

ELECTRICAL

MACHINE ANALYSIS

USING FINITE ELEMENTS



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Title Electrical Machine Analysis Using Finite Elements

Bei Gou, Woonki Na, Bill Diong



Title Electrical Machine Analysis Using Finite Elements:

Electrical Machine Analysis Using Finite Elements Nicola Bianchi,2005 From the fan motor in your PC to precision control of aircraft electrical machines of all sizes varieties and levels of complexity permeate our world Some are very simple while others require exacting and application specific design Electrical Machine Analysis Using Finite Elements provides the tools necessary for the analysis and design of any type of electrical machine by integrating mathematical numerical techniques with analytical and design methodologies Building successively from simple to complex analyses this book leads you step by step through the procedures and illustrates their implementation with examples of both traditional and innovative machines Although the examples are of specific devices they demonstrate how the procedures apply to any type of electrical machine introducing a preliminary theory followed by various considerations for the unique circumstance The author presents the mathematical background underlying the analysis but emphasizes application of the techniques common strategies and obtained results He also supplies codes for simple algorithms and reveals analytical methodologies that universally apply to any software program With step by step coverage of the fundamentals and common procedures Electrical Machine Analysis Using Finite Elements offers a superior analytical framework that allows you to adapt to any electrical machine to any software platform and to any specific requirements that you may encounter **Electrical Machine**

Analysis Using Finite Elements Nicola Bianchi,2017-12-19 From the fan motor in your PC to precision control of aircraft electrical machines of all sizes varieties and levels of complexity permeate our world Some are very simple while others require exacting and application specific design Electrical Machine Analysis Using Finite Elements provides the tools necessary for the analysis and design of any type of electrical machine by integrating mathematical numerical techniques with analytical and design methodologies Building successively from simple to complex analyses this book leads you step by step through the procedures and illustrates their implementation with examples of both traditional and innovative machines Although the examples are of specific devices they demonstrate how the procedures apply to any type of electrical machine introducing a preliminary theory followed by various considerations for the unique circumstance The author presents the mathematical background underlying the analysis but emphasizes application of the techniques common strategies and obtained results He also supplies codes for simple algorithms and reveals analytical methodologies that universally apply to any software program With step by step coverage of the fundamentals and common procedures Electrical Machine Analysis Using Finite Elements offers a superior analytical framework that allows you to adapt to any electrical machine to any software platform and to any specific requirements that you may encounter *Finite Element Analysis of Electrical Machines* Sheppard J. Salon,2012-12-06 In Finite Element Analysis of Electrical Machines the author covers two dimensional analysis emphasizing the use of finite elements to perform the most common calculations required of machine designers and analysts The book explains what is inside a finite element program and how the finite element method can be used to

determine the behavior of electrical machines The material is tutorial and includes several completely worked out examples The main illustrative examples are synchronous and induction machines The methods described have been used successfully in the design and analysis of most types of rotating and linear machines Audience A valuable reference source for academic researchers practitioners and designers of electrical machinery

Electric Energy Mohamed A. El-Sharkawi, 2015-09-15

The search for renewable energy and smart grids the societal impact of blackouts and the environmental impact of generating electricity along with the new ABET criteria continue to drive a renewed interest in electric energy as a core subject Keeping pace with these changes *Electric Energy An Introduction Third Edition* restructures the traditional introductory electric energy course to better meet the needs of electrical and mechanical engineering students Now in color this third edition of a bestselling textbook gives students a wider view of electric energy without sacrificing depth Coverage includes energy resources renewable energy power plants and their environmental impacts electric safety power quality power market blackouts and future power systems The book also makes the traditional topics of electromechanical conversion transformers power electronics and three phase systems more relevant to students Throughout it emphasizes issues that engineers encounter in their daily work with numerous examples drawn from real systems and real data

