what differentiates the smart grid from the "traditional" power grid as it has been known for the last century. Furthermore, the author provides the reader with a fundamental understanding of both power systems and communication networking. It shows the complexity and operational requirements of the evolving power grid, the so-called "smart grid," to the communication networking engineer; and similarly, it shows the complexity and operational requirements for communications to the power systems engineer. The book is divided into three parts. Part One discusses the basic operation of the electric power grid, covering fundamental knowledge that is assumed in Parts Two and Three. Part Two introduces communications and networking, which are critical enablers for the smart grid. It also considers how communication and networking

will evolve as technology develops. This lays the foundation for Part Three, which utilizes communication within the power grid. Part Three draws heavily upon both the embedded intelligence within the power grid and current research, anticipating how and where computational intelligence will be implemented within the smart grid. Each part is divided into chapters and each chapter has a set of questions useful for exercising the readers' understanding of the material in that chapter. Key Features: Bridges the gap between power systems and communications experts Addresses the smart grid from generation to consumption, both as it is planned today and how it will likely evolve tomorrow Explores the smart grid from the perspective of traditional power systems as well as from communications Discusses power systems, communications, and machine learning that all define the smart grid It introduces the new field of power system information theory

This textbook introduces electrical engineering students to the most relevant concepts and techniques in three major areas today in power system engineering, namely analysis, security and deregulation. The book carefully integrates theory and practical applications. It emphasizes power flow analysis, details analysis problems in systems with fault conditions, and discusses transient stability problems as well. In addition, students can acquire software development skills in MATLAB and in the usage of state-of-the-art software tools such as Power World Simulator (PWS) and Siemens PSS/E. In any energy management/operations control centre, the knowledge of contingency analysis, state estimation and optimal power flow is of utmost importance. Part 2 of the book provides comprehensive coverage of these topics. The key issues in electricity deregulation and restructuring of power systems such as Transmission Pricing, Available Transfer Capability (ATC), and pricing methods in the context of Indian scenario are discussed in detail in Part 3 of the book. The book is interspersed with problems for a sound understanding of various aspects of power systems. The questions at the end of each chapter are provided to reinforce the knowledge of students as well as prepare them from the examination point of view. The book will be useful to both the undergraduate students of electrical engineering and postgraduate students of power engineering and power management in several courses such as Power System Analysis, Electricity Deregulation, Power System Security, Restructured Power Systems, as well as laboratory courses in Power System Simulation.

A bestselling calculations handbook that offers electric power engineers and technicians essential, step-by-step procedures for solving a wide array of electric power problems. This edition introduces a complete electronic book on CD-ROM with over 100 live calculations--90% of the book's calculations. Updated to reflect the new National Electric Code advances in transformer and motors; and the new system design and operating procedures in the electric utility industry prompted by deregulation.

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Master the modeling, analysis, and simulation of today's power systems This comprehensive textbook discusses all the major modelling and simulation tools and techniques that a power engineer needs, and explains how those tools can be applied to modern power systems. The applications include loadflow studies, contingency analysis, transient and voltage stability studies, state estimation and phasor estimation studies, co-simulation studies. Written by a recognized expert in the field, Simulation and Analysis of Modern Power Systems contains real-world examples worked out in MATLAB, PSCA, and Power World EMTP and RTDS. You will get a thorough overview of power system fundamentals and learn, step by step, how to efficiently emulate and analyze the myriad components of modern power systems. The book introduces the most state-of-the-art power simulation tool available today, the Real Time Digital Simulator (RTDS) and its Hardware-In-Loop (HIL) capabilities. Explains how each technique is used in many essential applications Introduces the Real Time Digital Simulator (RTDS) and its Hardware-In-Loop (HIL) capabilities Written by a power systems expert and experienced educator

Paul Kennedy's classic naval history, now updated with a new introduction by the author This acclaimed book traces Britain's rise and fall as a sea power from the Tudors to the present day. Challenging the traditional view that the British are natural 'sons of the waves', he suggests instead that the country's fortunes as a significant maritime force have always been bound up with its economic growth. In doing so, he contributes significantly to the centuries-long debate between 'continental' and 'maritime' schools of strategy over Britain's policy in times of war. Setting British naval history within a framework of national, international, economic, political and strategic considerations, he offers a fresh approach to one of the central questions in British history. A new introduction extends his analysis into the twenty-first century and reflects on current American and Chinese ambitions for naval mastery. 'Excellent and stimulating' Correlli Barnett 'The first scholar to have set the sweep of British Naval history against the background of economic history' Michael Howard, Sunday Times 'By far the best study that has ever been done on the subject ... a sparkling and apt quotation on practically every page' Daniel A. Baugh, International History Review 'The best single-volume study of Britain and her naval past now available to us' Jon Sumida, Journal of Modern History

This book deals with several selected aspects of electric power quality issues typically faced during grid integration processes of contemporary renewable energy sources. In subsequent chapters of this book the reader will be familiarized with the issues related to voltage and current harmonics and inter-harmonics generation and elimination, harmonic emission of switch-mode rectifiers, reactive power flow control in power system with non-linear loads, modeling and simulation of power quality issues in power grid, advanced algorithms used for estimating harmonic components, and new methods of measurement and analysis of real time accessible power quality related data.

