

ELECTRICAL

MACHINE ANALYSIS

USING FINITE ELEMENTS



NICOLA BIANCHI

Nicola Electrical Machine Analysis Using Finite Elements

RJ Alexander



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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 **Design and**

Control of Grid-Connected Photovoltaic System Ahteshamul Haque, Mohammed Ali Khan, V S Kurukuru, 2023-04-28 The current model for electricity generation and distribution is dominated by centralized power plants which are typically associated with combustion coal oil and natural gas or nuclear generation units These power models require distribution from the center to outlying consumers and have many disadvantages concerning the electric utilities transmission and distribution and greenhouse gas emissions This resulted in the modelling and development of cleaner renewable power generation with alternative sources such as photovoltaic PV wind and other sources Further due to matured PV technology constant drop in installation cost greenhouse emissions reductions energy efficiency reduced transmission and distribution investments minimization of electric losses and network support the development of PV systems is proliferating In view of this development this book provides an idea for setting up the PV plant from initial study of the site to plan sizing Once the first planning is covered the book focuses on the modeling aspects of power electronics converter and control elements associated with it keeping the operating standards specified for the development of distributed generation systems in check This book will be useful for industrial professionals and researchers who are working toward modeling of PV plants and their control in grid connected operation All the necessary information related to these fields is available in the book Electric Energy Mohamed A. El-Sharkawi, 2008-08-05 The ongoing search for renewable energy the societal impact of blackouts the environmental impact of generating electricity along with the new ABET criterion have contributed to renewed interest in electric energy as a core subject Emphasizing modeling analysis and real world issues this new edition of Electric Energy

provides a refreshed overview of this increasingly important field New in the Second Edition Expanded coverage of the mathematical modeling of renewable systems power electronics and electric safety A chapter on power quality An expanded chapter on machines that includes dc machines and single phase motors A chapter on future power systems Along with the standard topics of power electronics and electromechanical conversion the text also covers energy resources power plants environmental impacts of power generation power system operation renewable energy and electrical safety Most of the topics are related to issues encountered daily in practice and most of the examples are from real systems and use real data With a flexible structure and exceptional relevance to real life issues Electric Energy Second Edition brings together all the topics needed to build the broad based background today s engineers need [SPICE and LTspice for Power Electronics and Electric Power](#) Muhammad H. Rashid,2024-11-13 Power electronics can be a difficult course for students to understand and for professional professors to teach simplifying the process for both LTspice for power electronics and electrical power edition illustrates methods of integrating industry standard LTspice software for design verification and as a theoretical laboratory bench Helpful LTspice software and Program Files Available for Download Based on the author Muhammad H Rashid s considerable experience merging design content and SPICE into a power electronics course this vastly improved and updated edition focuses on helping readers integrate the LTspice simulator with a minimum amount of time and effort Giving users a better understanding of the operation of a power electronic circuit the author explores the transient behavior of current and voltage waveforms for every circuit element at every stage The book also includes examples of common types of power converters as well as circuits with linear and nonlinear inductors New in this edition Changes to run on OrCAD SPICE or LTspice IV or higher Students learning outcomes SLOs listed at the start of each chapter Abstracts of chapters List the input side and output side performance parameters of the converters The characteristics of power semiconductors diodes BJTs MOSFETs and IGBTs Generating PWM and sinusoidal PWM gating signals Evaluating the power efficiency of converters Monte Carlo analysis of converters Worst case analysis of converters Nonlinear transformer model Evaluate user defined electrical quantities MEASURE This book demonstrates techniques for executing power conversion and ensuring the quality of output waveform rather than the accurate modeling of power semiconductor devices This approach benefits students enabling them to compare classroom results obtained with simple switch models of devices **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

Alternative Energy Systems M. Godoy Simões, Felix A. Farret, 2008 Durable and cost effective induction power generators have undergone numerous improvements that make them an increasingly attractive option for renewable energy applications particularly for wind and hydropower generation systems From fundamental concepts to the latest technologies Alternative Energy Systems Design and Analysis with Induction Generators Second Edition provides detailed and accurate coverage of all aspects related to the design operation and overall analysis of such systems Placing a greater emphasis on providing clear precise and succinct explanations this second edition features new revised and updated content as well as figures tables equations and examples Each chapter introduces a multi step chapter length problem relating the material to a real application The solution appears at the end of the chapter along with additional practice problems and references

New Material in This Edition Updated definitions for generated power and efficiency Technological advances such as new applications using doubly fed induction generators New methodologies such as the magnetization curve representation for induction generators Additional focus on renewable energy applications such as sea wind and hydropower systems Alternative Energy Systems provides the tools and expertise for advanced students and professionals in electrical mechanical civil and environmental engineering involved in the development of power plants

The British National Bibliography Arthur James Wells, 2006

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 Proceedings Nicola Sacchetti, Maurizio Spadoni, Stanislao Stipcich, 1975 **Annual Report** University of Wisconsin--Madison. College of Engineering, 2002 *International Aerospace Abstracts*, 1997 Forthcoming Books Rose Arny, 2001-06 Finite Element Analysis Of Electrical Machines Sheppard Joel Salon, 2006-10-01 Computer Literature Bibliography: 1946-1963 W. W. Youden, 1965 Physics Briefs, 1988 **INIS Atomindex**, 1979 Government Reports Announcements & Index, 1995 **Index to IEEE Publications** Institute of Electrical and Electronics Engineers, 1994 *Finite Element Methods in Electrical Power Engineering* A. B. J. Reece, T. W. Preston, 2000 This book is designed to give the theoretical foundation needed by the new user of finite elements in electrical power engineering and shows how the equipment designer can benefit from finite element analysis It is divided into three parts theory modelling and application of the finite element method The first part outlines relevant electromagnetics including treatment of boundaries saturation and permanent magnets It also shows how the finite element equations can be formulated The presentation throughout is aimed at giving the reader a physical understanding of the process The second part deals with special aspects of finite element modelling of engineering problems including problem formulation data generation and post processing and emphasises the importance of engineering judgement The final part is an assembly of real magnetic and electric field problems solved by finite elements including application to turbine generators permanent magnet machines switched reluctance drives induction motors transformers and bushings **Deutsche Nationalbibliografie** Die deutsche Nationalbibliothek, 2008

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