What's New in This Edition Color illustrations Substation and distribution equipment Updated data on energy resources Expanded coverage of power plants Expanded material on renewable energy Expanded material on electric safety Three phase system and pulse width modulation for DC AC converters Induction generator More information on smart grids Additional problems and solutions Combining the fundamentals of traditional energy conversion with contemporary topics in electric energy this accessible textbook gives students the broad background they need to meet future challenges

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles Mehrdad Ehsani, Yimin Gao, Ali Emadi, 2017-12-19

Air pollution global warming and the steady decrease in petroleum resources continue to stimulate interest in the development of safe clean and highly efficient transportation Building on the foundation of the bestselling first edition *Modern Electric Hybrid Electric and Fuel Cell Vehicles Fundamentals Theory and Design Second Edition* updates and expands its detailed coverage of the vehicle technologies that offer the most promising solutions to these issues affecting the automotive industry Proven as a useful in depth resource and comprehensive reference for modern automotive systems engineers students and researchers this book speaks from the perspective of the overall drive train system and not just its individual components New to the second edition A case study appendix that breaks down the Toyota Prius hybrid system Corrections and updates of the material in the first edition Three new chapters on drive train design methodology and control principles A completely rewritten chapter on Fundamentals of Regenerative Braking Employing sufficient mathematical rigor the authors comprehensively cover vehicle performance characteristics EV and HEV configurations control strategies modeling and simulations for modern vehicles They also cover topics including Drive train architecture analysis and design methodologies Internal Combustion

Engine ICE based drive trains Electric propulsion systems Energy storage systems Regenerative braking Fuel cell applications in vehicles Hybrid electric drive train design The first edition of this book gave practicing engineers and students a systematic reference to fully understand the essentials of this new technology This edition introduces newer topics and offers deeper treatments than those included in the first Revised many times over many years it will greatly aid engineers students researchers and other professionals who are working in automotive related industries as well as those in government and academia

Advanced DC/DC Converters Fang Lin Luo,Hong Ye,2016-12-08 DC DC conversion techniques have undergone rapid development in recent decades With the pioneering work of authors Fang Lin Luo and Hong Ye DC DC converters have now been sorted into their six generations and by a rough count over 800 different topologies currently exist with more being developed each year Advanced DC DC Converters Second Edition offers a concise practical presentation of DC DC converters summarizes the spectrum of conversion technologies and presents new ideas and more than 200 new topologies Beginning with background material on DC DC conversion the book later discusses both voltage lift and super lift converters It then proceeds through each generation including the groundbreaking sixth generation converters developed by the authors that can be cascaded for high voltage transfer gain This new edition updates every chapter and offers three new chapters The introduction of the super lift technique is an outstanding achievement in DC DC conversion technology and the ultra lift technique and hybrid split capacitor inductor applied in Super Lift Luo Converters are introduced in Chapters 7 and 8 In Chapter 9 the authors have theoretically defined a new concept Energy Factor EF researched the relations between EF and the mathematical modelling for power DC DC converters and demonstrated the modeling method for two converters More than 320 figures 60 tables and 500 formulae allow the reader to more easily grasp the overall structure of advanced DC DC converters provide fast access to precise data and help them to quickly determine the values of their own circuit components

Fuel Cells Bei Gou,Woonki Na,Bill Diong,2016-08-05 This book describes advanced research results on Modeling and Control designs for Fuel Cells and their hybrid energy systems Filled with simulation examples and test results it provides detailed discussions on Fuel Cell Modeling Analysis and Nonlinear control Beginning with an introduction to Fuel Cells and Fuel Cell Power Systems as well as the fundamentals of Fuel Cell Systems and their components it then presents the Linear and Nonlinear modeling of Fuel Cell Dynamics Typical approaches of Linear and Nonlinear Modeling and Control Design methods for Fuel Cells are also discussed The authors explore the Simulink implementation of Fuel Cells including the modeling of PEM Fuel Cells and Control Designs They cover the applications of Fuel cells in vehicles utility power systems and stand alone systems which integrate Fuel Cells Wind Power and Solar Power Mathematical preliminaries on Linear and Nonlinear Control are provided in an appendix

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