Matlab SimPowerSystems is a modern design tool that allows scientists and engineers to rapidly and easily build models that simulate power systems. Not only can you draw the circuit topology rapidly, but your analysis of the circuit can include interactions with mechanical, thermal, control, and other disciplines. The paper covers some case studies that provide detailed, realistic examples of how to use SimPowerSystems in power system analysis. The following types of studies are covered on the paper: 1. Thyristor-Based Static Var Compensator: Study the steady-state and dynamic performance of a static var compensator (SVC) on a transmission system. 2. Transient Stability of a Power System with SVC and PSS: Study of the application of static var compensator (SVC) and power system stabilizers (PSS) to improve transient stability and power oscillation damping of the system. 3. GTO-Based STATCOM: Study the steady-state and dynamic performance of a static synchronous compensator (STATCOM) on a transmission system. 4. Control of load flow using UPFC: Study the steady-state and dynamic performance of a unified power flow controller (UPFC). 5. Variable-frequency Induction Motor Drive: Study of a PWM inverter is used as a variable-voltage, variable-frequency source to drive an induction motor in variable-speed operation. 6. Chopper-Fed DC Motor Drive: Study of a DC motor drive with armature voltage controlled by a GTO thyristor chopper. 7. VSC-Based HVDC Link: Modeling of a forced-commutated voltage-sourced converter high-voltage direct current (VSC-HVDC) transmission link.

SMART GRID AND ENABLING TECHNOLOGIES Discover foundational topics in smart grid technology as well as an exploration of the current and future state of the industry As the relationship between fossil fuel use and climate change becomes ever clearer, the search is on for reliable, renewable and less harmful sources of energy. Sometimes called the “electronet” or the “energy Internet,” smart grids promise to integrate renewable energy, information, and communication technologies with the existing electrical grid and deliver electricity more efficiently and reliably. Smart Grid and Enabling Technologies delivers a complete vision of smart grid technology and applications, including foundational and fundamental technologies, the technology that enables smart grids, the current state of the industry, and future trends in smart energy. The book offers readers thorough discussions of modern smart grid technology, including advanced metering infrastructure, net zero energy buildings, and communication, data management, and networks in smart grids. The accomplished authors also discuss critical challenges and barriers facing the smart grid industry as well as trends likely to be of importance in its future development. Readers will also benefit from the inclusion of: A thorough introduction to smart grid architecture, including traditional grids, the fundamentals of electric power, definitions and classifications of smart grids, and the components of smart grid technology An exploration of the opportunities and challenges posed by renewable energy integration Practical discussions of power electronics in the smart grid, including power electronics converters for distributed generation, flexible alternating current transmission systems, and high voltage direct current transmission systems An analysis of distributed generation Perfect for scientists, researchers, engineers, graduate students, and senior undergraduate students studying and working with electrical power systems and communication systems. Smart Grid and Enabling Technologies will also earn a place in the libraries of economists, government planners and regulators, policy makers, and energy stakeholders working in the smart grid field.

The new edition of POWER SYSTEM ANALYSIS AND DESIGN provides students with an introduction to the basic concepts of power systems along with tools to aid them in applying these skills to real world situations. Physical concepts are highlighted while also giving necessary attention to mathematical techniques. Both theory and modeling are developed from simple beginnings so that they can be readily extended to new and complex situations. The authors incorporate new tools and material to aid students with design issues and reflect recent trends in the field. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Discover foundational topics in smart grid technology as well as an exploration of the current and future state of the industry As the relationship between fossil fuel use and climate change becomes ever clearer, the search is on for reliable, renewable and less harmful sources of energy. Sometimes called the electronet or the energy Internet, smart grids promise to integrate renewable energy, information, and communication technologies with the existing electrical grid and deliver electricity more efficiently and reliably. Smart Grid and Enabling Technologies delivers a complete vision of smart grid technology and applications, including foundational and fundamental technologies, the technology that enables smart grids, the current state of the industry, and future trends in smart energy. The book offers readers thorough discussions of modern smart grid technology, including advanced metering infrastructure, net zero energy buildings, and communication, data management, and networks in smart grids. The accomplished authors also discuss critical challenges and barriers facing the smart grid industry as well as trends likely to be of import in its future development. Readers will also benefit from the inclusion of: A thorough introduction to smart grid architecture, including traditional grids, the fundamentals of electric power, definitions and classifications of smart grids, and the components of smart grid technology An exploration of the opportunities and challenges posed by renewable energy integration Practical discussions of power electronics in the smart grid, including power electronics converters for distributed generation, flexible alternating current transmission systems, and high voltage direct current transmission systems An analysis of distributed generation Perfect for scientists, researchers, engineers, graduate students, and senior undergraduate students studying and working with electrical power systems and communication systems. Smart Grid and Enabling Technologies will also earn a place in the libraries of economists, government planners and regulators, policy makers, and energy stakeholders working in the smart grid field.

