This book is devoted to students, PhD students, postgraduates of electrical engineering, researchers, and scientists dealing with the analysis, design, and optimization of electrical machine properties. The purpose is to present methods used for the analysis of transitions and steady-state conditions. In three chapters the following methods are presented: (1) a method in which the parameter resistances and inductances are calculated on the basis of geometrical dimensions and material properties made in the design process, (2) a method of general theory of electrical machines, in which the transients are investigated in two perpendicular axes, and (3) PEM, which is a mathematical method applied to electrical machines to investigate many of their properties.

In one complete volume, this essential reference presents an in-depth overview of the theoretical principles and techniques which makes it an excellent reference for electrical engineers working in the diagnosis of electrical machines and drives. It also serves as an excellent resource for practicing electrical engineers looking to carry out design, analyses, and development of controlled-speed electrical drives.

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The comprehensive text examines electromagnetic devices, volume 34 in the book series Studies in Applied Electromagnetics and Mechanics is devoted to modeling and simulation, controls, systems testing, measuring, monitoring, diagnosis and advanced software development techniques. It is intended for courses in electrical machinery in which engineering practice is emphasized, this text provides coverage of AC and DC machines and stresses industry requirements and the NEMA standards of professional engineers. Traditional theories and concepts of mechanical force are also discussed.
Matrix Analysis of Electrical Machinery, Second Edition is a 14-chapter edition that covers the systematic analysis of electrical machinery performance. This edition discusses the principles of various mathematical operations and their application to electrical machinery performance calculations. The introductory chapters deal with the matrix representation of algebraic equations and their application to static electrical networks. The following chapters describe the fundamentals of different transformers and rotating machines and present torque analysis in terms of the currents based on the principle of the conservation of energy. A chapter focuses on a number of linear transformation commonly used in machine analysis. This edition also describes the performance of other electrical machines, such as direct current, single-phase and polyphase commutator, and alternating current machines. The concluding chapters cover the analysis of small oscillations and other machine problems. This edition is intended for readers who have some knowledge of or are concurrently studying the physical nature of electrical machinery.


First published in 1938, this book was originally intended to assist electrical engineers by explaining the fundamental principles behind all electrical machinery. The text is illustrated with a number of diagrams to illuminate key points. This book will be of value to anyone with an interest in the history of science education.

Electrical Machines May Be Analysed Utilising One Of The Three Methods Via: Classical Theory, Unified Theory And The Generalised Theory Of Electrical Machines. Generalised Theory May Also Be Regarded As The Matrix Theory Of Electrical Machines Which Requires Only A Knowledge Of The Circuit Equation, Elementary Matrix Algebra And The Principle That The Power Of The System Must Remain Invariant Irrespective Of The Terms In Which It Is Expressed. This Technique Is The Best Approach To Obtain Electrical Machine Performance For Both The Non-Specialist And The Specialist And That The Later Will Find It. A Powerful Tool When He Is Faced With More Complicated Performance Problems. An Attempt Has Been Made In This Volume To Study Most Of The Electrical Machines Normally Covered Undergraduate And Postgraduate Courses Utilising Matrix Analysis. The Book Also Includes Some More Advanced Problems To Indicate The Power And Limitation Of The Method After An Introduction To The Theory. The Same Methodology Has Been Applied To Static Circuits As Illustrations. The Generalised Machines Of First And Second Kind Have Been Introduced And Analysed Followed By The Different Case Studies, Both Static State And Transient Analysis Of Convex Machines Have Been Presented In Both Static And Rotating Reference Frames. The Beauty Of The Matrix Theory Has Been Projected While Developing The Equivalent Circuits Of Different Machines, Using Resolving Field Theory Where Physical Concepts Have Been Extracted From The Mathematical Models Developed Through Matrix Analysis. The Latest Development Of The Theory Via The Development Of State Model Of Different Electrical Machines Has Been Explained Clearly In The Text. These Models May Really Be Utilised For Stability Analysis Using Computers. The Book Has Been Presented In Such A Way That, It Will Be A Textbook For Undergraduate And Postgraduate Students And Also A Reference Book For The Researchers, In The Relevant Area And Practicing Engineers. The Treatment Of The Book May Find Wide Application For The Practising Engineers Who Face Day-To-Day Problems In The Practical Field Since The Theory Is Based On Elementary Knowledge Of Matrix Algebra And Circuit Theory Rather Than Complicated Physical Laws And Hypotheses.

The book on The General Theory of Electrical Machines, by B. Adkins, which was published in 1957, has been well received, as a manual containing the theories on which practical methods of calculating machine performance can be based, and as a test-book for advanced students. Since 1957, many important developments have taken place in the practical application of electrical machinery. The most important单步 in the development has been the increasing availability of the digital computer, which was only beginning to be used in the solution of machine and power system problems in 1957. Since most of the recent development, particularly that with which the authors have been concerned, has related to a.c. machines, this present book, which is in other aspects an up-to-date version of the earlier book, deals primarily with a.c. machines. The second chapter on the primitive machine does deal to some extent with the d.c. machine; because the cross-field d.c. generator serves as an introduction to the two-axis theory and can be used to provide a simple explanation of some of the mathematical methods. The equations also apply directly to a.c. commutator machines. The use of the word “general” in the title has been criticised. It was never intended to imply that the treatment was comprehensive in the sense that every possible type of machine and problem was treated. What was intended, however, was to state what the theory can do and what it cannot do. This book is devoted to students, PhD students, postgraduates of electrical engineering, researchers, and scientists dealing with the analysis, design, and optimization of electrical machine properties. The purpose is to present methods used for the analysis of transients and steady-state conditions. In those chapters the following methods are presented: (1) a method in which the parameters (resistances and inductances) are calculated on the basis of geometrical dimensions and material properties made in the design process; (2) a method of general theory of electrical machines, in which the transients are investigated in two perpendicular axes, and (3) a method, which is a mathematical method applied to electrical machines to investigate many of their properties.

Matrix Analysis of Electrical Machinery introduces you to both the modeling and control of electric machines. The direct current (DC) machine and the alternating current (AC) machine configuration (induction, PM synchronous, and BLDC) are all covered in detail. The author emphasizes control techniques used for high-performance applications, specifically those that require both rapid and precise control of position, speed, or torque. You’ll discover how to derive mathematical models of the machines, and how the resulting models can be used to design control algorithms that achieve high performance. Graduates studying power control and control as well as practicing engineers in industry will find this a highly readable text on the operation, modeling, and control of electric machines. An Instructor’s Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department. An Instructor Support FTP site is also available.

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromechanical machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems and neural networks, fuzzy systems, and evolutionary engineering tools in a historical manner that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the Wiley journal of the same name. It discusses the performance of other electrical machines, such as direct current, single-phase and polyphase commutator, and alternating current machines. The concluding chapters cover the analysis of small oscillations and other machine problems. This edition is intended for readers who have some knowledge of or are concurrently studying the physical nature of electrical machinery.