This book is open access under a CC BY 4.0 license. This book summarizes work being pursued in the context of the CIPRNet (Critical Infrastructure Preparedness and Resilience Research Network) research project, co-funded by the European Union under the Seventh Framework Programme (FP7). The project is intended to provide concrete and on-going support to the Critical Infrastructure Protection (CIP) research communities, enhancing their preparedness for CI-related emergencies, while also providing expertise and technologies for other stakeholders to promote their understanding and mitigation of the consequences of CI disruptions, leading to enhanced resilience. The book collects the tutorial material developed by the authors for several courses on the modelling, simulation and analysis of CIs, representing extensive and integrated CIP expertise. It will help CI stakeholders, CI operators and civil protection authorities understand the complex system of CIs, and help them adapt to these changes and threats in order to be as prepared as possible for mitigating emergencies and crises affecting or arising from CIs.

The book consists from three parts concerning simulation of some power system, control system and power electronics case studies using matlab and powerworld simulator programs • Part A: Simulation of Some Power Electronics Case Studies in Matlab Simpowersystem Blockset: • Part B: Control of DC Motor Using Different Control Strategies in Matlab: • Part C: Investigation of the Usefulness of the PowerWorld Simulator Program Developed by “Glover, Overbye & Sarma” in the Solution of Power System Problems: I. Part A: Simulation of Some Power Electronics Case Studies in Matlab Simpowersystem Blockset: This part covers some case studies that provide detailed, realistic examples of how to use SimPowerSystems in modeling power system dynamics in various types of application that use power electronics converters. The following case studies are simulated on the paper: 1- Thyristor-Based Static Var Compensator. 2. Transient Stability of a Power System with SVC and PSS. 3. GTO-Based STATCOM. 4. Control of load flow using UPFC. 5- Control of AC motor. 6- Control of DC motor. 7- VSC-Based HVDC Link. II. Part B: Control of DC Motor Using Different Control Strategies in Matlab: A simple model of a DC motor driving an inertial load has the angular speed of the load,  $\omega$ , as the output and applied voltage,  $V$ , as the input. The system was used as an example in [1]. The ultimate goal of this paper is to control the angular rate by varying the applied voltage using different control strategies for comparison purpose. The comparison is made between the proportional controller, integral controller, proportional and integral controller, phase lag compensator, derivative controller, lead integral compensator, lead lag compensator, PID controller and the the linear quadratic tracker design based on the optimal control theory. III. Part C: Investigation of the Usefulness of the PowerWorld Simulator Program Developed by “Glover, Overbye & Sarma” in the Solution of Power System Problems: The objective of this part is to investigate the

usefulness of the power system simulator PowerWorld program developed by “Glover, Overbye &Sarma”. The results obtained from the power simulator program were presented for different case studies. The following power system network was used in this study. The system consists from 6 buses. Area 1 includes bus 1-5 while Bus 6 will be part of Area 1 in some case studies, or will form separate area 2 in other case studies for comparison purpose.

This classic text offers you the key to understanding short circuits, open conductors and other problems relating to electric power systems that are subject to unbalanced conditions. Using the method of symmetrical components, acknowledged expert Paul M. Anderson provides comprehensive guidance for both finding solutions for faulted power systems and maintaining protective system applications. You'll learn to solve advanced problems, while gaining a thorough background in elementary configurations. Features you'll put to immediate use: Numerous examples and problems Clear, concise notation Analytical simplifications Matrix methods applicable to digital computer technology Extensive appendices Diskette files can now be found by entering in ISBN 978-0780311459 on booksupport.wiley.com.

This two-volume set (CCIS 955 and CCIS 956) constitutes the refereed proceedings of the Second International Conference on Advanced Informatics for Computing Research, ICAICR 2018, held in Shimla, India, in July 2018. The 122 revised full papers presented were carefully reviewed and selected from 427 submissions. The papers are organized in topical sections on computing methodologies; hardware; information systems; networks; security and privacy; computing methodologies.

The objective of this project is to investigate the usefulness of the power system simulator PowerWorld program developed by Glover, Overbye &Sarma. The results obtained from the power simulator program were presented for different case studies.

Provides practical guidance on the coordination issue of power protective relays and fuses Protecting electrical power systems requires devices that isolate the components that are under fault while keeping the rest of the system stable. Optimal Coordination of Power Protective Devices provides a thorough introduction to the optimal coordination of power systems protection using fuses and protective relays. Integrating fundamental theory and real-world practice, the text begins with an overview of power system protection and optimization, followed by a systematic description of the essential steps in designing directional overcurrent relays and other optimal coordinators. Subsequent chapters present mathematical formulations for solving many standard test systems, and cover a variety of popular hybrid optimization schemes and their mechanisms. The author also discusses a selection of advanced topics and extended applications including adaptive optimal coordination, optimal coordination with multiple time-current curves, and optimally coordinating multiple types of protective devices. Optimal Coordination of Power Protective Devices: Covers fuses and overcurrent, directional overcurrent, and distance relays Explains the relation between fault current and operating time of protective relays Discusses performance and design criteria such as sensitivity, speed, and simplicity Includes an up-to-date literature review and a detailed overview of the fundamentals of power system protection Features numerous illustrative examples, practical case studies, and programs coded in MATLAB and Python programming languages Optimal Coordination of Power Protective Devices is the perfect textbook for instructors in electric power system protection courses, and a must-have reference for protection engineers in power electric companies, and for researchers and industry professionals specializing in power system protection.

Power System Stability and Control contains the hands-on information you need to understand, model, analyze, and solve problems using the latest technical tools. You'll learn about the structure of modern power systems, the different levels of control, and the nature of stability problems you face in your day-to-day work.

"This e-book is devoted to the use of spreadsheets in the service of education in a broad spectrum of disciplines: science, mathematics, engineering, business, and general education. The effort is aimed at collecting the works of prominent researchers and "

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Author Ned Mohan has been a leader in EES education and research for decades. His three-book series on Power Electronics focuses on three essential topics in the power sequence based on applications relevant to this age of sustainable energy such as wind turbines and hybrid electric vehicles. The three topics include power electronics, power systems and electric machines. Key features in the first Edition build on Mohan's successful MNPERE texts; his systems approach which puts dry technical detail in the context of applications; and substantial pedagogical support including PPT's, video clips, animations, clicker questions and a lab manual. It follows a top-down systems-level approach to power electronics to highlight interrelationships between these sub-fields. It's intended to cover fundamental and practical design. This book also follows a building-block approach to power electronics that allows an in-depth discussion of several important topics that are usually left. Topics are carefully sequenced to maintain continuity and interest.

Fault Analysis Using Power World SimulatorPower System Analysis and DesignCengage Learning

This study presents options to fully unlock the world's vast solar PV potential over the period until 2050. It builds on IRENA's global roadmap to scale up renewables and meet climate goals.

The comprehensive and authoritative guide to power electronics in renewable energy systems Power electronics plays a significant role in modern industrial automation and high-efficiency energy systems. With contributions from an international group of noted experts, Power Electronics in Renewable Energy Systems and Smart Grid: Technology and Applications offers a comprehensive review of the technology and applications of power electronics in renewable energy systems and smart grids. The authors cover information on a variety of energy systems including wind, solar, ocean, and geothermal energy systems as well as fuel cell systems and bulk energy storage systems. They also examine smart grid elements, modeling, simulation, control, and AI applications. The book's twelve chapters offer an application-oriented and tutorial viewpoint and also contain technology status review. In addition, the book contains illustrative examples of applications and discussions of future perspectives. This important resource: Includes descriptions of power semiconductor devices, two level and multilevel converters, HVDC systems, FACTS, and more Offers discussions on various energy systems such as wind, solar, ocean, and geothermal energy systems, and also fuel cell systems and bulk energy storage systems Explores smart grid elements, modeling, simulation, control, and

AI applications Contains state-of-the-art technologies and future perspectives Provides the expertise of international authorities in the field Written for graduate students, professors in power electronics, and industry engineers, Power Electronics in Renewable Energy Systems and Smart Grid: Technology and Applications offers an up-to-date guide to technology and applications of a wide-range of power electronics in energy systems and smart grids.

This conference is the 4th of bi annual event since 2012 The conference covers topics from the fields of power engineering and renewable energy related

'A timely and cogent reminder that history never ends and is about to be made' - Tim Marshall, author of Prisoners of Geography With the world already struggling to contain conflicts on several continents, with security and defence expenditure under huge pressure, it's time to think the unthinkable and explore what might happen. As former soldiers now working in defence strategy and conflict resolution, Paul Cornish and Kingsley Donaldson are perfectly qualified to guide us through a credible and utterly convincing 20/20 vision of the year 2020, from cyber security to weapons technology, from geopolitics to undercover operations. This book is of global importance, offering both analysis and creative solutions - essential reading both for decision-makers and everyone who simply wants to understand our future.

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